



Biodiversity Challenge Badge

Resource and Activity

Materials



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Table of Contents

Join us to make a difference!	5
Introduction	6
How the resources are organized	7
Age ranges of activities	8
How to use this document	8
Be safe and sound	10
Our Air	11
Introduction	12
Up in the air	14
Biodiversity is linked to a healthy planet	32
Useful resources	49
Our Water	50
Introduction	51
Protect your watershed	52
Think downstream	78
Useful resources	109
Our Land	110
Introduction	111
Biodiversity on the menu	113
Gardening for goods	141
Protect habitats	169
Useful resources	199
Our World	200
Introduction	201
Discover!	202
Be creative!	222
Reach out!	240
Take action!	258
Useful resources	272
Glossary	273
Resources and additional information	277
Join us!	277
Share with us!	277
Take the challenge!	277
Other useful resources	277
Organizing events and activities	279
Find out!	279
Think!	279
Raise your voice!	279
Sponsor and partners	280
Acknowledgements	281

Join us to make a difference!

The Food and Agriculture Organization of the United Nations (FAO), the World Association of Girl Guides and Girl Scouts (WAGGGS) and the Youth and United Nations Global Alliance (YUNGA) have joined forces to encourage children and youth around the world to become aware of the issues that affect all human beings everywhere. Young people have the right and the responsibility to be informed and take action. They have the strength and the ideals to make the world a better place for themselves and for future generations.

By providing practical tools we educate children and youth and motivate them to become actively involved in the preservation and improvement of our natural environment and the life it sustains. Young people are responsible citizens capable of taking up the challenge and acting as effective agents of change at a local and international level.

As their leaders and teachers, you can empower them through sharing knowledge and encouraging their participation. If you believe, as we do, that children and youth have an important role to play in addressing and overcoming these and other issues, join us to shape the future leaders of our world.

Our world is changing and it needs your help! It is time for you, the children and youth from all over the world, to use your amazing energy and creativity to assume different challenges to build a future in which humans live in harmony with nature. Many young hands are already working hard to conserve the world's biological diversity, but there is still a long way to go, they need you! Remember, we only have one world, if you start working today, you can make a difference tomorrow!

Introduction

The following resources and activity ideas are designed to support you and your group and to help you educate children and youth about the amazing diversity of life on Earth and its importance. The guide contains simple teaching tools to make learning appealing and fun, and provides a selection of activities and exercises to carry out individually or in a group. The guide can be used to achieve the *Biodiversity Change Challenge Badge* or can be used separately.

The materials we propose seek to ensure that young people consider the environmental, economic and social impacts of their actions and decisions in the local and global community. By using the guide you will help them understand that all members of society have the right to live in and enjoy a healthy and safe world where they can ensure their well-being and happiness. Although these activities teach specific skills and knowledge, their broader intent is to stimulate thought and discussion about the issues that affect our world today, and its consequences for the future.

Other materials

This guide complements the *Biodiversity Change Challenge Badge* activity booklet. Other support material includes *The Youth Guide to Biodiversity*. For details on these documents and other resources please contact the YUNGA Secretariat or register to our newsletter to receive information on new developments automatically by sending an e-mail to:

children-youth@fao.org or yunga@fao.org



Help your group take up the challenge, use these materials to motivate them to learn and act - they have a lot to say about the issues that are affecting everyone on Earth and possess unique insights into solving problems in their communities. Children and youth have a loud voice, so encourage them to raise it and tell the world they are here to stay and make a change!

How the resources are organized

The resource and activities have been organized in the same order as in the *Biodiversity Challenge Badge*. It is divided into four categories:

Our Air: this category contains activities to help young people know and appreciate the species that live in the air and realize how individual actions can affect, positively or negatively, our air and, in consequence, the nature around us.

Our Water: this category contains activities to help young people know and appreciate the species and ecosystems that depend on water and be aware of the consequences of human activities that affect our water and, in consequence, water-related biodiversity.

Our Land: this category contains activities to help young people know and appreciate the land-based species and ecosystems of our world, learn about the many uses humans have for biodiversity and, in consequence, how these affect different aspects of our land.

Our World: this category contains activities to help young people know and appreciate the different components of biodiversity, to encourage them to learn about the threats that our environment is facing and, in consequence, to take action to ensure that the use of our natural resources is done sustainably.

Each activity of this guide contains:

<i>Aim</i>	A statement of the knowledge the activity wishes to transfer.
<i>Materials</i>	A list of the materials needed for the activity.
<i>Time</i>	The amount of time needed to carry out the activity.
<i>Background</i>	Some activities contain useful information that provides an overview to the focus of the activity.
<i>How to do it</i>	A clear explanation of the steps needed to develop the activity.
<i>Discussion</i>	Useful questions for you to use when discussing about the issues that are being considered.

More resources

Links to other resources are provided at the end of each category, to help you obtain useful information for you and your group and, of course, to get you moving!

Age ranges of activities

To help you and your group select the most appropriate activity, a coding system is provided to indicate the age group that the activity is most suitable for. Next to each activity you will see a code, for example “Level 1 and 2”, which indicates the activity should be suitable for five to ten years old and eleven to fifteen years old.

Please note that this coding is only indicative. You may well find that some activities at other levels are more suitable for your group or particular individual.

Level 1 FIVE TO TEN years old

Level 2 ELEVEN TO FIFTEEN years old

Level 3 SIXTEEN TO TWENTY years old

How to use this document

Step 1

Activities are provided for each category: “Our Air”, “Our Water”, “Our Land” and “Our World”. Use the activities you think will work best with your group, according to your possibilities, needs and interests. The activities listed are just ideas, so we encourage you to be creative and modify them or come up with new ideas. Most of all, think of ways to make the activities lively and fun, for example through songs, games, plays, concerts, painting, photography, posters, collages, poems, quizzes, essays, fairs, conferences, workshops and many more. Some activities can be done individually, and others in small groups.

You can contact others to join the discussions. Invite families and the community to contribute to and participate in your activities. You can also invite media representatives to help you publicize your event and promote public awareness.

Step 2

Support and guide your group while they carry out each activity. Allow enough time for the children and young people to prepare adequately. Encourage them to think and act creatively when undertaking their activities.

Step 3

Encourage a discussion. Providing an opportunity for questioning is a good way to promote a deeper understanding about a topic and develop thinking skills (see the “How to make good questions” box on page 9). Moreover, this will lead them to reflect of ways in which they can take action in their lives and their communities. Let your group discuss different points of view and come up with possible solutions. You can finish by reaching some general conclusions.

Step 4

At the end of the activity allow enough time for a feedback; see what individuals thought of the activity and what they have learned. Will this motivate them to make changes in their daily lives? See if they are

interested in doing another activity, maybe they want to carry out an initiative in their school or local community. You can introduce them to the *Biodiversity Challenge Badge*; see if they are interested in facing the challenge and getting the badge.

Step 5

Share with FAO and WAGGGS! Send us your stories, photos, drawings, ideas and suggestions to: children-youth@fao.org.

How to make good questions

Avoid questions that can be answered by “yes” or “no”. Let the participants know that you want them to reflect about a specific topic. Remind them every idea is important. Encourage them to ask questions.

Remember you don’t have all the answers. Let the participants discuss possible answers and come up with creative solutions. Answer a question with another question. This helps the participants to think further and draw conclusions.

Sample questions:

- What would happen if...?
- What did you notice about...?
- What are some possible explanations of...?
- What is the role of...?
- How do you think you/them would feel about...?
- If you were ... what would you do?
- What would you have done differently?
- What are the advantages and disadvantages of...?
- What can this teach us about...?
- Can you describe several things we can do to...?
- Would everyone agree with...? Why or why not?
- Can you name some good examples of...?
- What changes can you make to...?

Be safe and sound

Exploring the natural world is a fantastic way to learn about nature; however it is important to take some precautions to ensure nobody gets hurt. Remind your group of the following guidelines described in *Eco-fun: great projects, experiments and games for a greener Earth* by David Suzuki and Kathy Vanderlinden.

Protect yourself

- Be careful when using sharp objects and electrical appliances. Young children should seek the help of an adult.
- Don't look directly at the sun.
- Don't taste things you find unless you are certain they are not poisonous.
- Wear gardening or rubber gloves when handling soil.
- Wash your hands after finishing an activity.
- In some activities, you have the option of uploading pictures or videos to the internet on websites such as YouTube. Always make sure you have the permission of everyone in the pictures or video, and their parents, before you post anything online.

Protect the natural world

- Treat nature with respect.
- Be careful with the animals you work with; wear protection if necessary.
- Be gentle. Make sure they have appropriate food, water and air. When you're done, put them back where you found them.
- Never pick protected species. Before collecting plants or picking flowers, get permission. Only take what you need and make sure you leave at least one third of anything you find in the wild. If possible it is best to not pick anything and to leave everything as you found it.
- When you do activities, especially the outdoor ones, make sure you leave no trace.
- As much as possible, recycle or reuse the materials used in the activities.



Our Air

Introduction

Air is a gas that has no colour, smell or taste. Even if we cannot see air, we can be sure it is all around us! Air is important for almost all living things on Earth. Humans and animals need to breathe air to get the oxygen they need to survive, and plants need gasses from air to do photosynthesis. There wouldn't be life without air. So, what is air made up of?

The layer of air that surrounds our world is called the **atmosphere**. The air in our **atmosphere** is primarily made up of two elements, nitrogen (about 78 percent) and oxygen (about 21 percent). The remaining less than 1 percent is made up of different gases, but in very small quantities. We can also find suspended dust, spores, bacteria and water in air.

But, how clean is the air we breathe? Some days the air seems to be clean and fresh. Clean air is air that has no harmful levels of pollutants (such as dirt and chemicals) in it. Clean air is good for people to breathe. A clean **environment** is especially important for young people, who are particularly vulnerable to diseases as their bodies are not fully developed yet. However, other days the air seems to be dirty and it can feel heavy and may have a bad smell. When too much dirt or too many chemicals get into the air, we say our air is polluted. Polluted air is not good for people to breathe.

Air pollutants include smoke, carbon monoxide, nitrogen oxides, sulphur dioxide, particulates and ozone. Air pollutants can have natural and human sources. Natural sources include volcanoes, wildfires, airborne dust, cattle digesting grass and natural radioactive decay. However, most pollution is the result of human activity. The biggest causes are the operation of fossil fuel-burning power plants and automobiles that combust fuel. The burning of **fossil fuels**, like coal, oil and natural gas, at an extraordinary scale is leading to global warming and **climate change**.

Air pollution can act in many different ways and have many negative effects on our world. **Biodiversity** on our planet is decreasing as a result of human activities. Although air pollution is not the main cause of this, certain types of **ecosystems** are particularly vulnerable and can be affected by it. One of the most serious aspects of air pollution is that its effects reach everywhere. Scientists have discovered that some gases, for instance, are directly toxic and, furthermore, a number of **ecosystems** have been identified as especially sensitive to changes in the temperature of the **atmosphere**. Moreover, they agree that the average global temperature does not need to rise that much to pose the threat of **extinction** for many **species** as their **habitats** are being changed or destroyed.

Biodiversity supports many basic natural services for humans. **Biodiversity** cleans the air we breathe. Plants absorb **greenhouse gases** and help stop global warming. So, by conserving biological diversity now, we give future generations the option to value and benefit from it too. Moreover, we can find many flying **species** in our world. Large or small, colourful or not, the Earth is home to a great diversity of animals that routinely use flight in some form or another. Animals like birds, bats and insects have wings to fly and to survive. Wings come in an amazing variety of sizes, shapes and appearance, especially in the case of insects, which help them to move through the air and go from one place to another.

Air pollution can make people's eyes burn, their throats itch and their chests feel tight. Dirty air can make it harder for the plants we eat to grow and it can affect the health and development of our animals. Therefore, it is very important to acquire a good understanding of how air pollution affects the **environment**

and our health and ways in which we can prevent it. The activities below will help you have a good start; these were developed to allow children and youth to learn about some **species** that live in the air and to help them realize how individual actions can affect, positively or negatively, our air and, in consequence, the nature around us. Every small change makes a difference!

Note

For more information on Biodiversity and all the issues related to it see *The Youth Guide to Biodiversity* for young people. You can register at: children-youth@fao.org to be informed when the guide will be available.

Up in the air

Did you say air?

Level 1 2 3

Aim

To realize air is precious everywhere.

Materials

The game word below.

Time

30 minutes.

Background

There are almost 200 countries in our world. People living in them have different traditions, different food preferences and might look different, but one thing is true, the word air is precious in any language as clean air is vital for any living being.

How to do it

1. Start by asking your group to tell you how you say air in your language and then ask them to find the word air in other languages using the table provided below.
2. Ask your group to match the language with the correct word for air.
3. See who got most answers right!

Answers: Spanish: aire, Italian: aria, French: air, German: luft, Hindi: hava, Portuguese: ar, Chinese: kong qi, Japanese: kuki, Russian: Vozduha, Afrikaans: lug.

Discussion

Had you heard the word air in other language? Which one?
Why is air precious for all of us?
Would there be life without air?

Match the language with the correct word for AIR!

Spanish	Kong qi
Italian	Kuki
French	Ar
German	Vozduha
Hindi	Aria
Portuguese	Aire
Chinese	Lug
Japanese	Luft
Russian	Air
Afrikaans	Hava

Imitate the Wind!

Level 1 2

Aim

To see how air affects all the things around it.

Materials

Jar of soap bubbles, piece of cardboard, an outdoor setting, a breezy day.

Time

30 minutes.

Background

Wind is moving air. Warm air naturally rises and colder air sweeps in to take its place. This action produces wind, and wind affects all the things around it. Just take some time to watch!

How to do it

1. Take your group to an outdoor setting and ask them which way the wind is blowing.
2. Test the answer by blowing some bubbles into the air. Challenge the participants to run like the wind to pop all the bubbles before they float away. Ask your group to turn around to face into the wind. Are there any clouds, rain or blue sky in that direction? Whatever **weather** you see, the wind will probably bring it your way soon.
3. Explain to your group that your breath can act the way the wind does. Divide your group in couples and ask them to team up to keep a soap bubble in the air as long as possible. Tell them to blow soft and hard, and to fan the bubble with their hands or a piece of cardboard.
4. Then, take some time to watch how the wind blows everything, from trees and dead leaves to paper and clothing, and so on.
5. To finish, you can ask each participant to create a dance imitating the different objects in the wind.

Discussion

What things that have been created by humans use wind?
How does wind affect the things you see around yourself?
How does wind help the **environment** and its living creatures?

Source: National Wildlife Federation, Your Big Backyard, Fun, Outdoors, Outdoor Fun, Blowing in the Wind, www.nwf.org/Kids/Your-Big-Backyard/Fun/Outdoors/Outdoor-Fun/Blowing-In-The-Wind.aspx

Is it hot or cold?

Level 1 2 3

Aim

To learn about our air temperature.

Materials

Outdoor thermometer, paper, pencils, temperature chart.

Time

Two 30 minutes lessons (one at the beginning and one at the end of the activity), three 10 minutes lessons (to check the temperature every day).

Background

One of the most common things about the **weather** that people measure is air temperature, that means how hot or cold the day is. To measure air temperature people use a thermometer, this can help them to know what to wear before leaving their homes.

How to do it

1. Hang your thermometer outside, in a place where it is not too sunny or too shady.
2. Explain to your group that you are going to measure air temperature during one week. As the air temperature changes with the time of the day, you must check the temperature three times a day, for example once in the morning, once at midday and once in the afternoon before going home.

- Use the chart provided below to register the air's temperature, make a small circle on the chart so it lines up with the time of the day and what the temperature is. After marking the last temperature of the day, join all the circles together to have a clearer view of the temperature variation during the day. You will need five charts, one for each day of the week.
- The last day, review and analyze your findings with your group.

Discussion

Which was the highest temperature? What time was it?
 Which was the lowest temperature? What time was it?
 What are the benefits of measuring air temperature? For people? For businesses?

Source: Ecokids Canada, Teachers, Resources, Activities, Measuring Air Temperature, www.ecokids.ca/pub/teachers/resources/activities/temp.pdf

Temperature Chart

Temperature	Today's date:		Today's high:		Today's low:	
	30° C					
	25° C					
	20° C					
	15° C					
	10° C					
	5° C					
	0° C					
	-5° C					
	-10° C					
	-15° C					
	-20° C					
	-25° C					
		8 a.m.	10 a.m.	12 p.m.	2 p.m.	4 p.m.
	Time of the day					

Here Comes the Wind!

Level 1 2

Aim

To have fun with leaves and the wind.

Materials

Newspaper, adhesive tape, scissors, long socks or stockings, leaves (to be collected).

Time

30 minutes.

Background

Wind can be defined as air in motion. So, when wind starts moving, it can blow off many different things. Slow winds usually carry light things like dirt, leaves, flowers or feathers, but there are also high winds that can become dangerous as they reach fast speeds and they can carry all sorts of debris. In extreme cases they can cause damage to people and their properties.

How to do it

- Tell the children that you are going to play a game about the wind and how it blows off different things, in this case, leaves!
- Have each children make a paper hat using a newspaper.

3. Take your group to an outdoor setting where they can find some leaves and ask each one to stick a leaf on their hats. Each participant should wear its hat.
4. Give each participant a long sock or socking with some balls of newspaper inside the toe to make it heavier.
5. Explain to your group that they must knock each other's hats off using their newspaper bat; they must yell "Here comes the wind!" before trying to knock a hat.
6. The last player still wearing the hat wins the game! Watch out for eyes and noses!

Discussion

What things has the wind brought to your home?
 What do you think are the benefits of wind for humans and animals?
 Have you heard about dangerous winds that have caused damage?

Flying Animals Month!

Level 1 2

Aim

To learn about flying animals around the world.

Materials

Information cards provided below, research material (optional).

Time

Five 1 hour lessons, one lesson per week.

Background

Large or small, colourful or not, our world is home to a great diversity of animals that routinely use flight in some form or another, parachuting, gliding and powered flight, for example.

Animals like birds, bats and insects have wings to fly and to survive. Wings come in an amazing variety of sizes, shapes and appearance, especially in the case of insects, which help them to move through the air and go from one place to another.

How to do it

1. Start the activity by asking the children how they would feel if they could fly through the skies. It would sure be pretty awesome! Remind the children that many different animals living in different **habitats** around the world have this ability.
2. Explain to them that you are having a *Flying Animals Month*, when they will learn about five different animals that can fly. Choose an animal for each week of the month and help children learn about them using the information cards provided below.
3. Ask the children to imagine how these animals might look; you can have them make some cool drawings following their descriptions.
4. You can also encourage children to investigate more about these animals, to think about the **species'** relationship to its **habitat** and to other **species** and to determine the possible threats they might face.

Discussion

Can you name other flying animals you have seen?
 What do you think are the benefits that animals like birds, bats and insects obtain from their ability to fly?
 What can you do to help preserve these animals in your community?

Dark Pincertail

Size Length: 45 -50 mm
Hindwing: 31 – 34 mm

This insect is commonly known as the emerald dragonfly and was recently found around the borders between Bulgaria, Greece and the European Turkey. It has large emerald green eyes, a metallic green thorax and a dark green abdomen. At the base of the abdomen it also has wide yellow spots.

Andean Condor

Size Length: 100 - 130 cm
Wingspan: up to 320 cm

This is one of the largest flying birds in the world and it ranges across the Andes Mountains in South America. These birds have a glossy black plumage with a white ruff around the neck and bare skin on the head. They have large feet with powerful claws and hooked beaks to easily eat their scavenged prey.

Gouldian Finch

Size Length: 11.5 - 12.5 cm

This bird is extremely attractive and colorful and it is found only in Australia. It has a green upper body, a pale blue rump, a purple breast and a bright yellow belly. Their heads can be black, red or yellow. This bird has two long, elegant tail feathers. Females are less colored than males.

Heath fritillary

Size Wingspan: 3.4 - 4.6 cm

This is one of the rarest butterflies widespread through much of Europe reaching into Asia, but it suffered a serious decline in the 20th century. This butterfly is light orange-brown with brown markings and a number of white spots along the wing edges. The caterpillar grows up to 2.4 cm in length and has a black body with whitish spots and spines.

Brown tube-nosed bat

Size Head-body length: 32 – 42 mm
Forearm length: 25 – 32 mm

This tiny bat has a particular, simple nose with tube-shaped nostrils and it is found in Malaysia, Borneo, Indonesia, Nias Island, Peleng Island and New Guinea. It has a fuzzy brown fur, tending to grey on the sides and belly. As all bats, it has wings formed from a double membrane. Its ears are small and its teeth are very sharp.

Source: Arkive, www.arkive.org/species/

Let's Feed and Watch!

Level 1 2

Aim

To make a bird feeder and to identify the birds using it.

Materials

- Paper, pencils.
- For the bird mix: ½ cup lard or suet, 1 cup birdseed, ½ cup peanut butter, 2-3 cups cornmeal, ½ cup dried fruit (such as raisins or currants).

Time

One 30 minutes lesson (to make the bird feeder) and five 10-20 minutes lessons to watch the birds.

Background

Feeding and watching birds is enjoyed all around the world. All birds need water and shelter, but they all have different needs regarding food. Some of the foods that birds enjoy include berries, fruits, nuts, seeds, flower nectar, buds of trees and shrubs, insects, worms, fish and small animals, among others. Some birds even scavenge dead animals.

A great way to attract birds to your garden is by having bird feeders, and of course you will give them a great help especially through winter when they have a harder time finding the food they like. Also, one thing that birds cannot resist is water, so you can also have a shallow birdbath that they can splash in and drink from.

How to do it

1. Start by making your bird feeder. To make the bird mix, melt the lard and the peanut butter together. Stir in the seeds, the fruits and enough cornmeal to soak up the melted lard. Let it cool. Spread the mix under the scales of pine cones or onto cardboard cut-out ornaments. Chill feeders in refrigerator to harden the mixture.
1. Next, locate the bird feeder where you can see it well enough from a window to identify the birds using it without troubling them.
2. Ask the children to use their notebook to record all the kinds of birds you see, the duration of their visit and the amount of food they eat, and relate these to the **weather** conditions. You should repeat this activity for at least a week; remember to keep consistent patterns of monitoring times.
3. Discuss with your group about your findings.

Discussion

How do birds find their food?

Why do different types of birds like different types of food?

How can **weather** conditions affect food supply?

Sticky Leaves!

Level 1 2 3

Aim

To identify air pollution.

Materials

An outdoor setting, clear adhesive tape, scissors, white paper, leaves (to be collected).

Time

40 minutes.

Background

An air pollutant is any unwanted substance or chemical that contaminates the air we breathe, resulting in a decline of air quality. Air pollutants include smoke, carbon monoxide, nitrogen oxides, sulphur dioxide, particulates and ozone. Air pollutants have sources that are both natural and human. Natural sources include volcanoes, wildfires, airborne dust, cattle digesting grass and natural radioactive decay. Although some pollution comes from natural sources, most pollution is the result of human activity. The biggest causes are the operation of fossil fuel-burning power plants and automobiles that combust fuel.

Most of the main air pollutants can be harmful to human health. Air pollution is frequently associated with respiratory problems. It can make people sick or cause long-term illness, particularly in those most sensitive to pollution, such as children and the elderly. There are three ways in which animals can be affected by air pollution. They can breathe in gases or small particles, eat particles in food or water, or absorb gases through their skin. Soft-bodied invertebrates, such as earthworms or animals with thin, moist skin such as frogs, are particularly affected by absorbing pollution.

How to do it

1. Take your group to an outdoor setting with trees and shrubs. The activity can be done

at more than one location. If this is the case, choose areas that differ in their proximity to roads, factories, or other sources of air pollution. The areas will need trees or bushes in leaf but the leaves should not be near the ground. One important point to note is that smooth surfaced leaves give better results than hairy leaves.

2. Give the participants five minutes to explore their surroundings. They can explore in small groups or individually. Ask them to discover all the different things that make up the **environment** around them.
3. Gather the group together and discuss their discoveries. They should have noticed living things such as trees, plants and animals, as well as inanimate objects like soil, rocks and water. How are all these things connected? Who eats who? Where do the animals live? What do the trees and plants need to survive? They should discover that the **environment** is all linked together. Ask them if there is anything else that is vital to this **environment** that we can't see. The answer is air.
4. Have the participants sit down and ask them to spend one or two minutes breathing in the air and thinking about it. They should take really deep breaths and try to fill their lungs. At the end of the allotted time ask them to describe the air around them. Does it taste of anything? Does it smell of anything? Can they see it? What is in air?
5. Introduce the sticky leaves activity. Our air contains 21 percent oxygen, 72 percent nitrogen, approximately 7 percent **carbon dioxide** and approximately 1 percent other gases including pollutants. The majority of the gases and particles that make up our air, including the oxygen, nitrogen and **carbon dioxide**, are colourless, odorless and tasteless. However, some of the pollutants are in particles big enough to be visible to the naked eye. This activity enables these particles to be collected.
6. Ask the participants where they think air pollutants might come from (some sources are cars, fossil fuel-burning power plants, volcanoes, fires, dust). Ask them about their current location. What sources of air pollution are nearby?
7. Split your group into small teams and give each one some white paper, scissors and some sticky tape. Depending on the size or other characteristics of your natural area and the size of your group, you can allocate each group their own area or **vegetation** type or you can allow them to decide themselves where to sample.
8. Tell the participants to cut a piece of sticky tape and press it firmly, sticky side down, onto a leaf. They must then carefully remove the tape and stick it onto a piece of white paper. Each group should do this at least ten times in order to get a representative sample. Remind them to write down or draw the location where they took the sample.
9. Ask the participants to make a list of all the different things in your local area that contribute to air pollution.
10. Gather the participants together and compare the results. If you have access to a magnifying glass or microscope, look closely at the samples. Rank the different samples in order of how dirty they are.

Discussion

Where were the dirtiest samples taken from? Where were the cleanest samples taken from? Is there a pattern, if so why?

Where is the pollution coming from?

Think about the damage the pollution in the air might be doing. How might it affect the plants? How might it affect human health? How might it affect animals? Bear in mind that this is only the pollution that is visible. A lot of pollution is not visible to the naked eye.

Source: World Organization for the Scout Movement, Environment Programme,
www.scout.org/en/about_scouting/the_youth_programme/environment/environment_programme/activities

Story Time!

Level 2 3

Aim

To reflect about air pollution.

Materials

Paper, pencils.

Time

2 hours.

Background

Many of our everyday activities contribute to air pollution. Outdoor air pollution from industries and transportation reduces the quality of the air in which all living beings breathe; while indoor air pollution, which usually comes from cooking and heating with coal and wood without proper ventilation, leads to serious infections and respiratory diseases.

The air in a city smells different from air in the country, this happens because the majority of human activities which give off fumes or gases that pollute the air are developed inside our cities. These gases can be very dangerous, especially for children; if we breathe dirty air we are more likely to develop health problems and become ill.

How to do it

1. Tell your group that you are organizing a story writing contest; explain to them that they must create a story about any non-living object that decides to travel to the city with the wind, such as a leaf, a feather, a flower, a bag, a balloon, etc.
2. Encourage the participants to be creative and remind them that the story should help children to understand air pollution and the need to decrease it.
3. Explain to your group that the winning story will be chosen by a group of teachers or youth leaders and that the winner will have the chance to read it to the entire school or youth group. You can even send the winning story to a local newspaper, so it can be published.

Discussion

How does air pollution affect human beings?
How does air pollution affect plants and animals?
How can air pollution affect non-living objects?
Who is responsible for fighting against air pollution?

Counting Traffic

Level 1 2 3

Aim

To learn how cars contribute to air pollution.

Materials

A street where children can count traffic.

Time

Two 20 minutes lessons (one in the morning and one in the afternoon).

Background

The combustion of **fossil fuels** causes most of the air pollution we see in our cities every day. These combustion fuels come mainly from car engines and power stations in the form of different gases such as carbon monoxide, **carbon dioxide**, nitrogen oxides, hydrocarbons and dirty particles. This situation is made worse by the high traffic levels we experience as more and more cars are found on the roads. Car exhausts severely affect air quality and, therefore, our health. The contamination of the air we breathe can cause serious respiratory difficulties for some people, especially young children and old people.

Some of these gases make smog, a combination of smoke and fog. Smog is also a type of air pollution derived from car emissions and it is a big problem in many cities around the world. Smog continues to harm our health as it causes shortness of breath and coughing, as well as eye, nose, throat and lungs irritation. But all this air pollution does not only affect human beings, it also affects all natural **environments**. Some gases are toxic and can make living conditions difficult for many **species**, so it is time to start thinking about our planet!

How to do it

1. Ask each participant how they came to school or youth group today and whether they noticed if the roads were busy during their journey. Many, if not all, will say they used a motorized vehicle.
2. Take your group to a nearby road. Tell them to observe and record the passing traffic over a 5 minute period. Ask them to try to record the number of cars with only 1 person in them.

Make sure you take the necessary safety precautions when you take your group to a nearby street.

If possible, count the traffic at different times of the day, maybe in the morning and before leaving home. Work out an average of how much traffic passes the school or youth group during a day.

3. After discussing about air pollution from cars and other motorized vehicles, ask the participants to think about ways to help avoid air pollution.

Here are some examples:

- Be wise when using a car. Try carpooling with your friends when going to school or youth group. The fewer cars, the better.
- If possible, use public transport like buses or trains.
- Try walking or cycling with your friends to school or youth group. It is good for our air and good for your health.
- Save energy. Switch off lights you don't need them.
- Use energy efficient light bulbs.
- Open the windows instead of using air conditioning and wear an extra sweater instead of turning on the heating.

Encourage your group to put these ideas into practice!

Discussion

How do you think communities without access to motorized vehicles transport themselves from one place to another? What do they use?

What would you regard as eco-friendly travel? What other benefits do these forms of transport have?

What ways can you think of that will make car use less damaging to the **environment**?

What else causes air pollution?

Source: Friends of the Earth, Resource, Guides, Lesson Plan, Mad About Air,
www.foe.co.uk/resource/guides/lesson_plan_mad_about_air.pdf

Monsters Need Clean Air Too!

Level 1 2

Aim

To demonstrate that air can be clean or dirty.

Materials

Two covered glass jars, papers, clear tape, colouring pencils, magnifying glasses.

Time

Two 1 hour lessons.

Background

Many of our everyday activities are contributing to air pollution. Outdoor air pollution from industries and transportation reduces the quality of the air in which all living beings breathe; while indoor air pollution, which usually comes from cooking and heating with coal and wood without proper ventilation, leads to serious infections and respiratory diseases.

Air pollutants can be harmful to human health. Air pollution is frequently associated with respiratory problems. It can make people sick or cause long-term illness, particularly in those most sensitive to pollution, such as children and the elderly. There are three ways in which animals can be affected by air pollution. They can breathe in gases or small particles, eat particles in food or water or absorb gases through the skin. Soft-bodied invertebrates, such as earthworms or animals with thin, moist skin such as frogs, are particularly affected by absorbing pollution.

How to do it

1. To start, get the two glass jars and place an object inside one of them, don't put anything into the second jar. Show your group the jars and ask them how many jars have something inside them. The answer is that both jars contain something. The jar that appears to be empty actually contains air. If no participant answers that both jars contain something inside, continue to prompt them so they realize that that they need to look at the jars in a different way. After a participant guesses correctly, or you tell them the answer, discuss how air is all around us even though we can't see it.
2. Ask your group to imagine that a creature that has a breathing problem wants to come and live with them. Explain that they are going to investigate around their homes to find which the best place with the cleanest air for this creature to sleep is.
3. Have each participant draw four air catching monsters, they must be about 10cm tall and have big mouths because they will stick some tape onto this space.
4. Tell your group that they will place the four creatures in and around their house to measure how clean the air is, and find the place with the cleanest air for the creature to sleep, and the area with the dirtiest air so that the creature can avoid going there. Show the participants how the sticky side of the tape should face upwards. Explain to them that the tape will help to measure how clean the air is because the particles in the air will stick to the tape.
5. Tell your group that when they get home, they must hang the little monsters in four different places: one outside of the house, one in the place where they think the air is the cleanest in the house, one where they think the air is the dirtiest in the house and the last one in a place where they usually spend a lot of time.
6. Brainstorm a list of the places inside the house where the air might be the dirtiest. These might include near the stove in the kitchen, near the clothes dryer, close to where a pet sleeps, the garage, near a fireplace, woodstove or a heating vent. Brainstorm a list of the places where the air might be the cleanest.
7. Ask the participants to make predictions about where they think they will find the cleanest and dirtiest air and to share their reasons.
8. Send the group home with their creatures. Explain that they will leave the creatures up for one week. Tell the participants to register in their notebooks the exact place where they hang each monster, they can also write down the place where they hang it at the back of each monster. Tell the participants that when they take the creatures down, they must cover the sticky side of the tape with a clear tape. This will prevent the tape from sticking to other things when they bring it back to school or youth group.
9. After the participants have brought the creatures back to school, have them break into small groups. If possible, give a magnifying glass to each group. Have each group look at their "data" with the magnifying glass and determine where the dirtiest and

the cleanest air are in their houses. After the groups have finished, ask each one to share some of the results with the entire class or youth group.

Discussion

Which is the best place for your monster friend to sleep?
Which is the worst place for your monster friend to sleep?
Was there any common place that had the dirtiest air? How can that affect your monster's health?

Adapted from: Eekoworld, Parents & Teachers, Lesson Plans, Clean Air Detective,
http://pbskids.org/eekoworld/parentteachers/lessons1_1.html

Draw the Problems!

Level 2 3

Aim

To encourage youth to be conscious about air pollution.

Materials

White poster board, paints, markers, colouring pencils.

Time

2 hours.

How to do it

1. Challenge your group to draw a picture illustrating the problems caused by, or contributing to, air pollution in their community. You can stick two or three poster boards on a wall outside the class or meeting room, so others can see and get interested about what your group is doing.
2. Explain to the participants that through their drawings they must raise awareness about the importance of protecting the air we breathe. Tell them they can work individually or in groups and remind them that the important thing is to get their message across.
3. When they are finished, have each participant explain his/her part of the drawing and tell the rest of the group his/her message.

Discussion

How can this type of activity help raise awareness about an important issue?
Why do you think air pollution is such an important topic?
What can you do to prevent air pollution?

Keep the Air Clean Campaign!

Level 1 2 3

Aim

To learn about simple activities that help prevent air pollution.

Materials

Cardboard, markers, colouring pencils.

Time

1 hour.

Background

Energy is what makes things happen. We need it to make an airplane fly, to cook a pizza and to listen to music. We need energy for everything we do and every day we need lots of it. So, we have to get it from somewhere.

There are two different sources of energy:

Non renewable

This is a type of energy that cannot be recreated in a short period of time. This is because

it comes from things that will run out one day, for example, coal, gas and oil. These are called **fossil fuels** because they were formed over millions and millions of years by the action of heat from the Earth's core and pressure from rock and soil on the remains of dead plants and animals.

Renewable

This type of energy can be replenished in a short period of time. That means it comes from things we can use over and over again, for example, sunlight, water, wind, plants or heat from inside the Earth. The methods used for producing this type of energy are often better for the **environment**.

Renewable and non-renewable energy sources can be used to produce electricity. We get most of our electricity from non renewable sources and there is a bad consequence of doing so. The problem is that electricity in your home comes from stations that burn fuels that contribute to air pollution. Using electricity is not wrong; you just have to be smart about it.

How to do it

1. Explain to your group that they are creating a *Keep the Air Clean!* campaign. Remind them that there are many things they can do at home, at school, at camp, or anywhere, to help keep the air clean by using less energy.

Here are some examples:

- Turn the lights off in rooms that are not being used.
- Use energy efficient light bulbs.
- Ask for air conditioning to be turned down and open the windows to let some air in.
- If you need to use batteries, make sure they are rechargeable ones.
- Whenever you can, take the stairs, not the lift, it will help you keep fit.
- A TV set on standby can still use one quarter of the energy it uses when it is on, it is better if you unplug it.
- Unplug your equipment when they are fully charged. Mobile phones or shavers, for example, keep drawing electricity even when the battery is full.
- If your family is buying new household appliances, make sure they are energy efficient ones.
- And don't forget to spread the word to your friends and family!!!

2. Divide the participants into four groups and have each one make a poster with the ideas to reduce energy and prevent air pollution.
3. Hang the posters all around your school or youth group, so everyone can learn how they can help!

Discussion

How can you change your daily routine to use less electricity?

Can you describe some advantages of using less electricity in your daily life?

Why do you think it is important to encourage your family and friends to do the same?

Find Your Way to Wind Energy!

Level 1

Aim

To learn about wind energy.

Materials

A copy of the maze.

Time

20 minutes.

Background

Green electricity refers to power produced from renewable sources that do not harm the **environment**, like water, wind, sun, ground and biomass. This type of energy is called renewable because it can be replenished in a short period of time. That means it comes from things we can use over and over again. The methods used for producing this type of energy are often better for the **environment**.

Green power production technologies have fewer environmental impacts than the use of non renewable energy sources, like the burning of **fossil fuels**, which release a great amount of **greenhouse gases** into the Earth's **atmosphere**.

Wind energy is energy harnessed from the wind. Today, wind energy is mainly used to generate electricity. Wind turbines use blades to collect the wind's energy. The wind flows over the blades, causing them to turn. The blades are connected to a drive shaft that turns an electric generator to produce electricity.

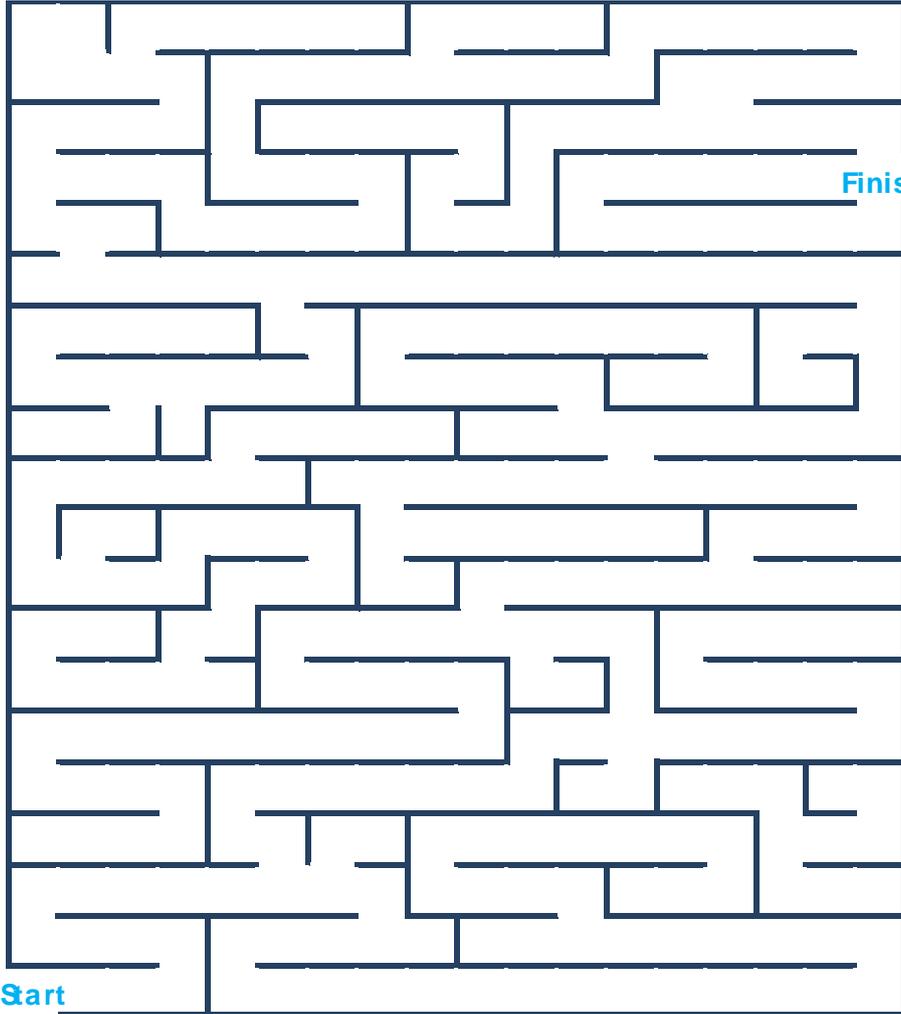
How to do it

1. Give each participant a copy of the maze.
2. Explain to them that using the maze below they have to find their way to a renewable energy source, wind energy!

Discussion

What is the connection between energy and the **environment**?
Why are renewable energy sources important?
What other uses do you think human beings can give to wind?

Find Your Way to Wind Energy!



Drawing source: Microsoft Office Images
<http://office.microsoft.com/en-us/images>

Wind Power!

Level 1 2 3

Aim

To learn and discuss about wind energy.

Materials

Information card provided below, research material (optional).

Time

1 hour.

Background

Alternative energy refers to sources of energy that can replace the use of non renewable energy sources, like the burning of **fossil fuels**, which release a great amount of **greenhouse gases** into the Earth's **atmosphere**. The effects of global warming are putting us to the test, so finding alternative energy sources has become a vital issue when discussing about our future.

Green electricity is power produced from renewable sources like water, wind, sun, ground and biomass. This type of energy is called renewable because it can be replenished in a short period of time. That means it comes from things we can use over and over again. The methods and technologies used for producing this type of energy are often better for the **environment**.

How to do it

1. Divide the participants into three or four groups.
2. Explain to them that they will become famous scientists that have prepared a special TV report to talk about wind energy, a renewable energy source. Each one must try to convince the rest of the class or youth group that this is the best type of energy. Tell them to be creative! They can present their topic in a serious or in a funny way.
3. Tell the participants to use the information card provided below to inform themselves. You might also want to encourage them to investigate a bit more about this type of energy.

Discussion

What are the differences between renewable and non renewable energy sources?
Why do you think energy sources that are strongly linked to air pollution are used all over the world?
What are the advantages and the disadvantages of wind energy?
Have you ever seen how a renewable energy source works? Can you explain?

Wind Energy

Wind can be defined as air in motion and it is caused by the uneven heating of the Earth's surface by the sun. The Earth's surface is made of different types of land and water; therefore, it absorbs the sun's heat at different rates. The daily wind cycle can give us an example of this uneven heating.

During the day, the air above the land heats up faster than the air above the water. The warm air over the land expands and rises, and the heavier, cooler air over the water rushes in to take its place, creating wind. During the night, the winds are reversed because the air cools more quickly over land than over water.

Today, wind energy is mainly used to generate electricity and it is considered to be a renewable energy source because the wind will blow as long as we have the sun. Wind turbines, often called windmills, use blades to collect the wind's kinetic energy. The wind flows over the blades creating lift, which causes them to turn. The blades are connected to a drive shaft that turns an electric generator to produce electricity.

Wind power plants, or wind farms, as they are sometimes called, are clusters of wind machines used to produce electricity. A wind farm usually has dozens of wind machines scattered over a large area. One disadvantage is that wind does not blow all the time, so during those periods other types of power plants must be used to make electricity. Most of the wind power plants in the world are located in Europe and in the United States, where government programs have helped support wind power development.

Wind energy and the environment

Wind is considered to be a clean fuel. Wind power plants produce no air or water pollution because no fuel is burned to generate electricity. Wind turbines do not release emissions that pollute the air or water, and they do not require water for cooling. Windmills may help reduce the amount of electricity generated from **fossil fuels** and, therefore, reduce the amount of air pollution, carbon dioxide emissions and water use of fossil fuel power plants.

The most serious environmental drawbacks to wind machines may be their negative effect on wild bird and bat populations and the visual impact of wind farms on the landscape as modern wind turbines are very large machines. Also, some people do not like the sound that wind turbine blades make.

Most wind power projects on land also require service roads that add to their impact on the environment. Making the metals and other materials in wind turbines and the concrete for their foundations requires the use of energy, which may come from **fossil fuels**. Nevertheless, some studies have shown that windmills produce more clean electricity over their operating life than the equivalent amount of energy used to make and install them.

Source: United States Energy Information Administration, Energy Kids, Wind,
www.eia.gov/kids/energy.cfm?page=wind_home

Air Pollutants Reduction Plan!

Level 2 3

Aim

To understand that single actions can help reduce the release of air polluting gases.

Materials

Paper, pencils.

Time

1 hour.

Background

The use of **fossil fuels** as a result of human activity is the major cause of air pollution. Most of the main air pollutants, like smoke, carbon monoxide, nitrogen oxides, sulphur dioxide, particulates and ozone, can be harmful to human and animal health.

Air pollution is frequently associated with respiratory problems in humans and it can also affect animals as they can breathe in gases or small particles, eat particles in food or water or absorb gases through their skin.

How to do it

1. Divide the participants into two or three groups.
2. Explain to each group that they work in the Ministry of the Environment, in the Department of Environmental Protection and that they have decided to elaborate an *Air Pollutants Reduction Plan* for the community. Remind them that they are responsible citizens aware of the relation between human activities and the emission of gases that contribute to air pollution. Each group must keep in mind that they are highly committed to reducing the amount of emissions generated by their local community.
3. Give the participants enough time to discuss and elaborate their Plan. Each group must come up with two programs that encourage their community (citizens, institutions and businesses) to change their behaviour and habits, so they contribute to prevent air pollution.
4. Ask each group to present their Plan to the rest of the participants and encourage discussion.

Discussion

Do you think your community needs programs like the ones you have presented?
What do you think your community would like about these programs?
Do you think your community would have a hard time applying these programs? Why?
Who do you think would have a harder time applying them: citizens, institutions or businesses?

Be an Eco-reporter!

Level 2 3

Aim

To investigate an issue related to air quality in your neighborhood.

Materials

Video camera (a digital camera, a mobile phone with a camera or voice recorder could work if you do not have access to a video camera).

Time

Two 1 hour lessons (1 hour to begin the activity and 1 hour to present their works), this activity might require some extra work at home.

How to do it

1. Remind your group how different topics are presented through videos or voice recordings.
2. Explain to them that they are going to become eco-reporters and that they will

make their own videos or voice recordings about any topic related to air quality in their neighborhoods. They can work individually or in small groups.

3. Tell your group that they can choose any eco topic related to air that interests them, from little school or youth group issues such as air conditioning or bus pollution, to bigger issues such as **deforestation** or home construction.
4. Give them time to organize themselves at school or youth group, but this activity might need some extra work at home.
5. When they are ready, have each individual/group present their work and why not send the best ones to a local TV or radio station!

Discussion

Was it easy to find an issue about air quality? Why?

Do you think people in your community are aware of the importance of preventing air pollution?

How might you help others understand the importance of this?

Time for Puppet Show

Level 1 2 3

Aim

To find a fun way to use recyclable materials.

Materials

An old clean sock, scissors, markers, any craft material (coloured cards, buttons, yarn, wool, pieces of cloth).

Time

1 hour.

How to do it

1. Explain to your group how puppets can help them use their imagination to write up and perform an endless variety of puppet shows.
2. Have each participant get his/her clean old sock. Ask them to pull the sock over the hand they do not use to write, so they can watch it and imagine how they wish their puppet to look like.
3. Tell them to draw a face, remembering that their thumb and forefinger will naturally make a "mouth" from which the puppet will talk. They can glue or sew on some buttons for eyes or ears, add a paper or cloth tongue and even glue on some yarn for hair or a beard. Tell them they can make their puppets look like plants, animals or monsters too! The possibilities are endless.
4. Divide the participants into two groups, have each one make up a story about nature and air using their new friends and present it to the other team. The elder participants could create a story and perform it for the younger groups or classes; they could even make sets as backgrounds for their puppets.

Discussion

Why did you choose to create that puppet? How can puppets help you learn?

Have you ever seen a puppet show? What good message did it leave you?

What famous puppets do you know?

Biodiversity is linked to a healthy planet

Waggle Dance!

Level 1 2 3

Aim

To learn about the important role bees play in pollination.

Materials

Colouring pencils, paper, adhesive tape.

Time

40 minutes.

Background

Bees, like other insects, are part of the food chain. Bees are known for their role in pollination and for producing honey and beeswax. They carry a powder called pollen from one flower to another. The pollen fertilizes the flowers, which allows them to make seeds and finally, fruit. Many of our food would not be available if it weren't for bees.

Bees are the major type of pollinator in **ecosystems** that contain flowering plants. Researchers say that one third of our food supply depends on insect pollination, most of which is accomplished by bees.

How to do it

1. Explain to your group that honeybees communicate through their "waggle dance" to show others in the hive where to find food, in this way they can indicate the direction and distance of the flower to others in the hive.
2. Divide the participants into three groups; explain that everyone will pretend to be honeybees from different hives.
3. Set up 'target' flowers in different locations in the school or youth group grounds. Use the paper to draw the flowers you need. Assign two or three flowers to each group.
4. Challenge teams to find the correct flower by conveying information using movements like the honeybees. Give the worker bees some time to decide which movements will mean what.
5. Each team must choose one member that will know where his/her group flower is, he/she must mime or dance to the rest of his/her group to give them information about distance, direction and type of flower. No talking! The flowers could provide some sort of reward or score; or penalties for choosing the wrong flower.

Here are some examples:

- Moving your sting in circles ▶ yellow flower
- Moving your sting to the right ▶ red flower
- Moving your sting to the left ▶ purple flower
- Moving your right leg ▶ go to the right
- Moving your left leg ▶ go to the left

Be creative and have fun!

Discussion

Which movements worked and which didn't?

What did you learn about honey bees?

What other forms of communication can you find in nature?

Source: Scottish Natural Heritage, Activity 11, Dancing Bees Survival Game,
www.snh.gov.uk/docs/A402698.pdf

Bird Behaviour Hike!

Level 1 2 3

Aim

To learn about bird behaviour.

Materials

An outdoor setting, notebooks, pencils, a copy of the bird behaviour primer.

Time

1 hour.

Background

Birds are vertebrate animals that are recognized because they have a beak, wings, and something that makes them very special, feathers! Birds are the only animals that have these. Feathers do many jobs for birds; soft down feathers keep them warm, wing feathers allow them to fly and tail feathers are used for steering. They also use their coloured feathers to hide or to find a partner.

Most birds can fly; there are only a few that cannot. Flying birds have strong bones and powerful muscles. Birds use a lot of energy when flying, so they need a lot of food to power their flight. Birds that cannot fly use their legs to walk or to run and some others swim.

Most birds eat insects and they use their beak and claws to catch their food, such as bugs or worms. Other birds eat fruits, plants and even meat.

How to do it

1. Take your group to an outdoor setting, a park or a tree-lined street, for example, where birds of different **species** can be observed.
2. Have the participants mark down the bird behaviour they spot in their notebooks. Use the bird-behaviour primer to guide the hike.
3. Ask your group to sketch the different behaviours they see.

Bird Behaviour Primer

- *Hiding*: using camouflage or cover to protect themselves from predators.
- *Flocking*: creating large groups to fly or feed, creating safety in numbers.
- *Bathing*: washing in water, or sometimes, giving themselves a dirt bath.
- *Flying*: using their wings or air currents to travel through the air.
- *Preening*: cleaning their feathers using their beak or feet.
- *Singing*: communicating using calls and songs.
- *Giving an alarm call*: hard to distinguish from a song, but usually shorter and simpler than songs.
- *Foraging*: searching for food on the ground, in bark, in water, etc. Food could include seeds, fruits, fish, even small mammals and reptiles.
- *Feeding*: actually eating the food they find.

Discussion

What behaviours are the most common?
Did any birds act in a way that surprised you?
What do you like the most about birds?

Source: National Wildlife Federation, *Get Outside, Be Out There, Activities, Observe and Explore, Bird Behavior Hike*, www.nwf.org/Get-Outside/Be-Out-There/Activities/Observe-and-Explore/Bird-Behavior-Hike.aspx

Time for Music

Level 1 2

Aim

To carefully hear and imitate the sound of nature.

Materials

An outdoor space.

Time

30 minutes.

How to do it

1. Remind your group that our nature is full of amazing sounds; ask them to think of some.
2. Take your group to an open space and ask them to be quiet and to listen carefully, they might hear a bird singing, a dog barking, a cuckoo calling, a bee buzzing, a squirrel eating, the breeze in the trees or even some water running.
3. Ask your group to look around to find things they could use to make those sounds. Try playing different sounds at the same time, now you should be ready to perform your nature symphony!

Discussion

Which is your favorite sound? Why?

What other sounds might children from a different, far away country hear?

Do you believe humans have copied any sounds from nature? Could you think of an example?

Spooky Gymkhana

Level 1 2 3

Aim

To identify different elements of nature.

Materials

An open area, a copy of the gymkhana list, notebooks, pencils.

Time

40 minutes.

How to do it

1. Explain to your group that you are going to have some fun in the outdoors. Divide your group into two or three teams.
2. Give each team a copy of the gymkhana list. The first one to complete all the activities is the winner. Tell them to use their notebook to register the places where they find/hear each item.

Remind them to be careful, so they don't harm themselves or any element from nature.

Spooky Gymkhana

- Feel a spider web.
- Find any creepy crawly walking through the garden. (Do not take it; just register the place where you found it).
- Find a weird looking moss.
- See an enormous cloud.
- Hear the howling wind.
- Find a rotting log.
- Find a bug party under a rock.
- Find any animal sign, a feather, some fur, a half eaten bone...
- Make a hole on the ground and put your hand inside so you can feel the soil.

- Hear some cracking branches.

Discussion

Can you think of other spooky things you can find in your backyard?
How does this activity help you appreciate our awesome nature?
Which of these elements do movie directors use in their scary movies? Why are they scary?

Let's Find Some Eggs!

Level 1 2 3

Aim

To learn about the great variety of bird eggs we can find in nature.

Materials

Small apricot (or large strawberry), avocado, chicken egg, large grapefruit, large grape, pea, small tangerine (if you can't find any of these fruits you can use others that have a similar size).

Time

30 minutes.

How to do it

1. Put the fruits, the vegetables and the egg on a table for your group to examine.
2. Explain that each of the fruits and vegetables is about the same size as a real bird egg. Ask your group to arrange the "eggs" from smallest to largest. Point to the chicken egg and ask your group what bird lays it. That's easy! But what bird lays an egg the size of the pea? A grape? An apricot? A tangerine? An avocado? A grapefruit?

Here are some possible answers:

- Pea ▶ hummingbird
- Grape ▶ robin
- Apricot ▶ crow
- Tangerine ▶ great horned owl
- Avocado ▶ goose
- Grapefruit ▶ ostrich

Discussion

What type of eggs have you seen?
Does the size of an egg say anything about the size of the bird that laid it?
Why do you think some eggs are speckled?

Source: National Wildlife Federation, Kids, Your Big Backyard, Fun, Outdoors, Science, Sizing Up Eggs, www.nwf.org/Kids/Your-Big-Backyard/Fun/Outdoors/Science/Sizing-Up-Eggs.aspx

A Species is Missing!

Level 1 2 3

Aim

To understand the interdependence of different animals on one another.

Materials

An outdoor setting.

Time

30 minutes.

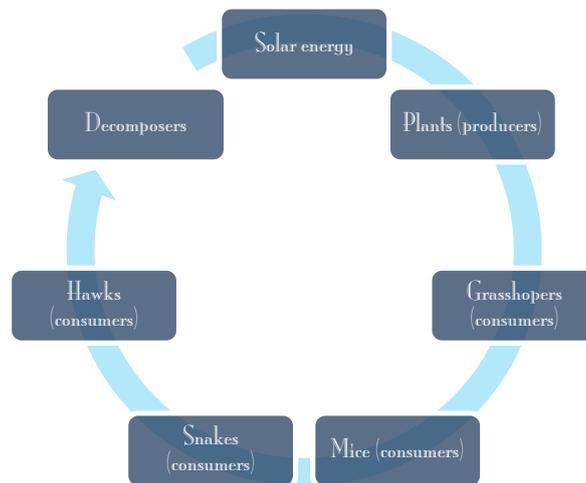
Background

All living beings form part of a food chain. Every food chain starts with solar energy. Plants are always the first step in the food chain and they are called producers as they use the energy from the sun and other substances from the air and soil to produce food.

Organisms further up the food chain that eat plants are called consumers. As one **organism** eats another, it uses a portion of these substances to sustain itself, and discards the rest in the form of waste.

Waste from dead plants and animals are broken down and used as food or nutrition by bacteria and fungi. These **organisms**, called decomposers, play a very important role as they transform complex substances into simple **nutrients** that are returned to the soil and can be used again by the plants. And the food chain starts all over again.

So, a food chain could look like this:



Some food chains are long and others are quite short. But a food chain always follows the same order. These steps are called trophic (or feeding) levels.

How to do it

1. Remind your group about the following food chain. Hawks eat snakes to survive and grow. In turn, snakes eat mice. Some mice eat grasshoppers and these eat plants, which make their own food using sunlight. So, in a way, the plant, the mouse, the grasshopper, the snake and the hawk are all connected to each other by food.
2. Explain to your group that you are playing a game. Divide your group into six teams and assign one element from the following food chain to each team:
Plants – grasshoppers – mice – snakes – hawks
3. The game is a variation of tag. Each team must have a base where they can be safe from being tagged. The hawks must tag the snakes, the snakes must tag the mice, the mice must tag the grasshoppers and these must tag the plants. When someone is tagged, he/she is eliminated from the game. The snakes, the mice and the grasshoppers will have a harder time as they must tag their food being careful not to be tagged first. When a couple of players are eliminated you can have them be human beings chasing the hawks.

You could also try other food chains, have fun!

Discussion

Were some animals left without food? How did they feel?
How do human beings affect different food chains?
What happens when one **species** disappears?
What can be done to avoid **species extinction**?

Is my neighborhood green?

Level 1 2 3

Aim

To discover how green a neighborhood is.

Materials

Papers, pencils.

Time

One 30 minutes lesson (to explain the activity) and other 1 hour lesson (to review the outcomes).

How to do it

1. Start by reminding your group how population growth and development have contributed to the loss of green spaces everywhere as more houses and businesses are constructed every day.
2. Tell your group that they are going to create a *Green Map* of their neighborhood. Ask them to draw on a piece of paper a small map (containing 5 to 10 blocks) that shows how many green spaces they can find near their house.
3. Also, tell your group to ask their parents, or maybe some elderly friends, how the neighborhood was some 10, 15 or 20 years ago in order to find out how much their neighborhood has changed and how many green spaces have been lost.
4. Ask each participant to present his/her map and to explain how the neighborhood has changed.
5. You could even ask the participants to distribute the map in his/her community to encourage others to maintain and preserve green spaces that are left.

Discussion

Has your neighborhood changed a lot during the last 10 or 15 years?

Why do you think it is important to have green spaces in your neighborhood?

How do you think the lack of green spaces affects the air quality in different neighborhoods?

Paint for the Air!

Level 2 3

Aim

To encourage others to care for our air.

Materials

Poster boards, pencils, colouring pencils, markers, adhesive tape.

Time

Two 1 hour lessons (1 hour to organize the activity and 1 hour to review the results).

How to do it

1. Explain to your group that you are organizing a drawing competition to encourage everyone at school or youth group to care for our air as it is essential to maintain the beauty and diversity of our world and its living beings.
2. Have your group pick a theme, for example: *Air Quality, Life Quality*. Tell them to be creative!
3. Divide the participants into small groups and have each one make a poster to publicize your event. Don't forget to include all the necessary information:
 - Theme of the competition;
 - Participants' age range;
 - Size of the drawing paper;
 - Drawing materials accepted;And of course don't forget to say that the drawing should reflect issues concerning air and why it is important to our world and to our health.
4. Place the posters all around your school or youth group. Make sure everyone hears

about it!

5. Tell your group that they will be in charge of selecting the winner and awarding him/her with a cool certificate (or maybe you could even give him/her a prize of your choice).
6. You can also make an award ceremony with the entire school or youth group to congratulate everyone for participating and encourage them to continue making a change.

Discussion

Were you able to get many people interested in your competition?
Do you think you are helping others to realize the importance of air and **biodiversity**?
What else could you do to encourage your family and friends to start acting?

Tiring Tag!

Level 1 2

Aim

To experience how unfair it is not to be able to enjoy clean air.

Materials

An open space.

Time

30 minutes.

How to do it

1. Explain to your group that you are playing a different kind of tag, where some people have to stop to catch some air before running again.
2. Chose the person who will be "It" and divide the rest of participants into two groups. One group will be the "healthy" group that has always lived in the country and enjoyed clean air, while the other group will be the "tired" group that has always lived in the city and has suffered the consequences of breathing polluted air.
3. Explain to your group that when the game begins everyone will start running, but when you blow your whistle the "tired" group will have to stop to catch some air, these participants must count up to ten and start running again. This should make the members of the "tired" group be tagged first.

Discussion

Who from the "tired" group was tagged?
Was it fair for some people not to be healthy enough to run fast?
Why is it important to enjoy healthy, clean air?

A Day in the Life of...

Level 1 2 3

Aim

To realize people have different lifestyles.

Materials

Notebook, pencils.

Time

1 hour.

How to do it

1. Divide the participants into three groups.
2. Explain to them that each group will have to write a journal entry about *A day in the life of:*
 - A young boy or girl that lives in a city surrounded by buildings and lots of cars.
 - A young boy or girl that lives in the countryside surrounded by some animals and different plants and trees.

- An indigenous young boy or girl that lives in a native community in the rainforest.

Make sure each group answers the following questions:

- *Where do you live? Can you explain what your house is like?*
- *What is the first thing you do when you start your day?*
- *What kinds of things do you use?*
- *How do you travel?*
- *How do you spend your free time?*
- *What are your chores at home?*
- *What is the last thing you do before going to bed?*
- *How do you think your everyday activities affect air quality?*

3. Have each group present their journal entry and encourage discussion.

Discussion

What is the main difference between these three lifestyles?

How does nature help maintain the air clean?

Which person is the best example of someone who has respect for nature? Why?

There is Airmail for You!

Level 1 2

Aim

To learn about the benefits of nature and fresh air and share it with others.

Materials

Card board, colouring pencils, coloured markers, scissors.

Time

1 hour.

How to do it

1. Tell your group that you are making postcards for them to give to a special someone and that they should include a message about the benefits of fresh air and outdoor fun.
2. Have each child decorate a postcard and come up with a nice and appealing message.

Here are some ideas:

- A shiny sun and fresh air helps me develop strong and healthy bones.
- Playing outdoors helps me improve my eyesight and reduces the need for glasses.
- Enjoying fresh air and sharing with the natural world makes me more happy, patient and calm.
- Spending time outdoors makes me better at making friends.
- Playing in fresh air helps me think better and develop my imagination and creativity.
- Having a healthy body and mind thanks to fresh air helps me do better at school.
- Breathing healthy air while I grow helps me be healthier during my adult life.
- Being outdoors helps me learn about the wonders of nature and develop a greater awareness about the need to protect it.

3. Tell each participant to ask the recipient of his/her postcard to say what he/she thinks about the message.

Discussion

Did you know that air gave you so many benefits?

Who did you give your postcard to? Why?
What were this person's feelings about the message you gave to him/her?

The Council of Beings

Level 2 3

Aim

To gain a better understanding of the relationship between the natural world and our impact on it.

Materials

An open area, stick.

Time

1 hour.

How to do it

1. Remind your group that role playing is a great way to appreciate different points of view and perspectives and that it also helps them to reflect with empathy.
2. Explain to them that they are going to represent and speak for a part of the natural **environment** during the *Council of Beings*.
3. Tell the participants that they can choose to represent any animal, plant or element of the **environment** such as air, soil or water. With a large class, you can have students represent a **species** as a group.
4. Call the Council of Beings to order by having the participants sit in a large circle in an outdoor setting. Explain that they are no longer humans and must take on the identity of their chosen aspect of nature.
5. To get everyone into their roles, begin the council by having everyone introduce themselves. For example, "I am an orangutan and I live in a rainforest..."
6. When everyone has introduced themselves, inform the council that the **environment** is in a very poor state. Pollution, **deforestation** and overuse of resources have put too much pressure on the planet and this is leading to the loss of wildlife **habitat** and is threatening **biodiversity**.
7. Once you have given them this scenario (you can also choose to describe a more specific scenario), allow each of the beings to respond. Encourage them to speak from their "being's" point of view. For example, the orangutan might say, "rainforest is being felled for different crops at an incredible rate and the remaining forest is being degraded by drought and forest fires. We are losing our homes and many of us have already died." Instead of raising their hands to speak, try using a large "talking stick". The participants must be holding the "talking stick" when they address the council.
8. Wrap up the council by having each "being" suggest how humans can make changes to prevent any further negative environmental impacts.

Discussion

How did you feel as an element of nature? Did you feel threatened by the environmental impacts of human activity?

Where do you think the impacts of pollution and **biodiversity** loss are being felt the most?

How do you think your group can help reduce these impacts? Will you take on any of the suggestions for change made during the council of beings?

Source: EcoKids Canada, Teachers, Resources, Activities, The Council of all Beings,
www.ecokids.ca/pub/teachers/resources/activities/council_of_all_beings.pdf

We All Help Each Other

Level 1 2

Aim

Identify ways in which living and non living things interact with each other.

Materials

Whiteboard, card, colouring pencils, scissors, popsicle sticks, tape.

Time

1 hour.

How to do it

1. Start by drawing a tree, a bat and the air in the whiteboard and ask the participants to identify these three elements of nature.
2. Ask the participants to identify ways in which these elements help one another live, for example, “the bat lives in the tree” or “the tree needs air to survive”.
3. Ask the participants for more examples using other plants, animals or elements of the **environment**. Explain that they all have survival needs and that they can fulfill them because they give each other what they need.
4. Next, have the participants draw any plant, animal or element of nature in a card, cut it out and mount it on a popsicle stick. Make sure they are all different and varied.
5. Explain to your group that you are playing the musical partners game, much like the musical chairs. You must control the music. While the music is playing the participants must move around the room like their chosen element, and when it stops they must find a partner and show each other their pictures. They are challenged to find a way in which their elements help each other to survive and tell it to the group. Then, you can start the music again and continue having fun!

Discussion

What are some of the things you drew?

What could happen if one of these living or non-living things would just disappear, bats, for example? Who would be in trouble?

How are all these elements important to humans’ survival?

Time to Think About Trees!

Level 1 2 3

Aim

To find out ways to help protect forests.

Materials

Paper, pencils, scissors, hat, papers, pencils.

Time

40 minutes.

Background

Forests cover about 30 percent of the land area on Earth. But a forest is more than just a group of trees. Forests play a vital role in the **environment**.

The world’s forests provide many different goods and services, for example:

- Home for plants and animals, which help to maintain the diversity of life on Earth;
- Food for people and animals;
- Valuable materials for different industries, for example, to obtain medicines or wood for building or energy;
- Filter pollution from the air as they soak up CO₂;
- Protect the quality of water and prevent soil loss;
- Produce wood fuels as an alternative to **fossil fuels**;
- Create shade;

- Give people nice places to live, relax and have fun; And much, much more!

During the years, increasing populations have created a bigger demand for forest products. Because of this, we risk destroying entire forests and all of the plant and animal life that exists in them. Moreover, the ability of our forests to store carbon and, thereby, to combat the changes in our **climate** is very important.

Our planet is getting hotter because of global warming! The release of **fossil fuels**, such as **carbon dioxide**, is increasing the amount of **greenhouse gases** in our **atmosphere**. Forests influence **climate change** mainly by affecting the amount of CO₂ in the **atmosphere**. When forests grow, carbon is removed from the **atmosphere** and absorbed in wood, leaves and soil. Because forests can absorb and store carbon over an extended period of time, they are considered “carbon sinks”. This carbon remains stored in the forest **ecosystem**, but can be released into the **atmosphere** when forests are cleared, burned or degraded. Forests have the potential to absorb about one-tenth of global carbon emissions projected for the first half of this century.

Since cutting down trees for wood is one of the main reasons why forests around the world are being destroyed, it is important to find ways to protect forests through our everyday choices and to practice **conservation** to sustain the availability and use of the important resources we obtain from forests. There are many easy things you can do to help, so get to work!

How to do it

1. Remind your group how forests contribute to maintain a healthy air and explain to them that they are playing a guessing game related to the **conservation** of trees and forests.
2. Write some **conservation** ideas in separated pieces of paper, fold them and put them inside a hat.
3. Divide the participants into groups of three.
4. Explain to the groups that each one will have to choose a representative, who will have to draw what is written on the paper so his/her partners can guess. You will be in charge of picking the papers from the hat. The participants can take turns to draw.
5. Tell each group representative to begin drawing at your call, no talking or writing allowed! Give them 30 to 40 seconds to finish their drawing. The first group to answer correctly gets one point. If no group guesses you can tell them the answer and continue with the next idea.
6. The team that has more correct answers is the winner!

Here are some ideas:

- Do not accept junk mail at your home.
- Write on both sides of the paper.
- Plant and nurture trees in your community.
- Collect your scrap paper and use it for different activities.
- Encourage businesses in your community to plant trees.
- Use cloth napkins and towels instead of paper ones whenever possible.
- When shopping, choose products with limited packaging, prefer bags rather than boxes.
- Use a reusable bag instead of paper bags.
- If you take your lunch to school or youth group use a lunch box or reusable bag instead of using disposable paper bags.
- Buy recycled paper.
- Recycle your used paper and newspapers.
- Print only if necessary.
- Dry your hands with a towel or a hand dryer instead of using paper towels.

- Donate used magazines and newspapers instead of throwing them away.

Discussion

How important are trees and forests in our lives?
 How have attitudes towards forest protection changed over time?
 How can people change their everyday habits to help promote forests' protection?
 What do you think is your role in the protection of forests?

Butterflies Square Puzzle!

Level 1 2

Aim

To learn about butterflies.

Materials

Pencils, a copy of the square puzzle.

Time

20 minutes.

Background

Other flying animals we all enjoy watching are butterflies. These insects have a head, a thorax, an abdomen, two antennae, six legs and a special mouth called a proboscis, which they use to drink liquids such as flower nectar. But don't forget the wings! Butterflies have four wings that are almost always covered by tiny scales, each scale has its own colour and together they make a pattern. Most scales get their colours from chemicals called pigments. But some scales show special colours that appear when light hits them in a certain way, so wings look shimmery and shiny.

These nice colourful insects are found on all continents, except Antarctica, and scientists estimate that there are more than 10 000 **species** of butterflies in our world. And many have not been found yet! Unfortunately, butterflies are facing **extinction** and many groups are already working for **species** and **habitats conservation**. You can help too, by learning about butterflies and telling others about them and the need to protect these beautiful creatures.

How to do it

1. Give a copy of the following word square puzzle to each participant.
2. Explain to your group that they must look for each of the following words within the puzzle.

- | | |
|----------------------|-----------------------|
| • <i>Butterflies</i> | • <i>Proboscis</i> |
| • <i>Wings</i> | • <i>Species</i> |
| • <i>Scales</i> | • <i>Habitats</i> |
| • <i>Colourful</i> | • <i>Conservation</i> |
| • <i>Pattern</i> | • <i>Nectar</i> |
| • <i>Pigments</i> | • <i>Antennae</i> |
| • <i>Shimmery</i> | • <i>Beautiful</i> |

3. Tell them to be careful because words may be spelled across, up, down, diagonally and even backwards. Have fun!

Discussion

What do you like the most about butterflies?
 Why is it important to promote the **conservation** of these beautiful creatures?
 Why do you think butterflies and their **habitats** are being destroyed?

Butterflies Square Puzzle

Q	W	S	H	I	M	M	E	R	Y	A	S	D	F	G	S
J	G	L	Z	P	R	O	B	O	S	C	I	S	S	E	T
W	S	Z	X	C	V	S	B	N	M	F	W	W	R	T	A
S	A	S	K	J	S	G	M	F	D	C	A	F	B	I	T
A	H	B	N	S	V	N	Q	P	P	O	T	D	E	I	I
C	S	H	U	L	S	I	R	J	O	N	O	G	A	L	B
A	I	L	N	T	T	W	K	S	J	S	A	T	U	A	A
S	G	V	D	T	T	J	P	I	H	E	T	N	T	N	H
V	C	B	G	H	Y	E	T	A	V	R	J	H	I	D	V
C	E	C	F	P	C	S	R	L	I	V	T	E	F	F	J
O	L	D	E	I	A	M	H	F	K	A	Y	L	U	I	G
L	S	W	E	L	B	K	G	S	L	T	I	P	L	L	S
O	A	S	P	T	Y	U	F	D	M	I	O	W	N	L	A
R	W	R	D	F	G	P	S	A	H	O	E	S	Q	S	Q
F	Q	W	E	R	A	C	I	N	J	N	T	S	H	I	W
U	T	G	F	T	B	H	O	G	Y	M	I	A	O	T	W
L	G	R	T	E	R	I	C	K	M	R	T	P	L	E	E
D	F	E	L	O	S	S	N	L	B	E	G	E	Y	R	D
B	R	P	R	I	C	C	A	N	T	E	N	N	A	E	V
N	J	A	Z	X	A	F	T	Y	U	J	I	T	J	U	B
G	F	I	Q	W	L	R	T	G	F	D	V	P	S	I	H
A	R	A	T	C	E	N	E	C	Y	C	L	E	G	H	J
I	P	O	A	S	S	R	T	Y	H	G	D	V	C	F	B

Solution:

Q	W	S	H	I	M	M	E	R	Y	A	S	D	F	G	S
J	G	L	Z	P	R	O	B	O	S	C	I	S	S	E	T
W	S	Z	X	C	V	S	B	N	M	F	W	W	R	T	A
S	A	S	K	J	S	G	M	F	D	C	A	F	B	I	T
A	H	B	N	S	V	N	Q	P	P	O	T	D	E	I	I
C	S	H	U	L	S	I	R	J	O	N	O	G	A	L	B
A	I	L	N	T	T	W	K	S	J	S	A	T	U	A	A
S	G	V	D	T	T	J	P	I	H	E	T	N	T	N	H
V	C	B	G	H	Y	E	T	A	V	R	J	H	I	D	V
C	E	C	F	P	C	S	R	L	I	V	T	E	F	F	J
O	L	D	E	I	A	M	H	F	K	A	Y	L	U	I	G
L	S	W	E	L	B	K	G	S	L	T	I	P	L	L	S
O	A	S	P	T	Y	U	F	D	M	I	O	W	N	L	A
R	W	R	D	F	G	P	S	A	H	O	E	S	Q	S	Q
F	Q	W	E	R	A	C	I	N	J	N	T	S	H	I	W
U	T	G	F	T	B	H	O	G	Y	M	I	A	O	T	W
L	G	R	T	E	R	I	C	K	M	R	T	P	L	E	E
D	F	E	L	O	S	S	N	L	B	E	G	E	Y	R	D
B	R	P	R	I	C	C	A	N	T	E	N	N	A	E	V
N	J	A	Z	X	A	F	T	Y	U	J	I	T	J	U	B
G	F	I	Q	W	L	R	T	G	F	D	V	P	S	I	H
A	R	A	T	C	E	N	E	C	Y	C	L	E	G	H	J
I	P	O	A	S	S	R	T	Y	H	G	D	V	C	F	B

Bee Hotel

Level 1 2 3

Aim

To make a bee home.

Materials

Hollow plants stems, gardening scissor, string.

Time

30 minutes.

Background

Bees, like other insects, are part of the food chain. Bees are known for their role in pollination and for producing honey and beeswax. They carry a powder called pollen from one flower to another. The pollen fertilizes the flowers, which allows them to make seeds and finally, fruit. Many of our food would not be available if it weren't for bees.

Bees are the major type of pollinator in **ecosystems** that contain flowering plants. Researchers say that one third of our food supply depends on insect pollination, most of which is accomplished by bees. So, it is a great idea to invite bees to stay in your backyard!

How to do it

1. Explain to your group that you are going to invite helpful bees to the garden by creating a bee home.
2. Prepare the nesting tubes, any hollow plant stems must be cut into 10-20 cm long sections. Bamboo canes have sealed nodes, so you must cut them so that long hollow sections are exposed; they come in a variety of internal diameters, those up to 1 cm will be used by some **species** of bee. Bramble and rose stems have pith into which tiny bees make their homes. If a source of reed is available, then dead hollow stems can be broken into sections.
3. Bundle the tubes with some string or wire.
4. Place the bee nest on a fencepost, a tree stump or another stable location. Look for a place that gets morning sun and shade the rest of the day. Ensure that the nest is protected from the rain.
5. Observe and enjoy, watch the different types of bees using their new homes; you may also see **species** of wasps using the tubes as their larvae feed on the bee grubs.

Discussion

Why is it important to help conserve bees?
Why do you think bees will like their new home?
Can you think of other ways that people can help bees?

Source: Buglife, Get Involved, Gardening, Make Your Own Garden Bee Nest.
www.buglife.org.uk/getinvolved/gardening/beenestsforgardeners

Air Spell!

Level 1 2

Aim

To use imagination to think about the perfect place with perfect air.

Materials

An outdoor setting, paper, pencils, box.

Time

30 minutes.

How to do it

1. Remind your group of how many times they have used their imagination to think about wonderful places. Ask them to think about a place which would be perfect for them because of its air quality.

2. Ask the participants to explore an outdoor setting to collect ideas, sights, sounds and smells. Tell them to mix up all these things together to make up a spell for a magical place with perfect air.
3. Have each participant write their spell down in a piece of paper. Each one can then share their spell.

Here is an example:

- A spoon full of moving branches...
- A sprinkling of flying dandelions...
- A lungful of fresh cut grass...
- A dash of buzzing bees... and...
- A handful of soothing silence.

4. Have each participant wrap their spells in a leaf and keep it somewhere safe, so it can come true!

Discussion

What do you like the most about air?
 Do you think you could live without air? Why or why not?
 What do you know about hobbies that involve air?

Newspaper Article

Level 2 3

Aim

To investigate and learn about the link between **biodiversity** and a healthy planet.

Materials

Notebook, pencils, research material (books, internet).

Time

Two 1 hour lessons (one hour to do some research and one hour to write the paper).

How to do it

1. Start by asking your group to do some research about the great diversity of our world and its link to a healthy planet where all living beings can lead a satisfying life.
2. Ask them to write an article for the school or for the local newspaper.
3. You could have everyone read their article and maybe choose a couple to send to the school or local newspaper.

Discussion

What was the main idea of your article?
 Was it hard or difficult to explain the link between **biodiversity** and a healthy planet?
 Do you think people in general need to learn more about this topic in order to help preserve our planet? What could you do to help?

This Year's Action Theme is...

Level 1 2 3

Aim

To come up with an action theme for your school or youth group.

Materials

Poster board, markers, paints, colouring pencils.

Time

1 hour.

How to do it

1. Explain to your group that you are going to create your school or youth group action theme with the purpose of getting everyone acting. The action theme should

encourage children, young people and adults to make a personal commitment to get involved in different activities regarding air quality and biological diversity.

2. Divide the participants in small groups and ask them to create their action theme. Ask them to use the poster board to make it look attractive and fun.
3. Have each group present their work and vote for the best one.
4. You can present it to your school or youth group director so it can be your official action theme and involve everyone there!

Discussion

How can a change in your life help our **environment**?

What are you doing to prevent air pollution?

What could you do to encourage other schools or youth groups as well?

Let's Dance for Our Air!

Level 2 3

Aim

To celebrate how wonderful the air is.

Materials

Poster board, markers, paints, colouring pencils, adhesive tape, music, tape recorder.

Time

1 hour to organize the activity, 3 to 4 hours to prepare the dance.

How to do it

1. Explain to your group that you are organizing a *Let's Dance for Our Air* Dance Competition at school or youth group. Remind them that your main objective is to celebrate the benefits of air and disseminate the importance of promoting air quality for our well-being and for the maintenance of our natural world.
2. Divide the participants into small groups and have each one make a poster to publicize your event. Don't forget to include all the necessary information:
 - Theme of the competition
 - Date and place of the competition (you could use your school or youth group theatre or conference room)
 - Participants' age range (or grades that can participate)
 - Where to register

And of course don't forget to say that the dance should reflect issues concerning air and why it is important to our world and to our health.

To make it even more fun you could assign different topics to each participating group, for example:

- *The Air in the Sahara*
- *The Air in Alaska*
- *The Air in the Amazonian Rainforest*
- *The Air in the Coral Reef*

3. Place the posters all around your school or youth group. Make sure everyone hears about it!
4. Your group can participate too, of course, so you can help them organize the winning dance.
5. You can ask other teachers or youth leaders to be the judges and to announce the winner, or you could even invite some outside judges (a professional choreographer maybe).
6. You can also invite a local TV station and other media to cover your event!

Discussion

What was the best part of the competition?

Who were the winners and why do you think they won?
What were the different messages the participants wished to transmit?

Make Your Voice Heard!

Level 2 3

Aim To express your point of view and let others know what you care about.

Materials Papers, pencils.

Time 1 hour.

How to do it

1. Explain to your group that they are going to write a letter to a government representative in order to encourage them to stop air pollution, make sure they say how it affects humans, plants and animals alike.
2. Have your group brainstorm some ideas they might want to include. Have them choose what a good opening, body and closing would be.
3. Write the letter with the help of your entire group and make sure you all sign it.
4. Send it to your Minister of the Environment, to a member of the Senate or the Parliament, or why not to the President of your country!

Discussion

How can writing a letter help you get your message across?
Why is it important to make others hear your voice?
What other issues could you write about?

Air Poetry Day

Level 1 2 3

Aim To express observations about air in an imaginative way.

Materials An outdoor setting, paper, pencils.

Time 1 hour.

How to do it

1. Tell your group that you are having an *Air Poetry Day* and that each one must write a poem related to air and the **environment**.
2. Take your group to an outdoor setting so they can relax, feel the air around them and get some inspiration.
3. Instruct the participants to think about air from a different perspective, so they can write a creative and original piece of art.
4. You can have your group read their poems to other groups or classes, or you could even invite their parents, so they can learn from their children and be encouraged to appreciate the air around them.

Discussion

How can poetry help express things in a different way?
Have you ever heard about any work of art related to air?
What other characteristics or elements of nature have inspired works of art?



Useful resources

CarboSchools

www.carboeurope.org/education

Forest Education Initiative

www.foresteducation.org

RSPB Wildlife Explorers Kids

www.rspb.org.uk/youth/learn

Clean Air Kids

www.clean-air-kids.org.uk

Nature Detectives

www.naturedetectives.org.uk

United States Environmental Protection Agency - Students

www.epa.gov/students



Our Water

Introduction

Have you noticed that Earth is blue? Well, our planet is blue because 70 percent of it is covered by water! However, out of the Earth's total supply of water, 97 percent is salt water and only 3 percent is fresh water. Furthermore, 2 percent of this fresh water is locked up in glaciers and ice-caps, and only 1 percent of the Earth's water is available for humans, animals, plants, and all other forms of life.

Water is life. No living being on Earth can survive without it. Water is essential for human health and well-being as it allows us to meet basic human needs such as drinking water and sanitation services. Water is also necessary to grow food and to manufacture all kinds of products. But, beyond human uses, water is also critical for the preservation of the **environment** and its living creatures. Water nurtures our landscapes and provides **habitat** for wildlife. Currently, scientists have come to appreciate to a higher extent the valuable services provided by water-related **ecosystems**, from flood control to storm protection and water purification.

Water is one of our world's most valuable resources, but it is also one of the most scarce. Some parts of the world have better access to clean, easily attainable water than others. In some places obtaining water is as easy as turning on the faucet, while in other places women and children must walk many miles every day to obtain water for their families. As population increases worldwide, the use of water in the domestic, agricultural and industrial sectors rises and the pressure on water resources intensifies. When water resources are degraded, they can impact every form of life, including human life. The challenge, therefore, is to overcome the need for competition and to find ways to harmonize the water requirements of people with those of the natural **environment**.

It is clear that the pressures affecting our planet's water systems are related to human development and economic growth. Rivers, lakes, **aquifers**, wetlands, and other water bodies are being strained as human populations swell and economies expand. Both surface and groundwater resources are being depleted and polluted to an extent never before witnessed. And **species**, **habitats**, and **ecosystems**, as well as people and communities around the globe are increasingly suffering for it. For this reason, it is essential to understand that water is a vital resource that needs to be protected and conserved.

But, who needs to take action? Everyone on our planet is responsible for preserving water and preventing its pollution! Children and youth are especially capable of making wiser choices and persuading elder people to save water and make sure that it is sustainably managed. The following activities aim to help young people to appreciate the **species** and **ecosystems** that depend on water and to encourage them to raise awareness about the need to protect water-related **biodiversity**. Even the simplest activities can make a real difference to the **environment**.

Protect your watershed

Some of these activities require participants to go near water bodies. Be sure to take water safety precautions and to develop the activity under qualified supervision.

Wool Treasure Hunt

Level 1 2 3

Aim	To discover the biodiversity of your watershed .
Materials	An outdoor setting close to a body of water, three different coloured wools.
Time	40 minutes.
Background	<p>A watershed is any area of land that water flows across or through. This water is going downhill, of course, and it flows toward a common body of water, such as a river, a stream, a lake or the ocean. Watersheds can be big or small. Homes, farms, villages and towns are part of some watersheds. They can cover thousands of hectares in the case of watersheds with big rivers or a few hectares like the case of local ponds.</p> <p>We all need a healthy watershed so that it can keep recycling clean, fresh water over and over again. Plants and animals need healthy watersheds as well, and maybe it is more critical to them than to us because a healthy watershed means a healthy environment for them to live in and grow.</p>
How to do it	<ol style="list-style-type: none">1. Explain to your group that you are going to have some fun in the local pond, lake or stream. Divide your group into three teams.2. Give each team a ball of wool and ask them to unwind it all over the place, around a tree, under a rock, close to some water plants, etc.3. Assign a different colour of wool to each team and ask them to wind up their roll of wool to find the treasure at the end of the roll. You can place a bottle of water there as they will all be thirsty, and you can discuss about the importance of water!
Discussion	<p>Which elements of nature did you find in this place? How could these elements vary when considering a different habitat?</p> <p>How are these elements interrelated, living and non-living?</p> <p>Why are all these elements important for your watershed?</p>

Where Does Your Water Come From?

Level 1

Aim	To learn that water comes from different sources.
Materials	A copy of the maze, pencils.
Time	30 minutes.
Background	When a person opens a faucet to drink a glass of water, he or she may be tapping a

source close to home or hundreds of miles away. The fact that water falls from the sky makes it easy for many of us to think that there will always be enough to meet all of our needs. But before rain and snowmelt can reach our faucets, this water first flows over land into rivers, lakes and **aquifers**.

Water is then directed to pipelines and water filtration systems so your local water utilities administration can provide water to its jurisdiction. Over time, large distribution networks have been developed to pipe treated surface water and groundwater to homes, businesses, parks, schools and other facilities.

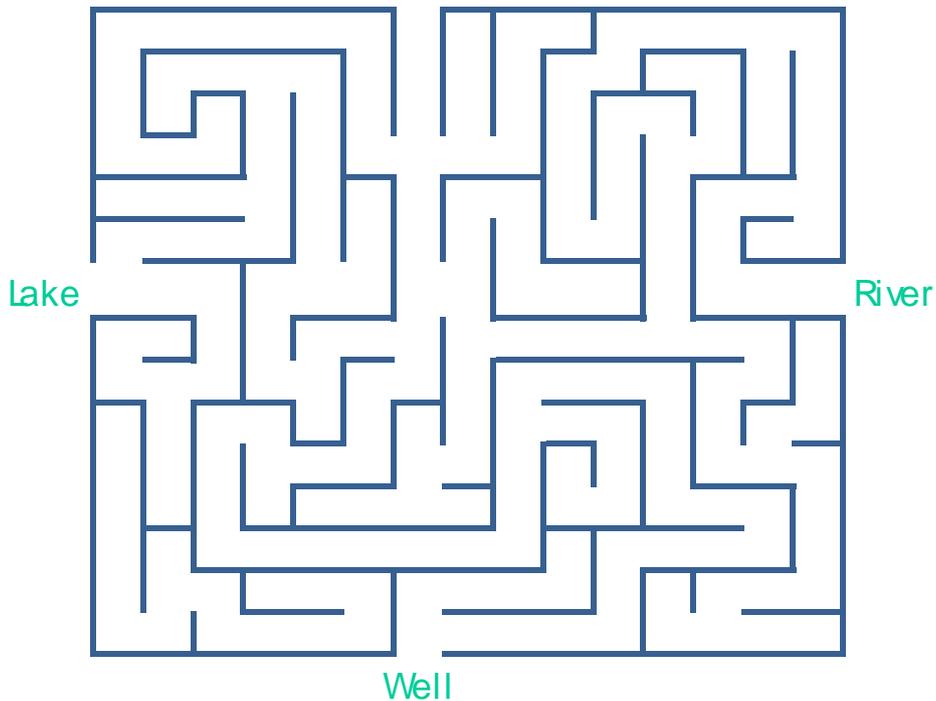
How to do it

1. It would be good to investigate where your water comes from, so children can have a better understanding on the subject.
2. Give each participant a copy of the maze.
3. Explain to them that using the maze below they have to find their way from their home to the different water sources.

Discussion

What is the connection between water and the **environment**?
Why is it important to treat water before making it available for human use?
What can you do to prevent water pollution?

Where does your water come from?



Drawing source: Microsoft Office Images
<http://office.microsoft.com/en-us/images>

Let it Rain!

Level 1 2 3

Aim	To discover the how nature looks during rain.
Materials	A rainy day, an outdoor setting.
Time	20 minutes.
How to do it	<ol style="list-style-type: none">1. Explain to your group how fun it can be to play outside while it is raining, of course if there is no lightning and if it is not too cold. You can tell them to wear some raincoats and boots or maybe not, getting soaked is even more fun!2. Take your group to play outside. You can try different games and activities:<ul style="list-style-type: none">• Racing under the rain.• Jumping in a puddle to see who can make the biggest splash.• Closing your eyes and listening to the sound of the raindrops, maybe you can make up a song to imitate that wonderful sound of nature.• Setting up a new musical instrument for the water to play, you could arrange a bunch of metal cans or pots in a line, for example.• Using some wet dirt to make a cool drawing on a thick piece of paper.• Making a drawing with some markers or water colours and taking it outside so the rain can transform it into a new work of art.• Building a waterway putting some rocks, sticks or mud in its path.• Using some wet dirt to make a yummy chocolate cake.

Don't worry about the rain - running around outside, rainy or not, is a very healthy thing to do, but make sure you dry yourself and change your clothes when you are finished!

Discussion	Does the sound of rain change as it speeds up or slows down? How does nature change when it is raining? Does it smell different? What are the benefits of rain?
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Source: National Wildlife Federation, Get Outside, Be Out There, Activities, Play, Rainy Day Fun, www.nwf.org/Get-Outside/Be-Out-There/Activities/Play/Rainy-Day-Fun.aspx

Explore a Pond

Level 2 3

Aim	To analyze what different creatures live in a water habitat .
Materials	A pond, strainer or dip net, shallow white plastic pan, small white plastic containers, white plastic ice-cube tray or plastic egg carton, plastic eyedropper, small paintbrush, hand lens or magnifying glass, nature journal and pencil.
Time	1 hour.
How to do it	<ol style="list-style-type: none">1. Explain to your group that you are having fun in a nearby pond. Ask them to wear proper clothes; it might be a good idea to wear some old sneakers or rubber boots.2. Approach slowly so you don't scare away the creatures near the water. How many can you see? What are they doing? Are any creatures flying over the

water? Swimming in the water or moving along the bottom? (For a clear underwater view, use a face mask or a homemade water scope.) Search plant stems and look under rocks and logs near the water's edge.

3. Fill the pan and containers with water and set them in a shady spot. Next, use your net or strainer to catch small fish, insects, and other tiny creatures. Try these ideas: look in different places, at the surface, along the shore, across the bottom. Check for wiggly creatures in the muck as the water runs out. Hold the net just under the surface. Have a participant hold a rock or branch in or right over the net and gently swish off any clinging creatures into the net.
4. Empty whatever you find into the pan or containers. Next, you can see them better by filling an ice-cube tray or plastic egg carton with clear water and transferring the creatures from the collecting containers to the tray. An eyedropper or paintbrush works well to pick them up, one at a time. Put each kind of creature in a separate section of the tray. Now see if you've captured something that: has no legs, has six legs, has a shell, has a tail, is red, is green, wiggles, etc.
5. Be sure to let everything go. Gently lower the containers to the water and let all the creatures swim out.

Discussion

Why is it important to have such a great variety of **species** in a given **habitat**? What would happen if any of these disappear? Or worse, what happens when **habitats** are destroyed? What can you do to avoid this?

Source: National Wildlife Federation, Ranger Rick, Explore a Pond, www.nwf.org/Kids/Ranger-Rick/Activities/Outdoors/Observing-Wildlife/Explore-a-Pond.aspx

Measuring Rain

Level 1 2

Aim

To collect and measure rainfall.

Materials

A rainy day, a plastic bottle of any size with a narrow neck, a funnel (its diameter equaling the base of the container), a wooden scale or a stick.

Time

1 hour approximately (it depends on how much the rain lasts).

Background

When it rains, the water flows over the land to join a bigger body of water. The land over which water flows is called **watershed**. You can compare a **watershed** with a funnel that collects all the water within the drainage area and channels it into a stream or river.

How to do it

1. Explain to your group that you are going to measure rainfall.
2. Find a level, open area and place your bottle in it. The funnel must be placed in the bottle before it begins to rain. Make sure the container is not disturbed during the rain period. It would be a good idea to sink the bottle a few centimeters into the ground so it doesn't fall.
3. After the rain, collect your container, put it on a level surface and use the wooden scale to measure the depth of the collected water. Use a stick if the neck of the bottle is too narrow. The wet part of the stick can be measured and this can be related to the volume of rainfall.

Discussion

Why is it a good idea to collect rain water? What uses could you give to it?

How are places that do not get enough rainfall during a long period of time affected?
How can our activities be affected by water scarcity?

Be An Ocean Watcher

Level 1 2 3

Aim

To discuss some ideas to protect the beaches and the oceans.

Materials

Cardboard, colour markers, adhesive tape.

Time

1 hour.

How to do it

1. If you live near the seashore, this is a great way to encourage your group to be conscious about the importance of respecting and protecting the beach and the sea. Explain to them that they are going to create some signs to encourage everyone at school or youth group to act responsibly when enjoying a day at the beach!
2. Place the signs all around your school or youth group. Or you could even place them at the beach, in a restaurant or in a store maybe, be sure to ask for permission!

Here are some ideas:

- Enjoy looking at animals and plants, but don't touch them or disturb their homes.
- Do not take away with you any beach treasure, leave it there for others to enjoy.
- Recycle motor oil at a gas station, everything that goes down the drain ends up in the ocean.
- If you have a beach picnic, don't forget to take all the trash with you. Trash that gets into the oceans can really harm the animals, especially plastic.
- Everything you dump ends up somewhere, and a lot of trash ends up in the ocean. Recycle!
- If you bring your pets to the beach, make sure they don't disturb the local wildlife.
- When it is safe, ask for tap water instead of bottled water, packing and shipping all that bottled water produces tons of pollution.
- Take the bus, ride your bike or walk instead of driving your car, this will burn fewer **fossil fuels** and cut back on acid rain and water pollution.
- Eat only fish that come from carefully monitored and sustainable fisheries or aquaculture. Be selective about the seafood you eat.
- Don't bring home wildlife, plants and animals. Leave them in their home, that is where they survive best.

Discussion

Have you ever been to a beach that had different trash items everywhere? How did you feel?

How do you think plants and animals living there can be affected?

How can trash affect marine life?

Why is it important and necessary to respect and preserve oceans?

Source: American Museum of Natural History, Ology, Marine Biology, Be An Ocean Helper,
www.amnh.org/ology/index.php?channel=marinebiology&features/stufftodo_marine/help_main.php?TB_iframe=true&height=500&width=750

Water, Water Everywhere!

Level 1 2 3

Aim	To realize how much water is in the news and why.
Materials	Newspapers, magazines, notebook, pencils, colouring pencils, scissors.
Time	One 15 minutes lesson (to explain the activity) and one 40 minutes lesson (to review the outcomes).
How to do it	<ol style="list-style-type: none">1. Explain to the participants that they are going to make their own water scrapbook, so they can always remember why water is so important. The participants can do this as homework or in class.2. Ask them to look for water related articles and photographs on newspapers and magazines. These can be related to water availability, water related disasters, uses of water, etc. Ask your group to do this for at least a week.3. Have each participant present their scrapbook to the rest of the group.
Discussion	Which was your favorite article? Why? Were there some common stories? What were they about? Why do you think water is always in the news?

Water Shortage!

Level 1 2 3

Aim	To experience how water is a precious resource.
Materials	A 4 litre (1 gallon) recycled plastic jug, cup, water.
Time	A school day.
How to do it	<ol style="list-style-type: none">1. Before the activity day ask each participant to bring to school or youth group a four litre recycled plastic jug and a cup.2. Explain to your group that today you are challenging them to make it through the day using only four litres of water. They will have to use this water for all their activities, washing their hands, brushing their teeth, drinking (if it is safe), and any other water use (except for flushing the toilet).
Discussion	Was this activity difficult for you? How did you feel knowing that you only had one gallon of water for the day? Do you think you could also use this water to wash your clothes, clean yourself, cook, etc? How do you think other people manage to live like this? What negative effects can this have on their lives?

Your Own Watershed!

Level 1 2 3

Aim	To create a watershed model and understand how it works.
Materials	Big pan (metal or plastic), rocks (big and small), aluminum foil, water, dirt.

Time

40 minutes.

Background

A **watershed** is all the area of land that sends rain into a common body of water, such as a river, a stream, a lake or an ocean. As humans, animals and plants live together in this area and they depend on each other to survive, but human activities can hurt (or help) the **environment**. Therefore, it is essential to reflect about water quality and the need to keep pollutants out of the water.

How to do it

1. Explain to your group that you are going to create a **watershed** model in order to understand how water raining on land can end up in a body of water.
2. Ask the participants to use the pan to create the **watershed** model. Tell them to make some hills and mountains using the rocks and the aluminum foil. Have them cover the entire pan with the aluminum foil to represent the land. It should be molded so that some parts are flat while other parts have bumps and uneven parts. The foil should slope downward so that there is an area at the end of the pan where water can collect.
3. Have the participants take turns creating rain by gently pouring some water near the upper slope of the land. Have everyone watch the water make its way through the land and collect at the bottom to show how groundwater seeps down to the lowest level. You can increase the slope of the pan by placing a book under the upper end of the pan.
4. Next, explain to your group that you are going to consider how a body of water can be polluted by different materials found on land. Tell them the dirt represents pollution. Place some dirt on different spots on land and ask students to guess what will happen if it rains again. Have a participant pour some water again so that your group can watch the flow. Explain that this is called runoff, the water that flows off of land into a body of water and may carry pollutants with it. Point out that the dirt may flow all the way to the body of water at the bottom.

Discussion

How does a **watershed** support people, animals and plants?

What are the effects of pollution in a **watershed**? And how could this pollution affect the **environment**?

Can you name some ways to reduce the negative effects of people on their local **watershed**?

Where is All This Pollution Coming From?

Level 2 3

Aim

To learn about point and non-point pollution sources.

Materials

Sources of pollution list provided below.

Time

40 minutes.

Background

Watersheds can be affected by two types of pollution: point source and non-point source.

- *Point source pollution* is easy to identify as it can be traced directly to its source. For example, if there is an oil spill caused by an oil tanker, you can “point” your finger at the exact source of the pollution.
- *Non-point pollution* is a little more difficult to identify. Storm water runoff pollution is a type of non-point source pollution. This means that the pollution cannot be traced

back to a specific source because it comes from many different sources throughout the **environment**. This type of pollution is currently the main cause of **watershed** pollution today. Storm water runoff can collect many different types of pollution from different sources before it reaches a body of water, including trash, dirt and chemicals. Storm water collects these materials and flows directly into a body of water. You can't "point" to the specific origin of the contamination because it comes from too many different places and is difficult to trace.

How to do it

1. Divide the participants into four groups and assign two sources of **watershed** pollution to each one.
2. Tell them to identify what types of pollution they are, point source pollution or non-point source pollution. Ask them not to say the answers out loud because the other teams will have to guess what their types of pollution are.
3. Explain to your group that they are playing a guessing game. Each team must role-play their sources of pollution while the other teams guess. Give them some 10 minutes to prepare themselves. The team that has the most correct answers is the winner!

Pollution Sources

- An open garbage dump.
- Soil erosion from agriculture fields.
- A broken pipeline that leaks raw sewage into a river.
- Runoff from the streets.
- Erosion from construction sites.
- A family dumping garbage in the sea.
- Clothes being washed in a stream.
- Water from agriculture fields.

Discussion

Can you think of other examples of point and non-point pollution sources?
Why do you think point sources have decreased?
How do you contribute to pollute your **watershed**? What can you do to change that?

Water Villains!

Level 1 2

Aim

To learn about water pollution.

Materials

Villain information cards provided below, colouring pencils, paper.

Time

40 minutes.

Background

Water can be easily contaminated by different causes. Water pollution is a serious issue as it affects the quality of water and the latter affects all living beings that depend on water.

How to do it

1. Explain to your group that water can get contaminated by different famous and well known "villains".
2. Divide your group into six teams and give one of the villain cards to each one. Have them make a drawing of what they believe their villain looks like.
3. Ask each team to present their villain to the rest of the group.

Discussion

Where does each villain come from?

How can these villains affect our health and the health of other living beings?
How can we combat these villains?

Water Villains Cards

Silt and Dirt

We are distributed by bulldozers, trucks and heavy machinery that flow into the water from construction sites and other land areas. There is no one like us! We can block sunlight from entering water and can kill water plants. But that is not it; we can also clog gills of fish and smother small creatures that live in the bottom of a water body.

Chemicals

There are thousands of us and there are hundreds of ways by which we can creep into the water. We flow in with the water that runs off fields with pesticides, from factories or from drains. Once in the water we can kill fish, birds and other animals. We can also be sneakier by gradually collecting in the bodies of these animals for many years and showing our nasty effects much later.

Acids

We are a cool gang, we fly in with the air and mingle with the rain to join the water of lakes and streams, and then we work hard to make the water acidic. We call ourselves acid rain. When we arrive with rain and mix with water, the plants and animals living in it could get pretty sick. We can also harm other non living elements, such as your statues and houses; we enjoy making your city look unsightly.

Nitrates and Phosphates

We reach different water bodies with all the water from fields which have been fertilized, and from all the water used to wash clothes with detergents that contain phosphate. We help lots of algae to thrive and when these algae decompose, they draw more and more oxygen. So, when you see a green film on the water you can be sure it's us having a blast!

Bacteria and Viruses

You can't see us but we can really harm your health! We can spread water-borne diseases like dysentery, hepatitis or typhoid, just to name a few, when we get into the water you drink. And we get into the water with all the sewage (with human and animal waste) which is not treated in a treatment plant. We need lots of oxygen and we grab as much as we can from water, so we don't let many other things live in the water with us.

Oils

We are the oil that won't mix with the water. People only remember us when we make the headlines in the news, like when there has been an accident with an oil tanker and there is a terrible oil spill. But the truth is that we are always here, sliming our way into the seas and oceans from the tankers when they clean out their tanks, from oil refineries and even from the city streets.

Source: United Nations Environment Programme, Tunza, A Trip With Drip,
http://unep.org/tunza/children/images/flash/a_trip_with_drip/start.swf

How Does Pollution Affect Nature?

Level 1 2 3

Aim

To study the effects of pollutants on plant growth.

Materials

Lima beans (these should be pre-soaked), plastic sandwich bags, paper towels, marker, solutions: water, vinegar, salt, liquid soap.

Time

A 1 hour lesson (to prepare the experiment), five 10 minutes lessons (to make the seed observations) and a last 30 minutes lesson (to have a group discussion).

How to do it

1. Ask your group where plants get the water they use to grow from (rain, groundwater, irrigation) and how plant growth would be affected by polluted water.
2. Prepare 30ml of each solution: clean water (control), vinegar, salt water and soapy water.
3. Tell your group the context of the experiment: a local chemical company has been dumping waste into their back fields and it has been leaching into a local groundwater source. Local scientists (your group) have been asked to study the long-term effects of this pollution on local crops (lima beans). Participants will compare seed growth in four different solutions (water, vinegar, salt, and soap). The water represents freshwater, the vinegar represents acidic rain, the salt solution represents saltwater, and finally, the soap represents chemical spills into freshwater supplies (from residential and factory sources).
4. Divide the participants into lab groups (preferably groups of four). Each group must receive 4 lima beans, 4 sandwich bags and 4 pieces of paper towel.
5. Ask each group to label each bag, one for each liquid. Participants must soak one paper towel in each liquid and place it in the corresponding bag. They must then add 10 ml of the corresponding liquid into each bag. One lima bean should be placed at the top of each paper towel and the bag must be sealed. Tell each group to make a hole at the top of each bag as the seeds will need oxygen to grow. Ask them to put all their experiments in the same place in the classroom or meeting room for observation over the next 7 days.
6. In the interim, have each group organize their "scientific notes":
 - Purpose
 - Hypothesis
 - Materials
 - Procedure
 - Observations

Day	Fresh Water	Salt Water	Acid Rain	Waste Water
Day 1				
Day 2				
Day 3				

- Results and Conclusions.

7. On a daily basis, ask each group to record their observations through drawings, descriptions and measurements of seed or root growth.
8. Each group must complete their scientific report by outlining the best **environment** for plant growth based on their findings. In their conclusions, they should make recommendations to the industry in order to save the local crops; make sure they support their statements with their results.

9. Have each group present their results and conclusions to the rest of the group.

Discussion

Did all the seeds grow? Why or why not?
Which seeds grew at the beginning, and which at the end of the experiment?
Why did some seeds stop growing?

Source: H2oh!, Activities, How does pollution affect nature?
www.waterecan.com/h2oh/2-1.shtml

Which land is better?

Level 1 2 3

Aim

To learn how plants and water retention are related.

Materials

Two cardboard boxes (90cm x 50cm x 15cm), plastic sheet, piece of tin for a spout, one tin can with a perforated base, brick pieces, pebbles, ordinary soil, manured soil, seeds of any fast growing plant, two glass jars, water.

Time

A 1 hour lesson and a 30 minutes lesson (after plants have grown).

Background

Plants are essential for **watersheds** as they make water behave differently than when the land is bare. Plants keep water from washing the soil away. Their roots hold dirt together and their branches and leaves avoid heavy rain drops from hitting the soil directly. Land with a lot of plants growing on it will hold water longer and release it more slowly. It is the roots of the plants, trees and grass that make soil softer, so they help water to sink into the ground.

How to do it

1. Explain to your group that you are going to make an experiment about plants and water absorption.
2. Take the two cardboard boxes and line them with the plastic sheet in order to make them leak proof.
3. At one end of each box cut a "V" notch 10 cm deep and fit it with a tin spout to draw the run-off water into a glass jar.
4. Fill each box with 3 – 4 cm layer of brick pieces and pebbles, followed by 3 – 4 cm of ordinary soil and 3 – 4 cm of manured soil.
5. Sow seeds of any quick growing plant in one box (box 1). Leave the other box bare (box 2). Sprinkle water on box 1 regularly until the plants are 8 – 10 cm high.
6. Set the boxes on a table so that the spout extends over the edge. Place a stick under the other end of the boxes to give them slope and place the empty glass jars beneath the spouts.
7. Gently pour equal amounts of water over the boxes. Check the rate of water flow and collect the water that flows out of the two boxes on the glass jars.

Discussion

Is there a difference between the quantity and the quality of the water collected in the two jars?
What made the difference?
How can these affect great extensions of land and their inhabitants?

Source: United Nations Environment Programme, Tunza, A Trip With Drip,
http://unep.org/tunza/children/images/flash/a_trip_with_drip/start.swf

I Need Water and So Do You!

Level 1 2 3

Aim	To generate understanding about every living being's dependence on water.
Materials	Poster board, colouring pencils, colour markers, internet access, books (to do some research about local animals).
Time	Two 1 hour lessons.
How to do it	<ol style="list-style-type: none">1. Remind your group how every living being depends on water to survive and explain to them that the purpose of the activity is to explore this relationship from the perspective of an animal found in your watershed.2. Divide your group into small teams and ask them to pick an animal from their watershed; maybe you could give them some time to research about their animal using the internet or some books.3. Have each group discuss about their animal. What is the animal's habitat? What is the animal's relationship with water? Which water uses might affect the animal's health and its habitat?4. Next, ask each group to use the poster board to create an advertisement from their animal's point of view explaining why water is important to them. Remind them that through their advertisement they should try to convince the viewers to take action on the issue: conserve water, prevent pollution, protect habitats, etc.5. Have each group present their advertisement to the rest of participants. You can even place the advertisements around your school or youth group to encourage others to act!
Discussion	How does your animal find and use water? How would your animal be affected by water pollution? Whose responsibility is it to protect your local watershed ?

Adapted from: H2oh!, Activities, Water Alive!
www.watercan.com/h2oh/g4wateralive.shtml

Which Animal Can You Find in Your Watershed?

Level 1 2

Aim	To learn about different aquatic animals living on different watersheds .
Materials	Computer, access to internet, books (for research), photo camera (if possible).
Time	1 hour.
Background	<p>A watershed is any area of land that water flows across or through. This water is going downhill, of course, and it flows toward a common body of water, such as a river, a stream, a lake or the ocean. Watersheds can be big or small. Homes, farms, villages and towns are part of some watersheds. They can cover thousands of hectares in the case of watersheds with big rivers or a few hectares like the case of local ponds.</p> <p>We all need a healthy watershed so it can keep recycling clean, fresh water over and over again. Plants and animals need healthy watersheds as well, and maybe it is more critical</p>

to them than to us because a healthy **watershed** means a healthy **environment** for them to live in and grow.

How to do it

1. Ask your group to choose an aquatic animal from their local **watershed** and to gather as much information about it as they can.
2. Have them make a nice presentation about their animal using a computer program, they could even include photographs.
3. Contact other schools from your country (or even from other countries if possible) and share this information with them. Ask them to do the same. This is a great way to learn about different animals from different places! You could even collaborate on a research about a particular **species** that is found in both locations.

Discussion

How do these animals fit into the **watershed**?
Why is it important to maintain a healthy and clean **watershed**?
What is the connection between our everyday activities and the state of our **watershed**?

Camouflaged!

Level 1 2 3

Aim

To learn how colours can help animals survive in their **habitats**.

Materials

An outdoor setting, green and white construction paper, scissors.

Time

20 minutes.

How to do it

1. Ask your group if they can hide in plain sight, well, lots of animals can. Frogs, for example, use their green colour to camouflage themselves between the plants, the leaves or the grass and hide from their enemies.
2. Cut about 20 green frog shapes and 20 white dove shapes. Show the participants the green frogs and white doves, so they can see how they look.
3. Hide the frogs and the doves all over the garden. Explain to the participants that they must look for both animals.

Discussion

How many green frogs did you find? How many white doves did you find?
Which animal was easier to find? Why?
What other colours might help an animal survive near a pond?

Make Your Own Rain

Level 1 2 3

Aim

To demonstrate how the water cycle works.

Materials

A large glass or clear plastic kitchen bowl, plastic food wrap, a small stone or marble, a clean jam jar (small enough to fit completely inside the bowl), some water-soluble ink or paint, dirt, water.

Time

1 hour.

Background

Our world has a limited amount of water; and the amount of water we have now is the same our Earth had when dinosaurs existed! The water cycle refers to how the Earth's

water recycles itself, and it is made up of different parts:

- **Evaporation:** the sun heats up the water in oceans, rivers or lakes and turns it into vapor or steam. This water vapor goes into the air. This is the process when liquid changes into a gas.
- **Transpiration:** plants lose the water they absorb from the soil through their leaves; this water is then evaporated and sent back up into the air.
- **Condensation:** the water vapor sent into the air cools up and changes back into liquid, forming clouds. This is the process when a gas is changed into a liquid.
- **Precipitation:** when too much water has condensed the air cannot hold it anymore. The small droplets of water in the clouds form larger droplets and water falls back into the earth in the form of rain, hail, sleet or snow.
- **Infiltration:** when water falls back into the land, this water can soak into the ground through the soil and become part of the groundwater.
- **Runoff:** some of the water that falls back into the earth runs over the surface of the land and flows down hill into rivers, streams, lakes or oceans.

How to do it

1. Explain to your group that you are going to make an experiment to help them understand how the sun makes the world's water cycle work, and how the water cycle helps to purify water.
2. Sit the jam jar in the middle of your bowl.
3. Add some water to the bowl, ensuring that the jar doesn't start to float. Add a few drops of ink to the water to colour it, and gently mix it in.
4. Cover the top of the bowl securely but slightly loose with the food wrap; there should be a little 'give' left at the top, but not too much.
5. Place the stone directly above the jam jar (if you've got the tension of the cover right, this should mean that the weight of the stone makes a little depression in the plastic film) centered over the open mouth of the jam jar.
6. Stand everything in direct sunshine, wait and watch.

You could also try this experiment using water mixed with dirt, after the bowl spends some hours on the sun, the jam jar should contain relatively clean water and the bowl should contain the dried dirt.

Note:

As the sun warms the bowl, the water inside begins to heat up and as its temperature rises, it starts to evaporate. The water vapor produced condenses on the internal surface of the plastic film, forming tiny droplets, and once they get large enough, they run down the underside of the film, to the low point created by the weight of the stone. As more and more collect, eventually the drops become too heavy to stick onto the film any longer, and "rain" falls into the open mouth of the jam jar. A careful look should also reveal that the water collecting in the jar is clear, not coloured, the ink is being left behind, just as the salt is left behind in the sea water. Minerals like salt and other substances dissolved in water are left behind during the evaporation, as a result, when the water vapor condenses to become water again, it is relatively pure.

Discussion

What are the two processes responsible for purifying the water? (Evaporation and Condensation).

How does this process work on Earth?

If the plastic wrap represents the **atmosphere**, What would happen if the plastic wrap was dirty? (Air pollution).

Source: Eco Friendly Kids, Simple Solar Experiments for Schools, Making Your Own Rain,
www.ecofriendlykids.co.uk/simple-solar-experiments-for-schools.html

Watershed Crossword Puzzle!

Level 1 2

Aim	To recall some words related to watersheds .
Materials	A copy of the crossword puzzle, pencils.
Time	20 minutes.
How to do it	<ol style="list-style-type: none">1. Explain to your group that they have to figure out the missing words from each sentence. Ask them to write them into the corresponding boxes in the crossword puzzle.

Watershed Crossword Puzzle

Down

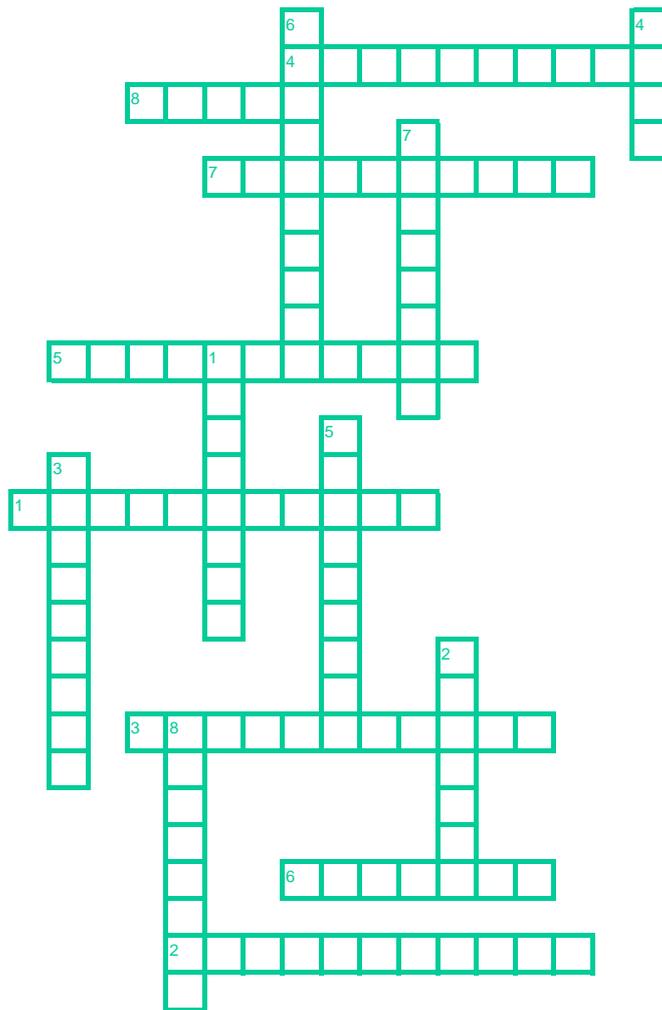
1. Storm water runoff occurs after a ...
2. Water suitable for drinking is called...
3. An oil spill is a point source of ...
4. A hole drilled into the earth to obtain water is called...
5. A ... is any area of land that water flows across or through.
6. ... can be defined as the application of measures for the sake of cleanliness.
7. ... has the responsibility to protect and maintain a healthy **watershed**.
8. A ... refers to a source of supply; something that can be used to make something else.

Across

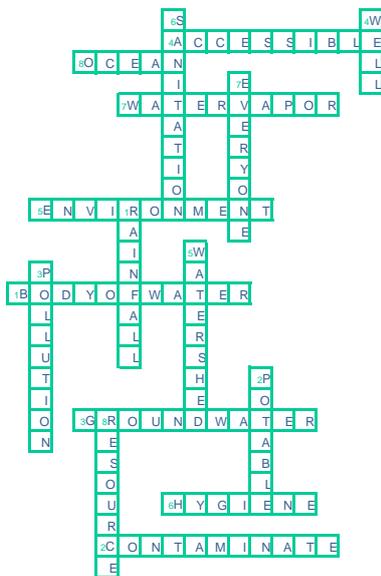
1. Water in a **watershed** flows toward a common ...
2. ... means to make unsuitable with something unclean.
3. When water sinks into the ground it is called ...
4. ... can be defined as easy to reach or use.
5. A healthy **watershed** provides a safe ... for animals to live in.
6. The promotion and preservation of health is known as ...
7. Plants transpire water into the air by taking it up through their roots and releasing it as ...
8. An ... can be defined as a major body of water.

Discussion	<p>Why does it matter to learn about watersheds?</p> <p>Do you believe it is fair that other people do not have access to sufficient good quality water? Why?</p> <p>What might your school or youth group do to prevent water pollution and safe water?</p>
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Watershed Crossword Puzzle



Solution:



Watershed Snakes and Ladders

Level 1 2 3

Aim

To reflect about different issues related to our **watersheds**.

Materials

40x40 piece of cardboard, colour pencils, markers and dice.

Time

1 hour.

Background

You might wonder why there is so much difference in water availability. Some reasons are natural - some parts of the world get little or irregular rainfall (it might happen that rain does not come for two or three years). This means there is no water to fill up the different bodies of water. No rain means no water for domestic use and for agriculture; therefore, it is not possible to grow food. This situation is called drought.

In some parts it rains for a short period of time. It rains heavily and often all the rain water flows away before it can be stored and used. This can happen especially where there is not enough **vegetation** to cover the soil. It is the roots of the plants, trees and grass that make soil softer. Land with a lot of plants growing on it will hold water longer and release it slowly. In other places even if lakes and ponds are filled up with rain water, this is used faster than it is filled.

Population growth means more and more people need water. But, people are using our water from its natural stocks faster than it takes nature to replenish it. Human beings are digging very deep to extract the underground water that has been collecting for thousands of years.

Whatever the amount of rainfall, once the rain falls, it flows over the land to join a bigger body of water. The land over which water flows is called **watershed**. You can compare a **watershed** with a funnel that collects all the water within the drainage area and channels it into a stream or river.

Source: United Nations Environment Programme, Tunza, Children, A Trip With Drip,
http://unep.org/tunza/children/images/flash/a_trip_with_drip/start.swf

How to do it

1. Take a 40 x 40cm piece of cardboard and divide it into a 10 x 10 grid of squares. Number the squares starting from the bottom left square as 1 and going backwards and forwards up the board to the top left square.
2. Draw seven ladders and seven snakes which connect different squares to each other. On the other squares, write the following instructions:
 - Your streets are full of debris; some have been washed into a water body and are harming aquatic life, go back three spaces.
 - Farmers from your community are using too many fertilizers that are being carried in storm water runoff and are negatively affecting your water supply, go back three spaces.
 - Your **watershed** is full of plants that help retain water and prevent destructive floods, go forward three spaces.
 - Your community is using water barrels to collect rain water and people are using it for different activities, go forward three spaces.

Ask your group to help you make it look colourful and fun!

4. Explain the game. You will need one marker for each player and a dice. Roll the dice and move the marker the number of spaces you got on the dice. If you land on a

ladder, you can climb up if you give a reason how water contributes to maintain a good health. If you land on a snake, you must slide down unless you can give an example of how you can prevent water pollution. The first to reach the space 100 is the winner! Have fun!

Discussion

How do our everyday activities affect water quality?

What could be the consequences of not having enough water to satisfy our daily needs?

If you know that everyone has the right to enjoy clean and fresh water, what can you do to help people that don't?

Exploring Pollution Sources

Level 2 3

Aim

To explore possible sources of **watershed** pollution.

Materials

Bag (to collect the samples), gloves.

Time

40 minutes.

Background

Watersheds can be affected by two types of pollution: point source and non-point source.

- *Point source pollution* is easy to identify as it can be traced directly to its source. For example, if there is an oil spill caused by an oil tanker, you can “point” your finger at the exact source of the pollution.
- *Non-point pollution* is a little more difficult to identify. Storm water runoff pollution is a type of non-point source pollution. This means that the pollution cannot be traced back to a specific source because it comes from many different sources throughout the **environment**. This type of pollution is currently the main cause of **watershed** pollution today. Storm water runoff can collect many different types of pollution from different sources before it reaches a body of water, including trash, dirt and chemicals. The storm water collects these materials and flows directly into a body of water. You can't “point” to the specific origin of the contamination because it comes from too many different places and is difficult to trace.

How to do it

1. Explain to your group that you are going to look for possible pollution sources around your school or youth group grounds. Remind your group that trash can get into a body of water sometimes by mistake and sometimes due to people being careless.
2. Take the participants outside and ask them to identify possible sources of pollution, point and non-point. You can have the participants collect samples of trash or pollutants they find around the school or youth group.
3. Take the samples back to the classroom and ask the participants how introducing those items into the local **watershed** might negatively affect the body of water where they will end up. Next, have them describe how it might affect wildlife or people there.

Supervise your group to ensure that no one collects dangerous articles.

Discussion

Which was the worse source of pollution you found? Explain why.

How might **watershed** pollution affect aquatic wildlife?

Is there any source of pollution on your neighborhood? What could be a possible solution?

Oil Spills!

Level 1 2 3

Aim

To feel and observe the effects of oil on water and other different materials.

Materials

Vegetable oil, black tempera paint, water, two containers or basins, fur scraps, feathers, leaves, sand, pebbles, shells, wood scraps, paper towels (to clean up).

Time

50 minutes.

Background

Over the past years our world has faced **habitat** destruction and environmental contamination. More and more creatures are being threatened because of different activities humans develop each day. In the recent past, oil spills have caused major problems to different animals and plants. But a worrying fact is that currently almost 90 percent of the oil in the oceans comes from smaller discharges from oil-tankers, especially when these are cleaned out. It is estimated that over one million tonnes of oil are spilled into the ocean each year from ships and oil rigs.

Habitats have been destroyed and many animals have died. Oil clogged the feathers and respiratory tracts of sea birds. Fish, shellfish and other sea animals, including plankton, also died due to the oily waters. The film of oil on the surface reduces the amount of light and oxygen passing into the water, causing underwater marine life to suffocate to death.

Fortunately, when such terrible accidents happen, different groups work to mitigate the consequences. One important step toward this is to understand the effects of oil on water and different animals and plants.

How to do it

1. Explain to your group that they will observe and describe oil and water, and different materials introduced into them.
2. Use black tempera and vegetable oil to make pretend oil.
3. Put some water in the two basins; and spill the oil in one of the basins.
4. Tell the participants that their right hand will only go inside the water basin and their left hand will only go inside the water and oil basin.
5. Ask each participant to place one hand in each container and move it around to see how it feels. Ask them to describe each basin using only words; list them under the appropriate headings, oil and water or water.
6. Divide the participants into small groups and give each one any of the following items to submerge in both basins, first in the water basin and then in the water and oil basin: fur scraps, feathers, leaves, sand, pebbles, shells and wood scraps. Allow the participants to investigate the changes that occur in the texture of these materials.
7. Ask each team to describe, compare and contrast how the items feel in the two containers using the list of words they created previously.

Make sure you clean up when you are finished!

Discussion

How did water change after adding the oil?

How did oil affect the different elements you used? How might oil affect animals and plants in real life?

How do oil spills affect human beings?

Adapted from: Alaska Oil Spill Curriculum k-3, Oil Exploration,
www.pwsrca.org/outreach/Curriculum/gradesK-3.pdf

Clean Up an Oil Spill

Level 1 2 3

Aim

To understand why it is such a difficult task to clean up an oil spill.

Materials

One 28 cm x 19 cm x 4 cm clear glass baking dish (or equivalent), water, blue food colouring, 12 tbsp. vegetable oil, 8 tbsp. pure cocoa powder, 1 tsp. table salt, a tablespoon, a teaspoon, 5 paddle-pop sticks, a coffee mug, sorbents (paper towel, cotton balls, rag, string, nylon pot scrubber, sponge, styrofoam cup, garden peat moss), 1 squirt of liquid dishwashing detergent, tweezers.

Time

1 hour.

How to do it

1. Explain to your group that you are going to try and clean an oil spill.
2. To prepare the fresh water, fill the baking dish with cold tap water within 1 cm of the rim, add five to six drops of food dye and mix well. Let the solution settle.
3. To simulate the crude oil, place three tablespoons of vegetable oil in the mug, add two tablespoons of cocoa powder and mix thoroughly with a paddle pop stick.
4. To contaminate the fresh water, very slowly pour the simulated crude oil from a height of 1 cm onto the top of the fresh water dish. If you pour the oil too quickly, the experiment won't work. Wait three minutes to see what happens.
5. To test the sorbents, place a small sorbent sample into the centre top of the contaminated fresh water. How much oil did the sorbent clean up? How quickly? Does the sorbent pick up water too? If so, how can you tell? Does the sorbent sink or float?
6. Remove the sorbent using the tweezers and repeat the step 1 with other sorbent samples. Clean out the contaminated fresh water. Keep track of the amount of time it takes to clean up the oil spill using the different methods. Of the sorbents you tested, which one worked the fastest? The best? What other materials could you use as sorbents?
7. Prepare new simulated fresh water following the instructions above and add oil to contaminate it.
8. Add detergent to the oil-contaminated fresh water. What happened when the detergent was added to the contaminated fresh water? Where would the oil go in "real" fresh water after a dispersant (like the dishwashing detergent) is used? How clean is the fresh water now that it has dishwashing liquid in it?
9. Repeat all of the above procedures substituting the fresh water for ocean water. To prepare the ocean water, follow the fresh water procedures and add 1 teaspoon of salt and mix it with the water before adding the crude oil.

Discussion

What happened to the oil when you dropped it on the fresh water/ocean water? Did it sink? Float? Mix in?
How would you pick up the oil-contaminated material in a real oil spill in fresh water/the ocean?
How would you dispose of the oil-contaminated material in a real oil spill?
When oil reaches the shoreline, what other problems might occur?

Source: Australian Maritime Safety Authority, Educational Resources and Information, Teachers, Classroom Projects, Experiment to Clean Up an Oil Spill
www.amsa.gov.au/marine_environment_protection/Educational_resources_and_information/Teachers/Classroom_Projects/Clean_up_oil_spill_exercise.asp

Wetland Model

Level 2 3

Aim

To learn what a wetland is and describe its functions.

Materials

Whiteboard, modeling clay, oasis (florist foam), roasting pans, small piece of indoor-outdoor carpeting, sponges, pine needles, twigs, grass, weeds, soil, and other natural materials, cotton swabs (optional), toothpicks (optional), cardboard, glue, scissors, paper and pencils, markers, whiteboard markers, pictures of wetlands and wetland plants and animals, jar of muddy water, water, reference books, poster paints.

Time

1 hour.

Background

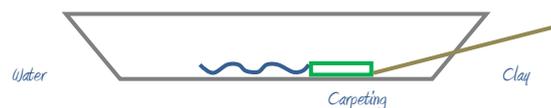
Wetlands are unique **habitats** which possess very special characteristics as they lie at the interface of terrestrial and aquatic **habitats**. They present an incredible mixture of **species**, conditions, and interactions. Wetlands are among our planet's most diverse and varied **habitats**.

Wetland soils are shaped by water. These soils, known as hydric soils, are saturated or even submerged all or part of the year. Wetlands help filter silt and pollutants from water, help prevent soil erosion and often reduce flood damage.

The high level of **nutrients** and the availability of water make wetlands an ideal **habitat** for fish, amphibians, shellfish, and insects. Moreover, many birds and mammals rely on wetlands for food, water and shelter.

How to do it

1. Explain to your group that you are building a wetland model in order to show them how some of the important wetland functions work.
2. Spread a layer of modeling clay in half of the roasting pan to represent land. Leave the other half of the pan empty to represent a lake or other body of water, such as a river or ocean. Shape the clay so that it gradually slopes down to the body of water.



3. Smooth the clay along the sides of the pan to seal the edges, you can also form meandering streams in the clay that lead into the body of water.
4. Cut a piece of indoor-outdoor carpet to completely fill the space across the pan along the edge of the clay. The carpeting represents the wetland buffer between dry land and open water.
5. Begin the activity by asking your group to list the characteristics of a wetland. Write their answers on the whiteboard and take a group survey to decide which characteristics might apply to all wetlands.
6. Next, show your group some pictures of different types of wetlands, including freshwater and salt marshes, freshwater swamps, mangrove swamps and bogs. Have them think about the animals that might live in the different types of wetlands.
7. Now, demonstrate some of the functions of a wetland using the model:
 - **Flood control:** after fitting the piece of carpeting into the wetland area, pour some water slowly on the land. What happens? Some of the water is slowed down by the wetland (carpet) and the excess slowly flows into the body of water.

Now, remove the carpeting and water. Pour the same amount of water on the model at the same spot and rate as before. Have your group note any difference.

The water should fill the body of water much more quickly than before. That is because it is no longer buffered by the wetland. Explain that most wetlands are shallow basins that collect water and slow its flow rate. This slowing process helps reduce flooding and also helps prevent soil erosion. In many coastal areas wetlands are drained and filled in, and houses or marinas are built right along the water. Without a wetland buffer, these developed open areas are often subjected to severe flooding and erosion, especially during violent storms.

- **Water purification:** pour the water out of the model and replace the piece of carpeting in the wetland. Pour some muddy water from the jar onto the land. Ask your group to compare the water that ends up in the body of water with the water in the jar. Explain that the soil particles are trapped by the carpeting, making the water in the body of water much cleaner.

Remove the carpeting, pour out the water and try the experiment again. What happens without the wetland in place? Why do all the dirt particles end up in the body of water? The thick mat of plant roots in a wetland helps trap silt and some types of pollutants. Without a wetland, excessive amounts of silt and pollutants can end up in lakes, rivers and other bodies of water.

8. Next, discuss how wetlands are important wildlife **habitats**, as well as important recreation sites for people.
9. Explain to your group that now they are helping you to make a complete wetland model. Instead of using carpeting to represent the wetland, have your group use oasis (florist foam). The participants can attach plants and animals to the model using toothpicks. They can make a freshwater marsh, a salt marsh, a freshwater swamp, a mangrove swamp or a bog. Have them decorate the model according to the type of wetland they choose. Here are some ideas:
 - For cattails, use cotton swabs painted in brown, pieces of grass or toothpicks painted in green with bits of brown clay stuck on the tops.
 - Use long pine needles for reeds.
 - Shape wetland creatures from clay or cut them from paper and glue onto toothpicks.
 - Make trees by gluing pieces of green sponge onto twigs.

You can now repeat the experiment to see it in action again!

Discussion

Have you ever been to a wetland? What did you enjoy about it the best?
What other functions of wetlands can you mention?
Why is it important to preserve every **habitat** we can find in our World?

Source: national Wildlife Federation, Eco-Schools USA, Wetlands Information and Activities, Wetland Models.
www.nwf.org/Global-Warming/School-Solutions/Eco-Schools-USA/Become-an-Eco-School/Special-Reports/Oil-Spill-and-Wetland-Activities.aspx

Water Behaviour

Level 1 2 3

Aim

To understand that water acts differently on different types of ground.

Materials

Four stream trays (or simple trays with a spout on one side), sod, sand, gravel, loose soil, water container with a sprinkle spout, containers to catch runoff.

Time

1 hour.

How to do it

1. Explain to your group that they are making a small experiment to learn how water behaves different on various types of ground and, therefore, runoff is different as water flowing through the ground is cleaned as it travels.
2. Prepare the stream trays, one filled with sod, one filled with sand, one filled with gravel and one filled with loose soil.
3. Gather your group around each tray and ask them to predict what might happen when you add water.
4. Add water to each tray using the sprinkle spout and observe what happens in the tray and with the water collected as runoff.

Discussion

What were the differences in the stream trays regarding water absorption and the runoff collected?

Which set-up do you think is the healthiest for the **environment**? Why?

How can **vegetation** help retain water?

Source: Penn State, College of Agricultural Sciences, School of Forest Resources, Lesson Plans, Water, Naturally Cleaned.
<http://sfr.psu.edu/path/sfr/lesson-plans/water/6-8/naturally-cleaned>

Do You Agree?

Level 2 3

Aim

To reflect about water-related issues.

Materials

Whiteboard, agree-disagree signs, adhesive tape.

Time

40 minutes.

How to do it

1. Draw a vertical line on the whiteboard. On the left-hand side paste the “*I disagree*” sign and on the right-hand side paste the “*I agree*” sign.
2. Explain to the participants that you are going to read a statement and that each individual should make a drawing of him or herself along the line according to their belief. If they strongly agree with the statement they should make their drawing at the right-hand side of the line and if they do not agree they should draw themselves at the left-hand side.
3. Give them a short time to think quietly to themselves about how they feel regarding that statement. When everyone has made their drawing, pair each participant with another one that has a differing opinion from theirs.
4. Have these pairs present their opinions, each taking turns listening to the other.
5. Open a class discussion on the issue.

Statement ideas:

- *I strongly feel that water access and culture are interrelated and that this relation greatly determines people's identity.*
- *Access to clean water is a global issue and, therefore we are responsible for taking action to support people who are dealing with this problem.*
- *Individuals can't make a big difference regarding water pollution prevention and **conservation**; industries are the ones that must start making changes first.*

You could think about more statements that are related to some local issues!

Discussion

How many people today do not have access to clean drinking water?

Which regions have the biggest lack of clean drinking water?
Why is water such an important issue?
Which gender is primarily impacted by lack of water? Why?

Biodiversity & Water Problem Tree

Level 1 2 3

Aim	To identify the causes and consequences of a water-related issue.
Materials	Whiteboard, whiteboard markers.
Time	1 hour.
How to do it	<ol style="list-style-type: none">1. Explain to your group that they are creating a <i>Biodiversity & Water Problem Tree</i>. Start by drawing a tree, with its roots and branches, in the whiteboard.2. Write the problem in the trunk of the tree.3. Identify the main causes of the problem and write them on the roots of the tree, below the problem. For example, "Our wetlands were destroyed and now we are being affected by floods".4. Think about the consequences of the problem and write them on the branches of the tree, above the problem.5. You can add further layers, smaller roots and branches or leaves, by identifying the underlying issues that create the causes, and indirect or "knock-on" effects.6. Finally, your group could add neighbouring trees, buildings, or animals living on the tree to represent other problems or related issues. Make sure to indicate the interdependence between all things.
Discussion	Why is it important to identify the "roots" of the problem? What can be a possible solution to your problem? Who must participate to solve this problem?

Adapted from: World Association of Girl Guides and Girl Scouts, Climate Change take Action Now, www.wagggsworld.org/en/grab/21431/1/climate-change-take-action-now.pdf

Get Your Message Across!

Level 1 2 3

Aim	To express your point of view and let others know what you care about.
Materials	Paper, pencils.
Time	1 hour.
How to do it	<ol style="list-style-type: none">1. Explain to your group that they are going to write a letter to a government representative in order to tell them that they care about and are serious about the protection of their watershed.2. Have your group brainstorm some ideas they might want to include. Have them chose what a good opening, body and closing would be.3. Write the letter with the help of your entire group and make sure you all sign it.4. Send it to your local Water Utilities Administration, to a member of the

Senate or the Parliament, or why not to the President of your country!

Discussion

Why is it sometimes better to write a letter when you want to say something?
Whose responsibility is it to help maintain a clean **watershed**?
How can an unhealthy, polluted **watershed** affect your water availability?

Community Water Conservation

Level 1 2 3

Aim

To learn about the actions that are being taken at a local level to maintain a healthy **watershed**.

Materials

Notebooks, pencils.

Time

A 10 minute session to explain the activity and to prepare some questions for the government representative's visit and a 40 minute session to receive him or her.

How to do it

1. Invite a local government representative, from the Ministry of the Environment for example, to your school or youth group, so he or she can talk about the initiatives that are being implemented to prevent water pollution and maintain a healthy **watershed** in order to preserve the local **biodiversity**.
2. Before that day, make sure you encourage your group to think about the things they might want to know and help them prepare some questions.

Discussion

Does your area suffer from floods or drought? How do the authorities deal with these issues?
How can we balance the needs of people, protect the **environment** and have a good economy?
How can you make your everyday activities more sustainable?

Be Wise About Water

Level 1 2 3

Aim

To learn how to use water wisely.

Materials

Cardboard, colouring pencils, colour markers, scissors.

Time

1 hour.

How to do it

1. Remind your group how important it is to use water wisely as it is a vital resource that needs to be preserved.
2. Explain to your group that they are going to make some signs related to water - water saving tips or fun facts about water. These signs will be placed in your school or youth group.
3. Have all the participants give ideas and write them down.
4. Divide your group into three or four teams and have each group use the cardboard to create some really cool and appealing signs.
5. Put the signs around your school or youth group to encourage everyone to value and care for water.

Here are some ideas:

- When you turn the tap on, don't turn it the whole way, keep a slow flow.

- Close the water tap while soaping the dishes.
- Water constantly moves or changes form, but the total amount of water does not increase or decrease, so the water you just drank could have been the drinking water of a dinosaur!
- Take a shower instead of a bath. Challenge your family to see who can shower the fastest.
- When you get a glass of drinking water, take only as much as you will drink.
- Many brands of bottled water contain the same chemicals as tap water. So, if you know that your drinking water is safe, don't buy bottled water.
- Close the water tap while brushing your teeth.
- When you take a shower, don't let the water be wasted while you are waiting for it to warm-up, catch it in a bucket and water the plants.
- A human being can spend one month without food, but 5 to 7 days without water.
- Collect rain water and use it to water your plants, to flush the toilet or to wash your clothes.
- Wash vegetables and fruit using a pan of water, rather than under running water.
- 2.4 billion people in the world have no access to safe drinking water, so think about how lucky you are!
- Look around your home to make sure you do not have any dripping taps. A dripping tap may waste up to 50 litres a day.
- Wash your car using a bucket and a sponge instead of a running hose.
- It is better to water the garden early in the morning or late in the evening, rather than in the middle of a sunny day, because this is when more water is lost due to evaporation.

Discussion

Whose job is it to preserve water?

Do you think you could stay a whole day without using water? Why or why not?

Do you think your family should be more water conscious? What can you do about it?

Think downstream

Which Part of the World is Water?

Level 1 2 3

Aim	To reflect about how much fresh water our world has.
Materials	Water, 12 spoons, a world globe.
Time	30 minutes.
How to do it	<ol style="list-style-type: none">1. Start by asking your group to use the world globe to identify all the sources of water they can find: oceans, rivers, lakes, ice caps, ponds...2. Remind them that 97 percent of water is in the oceans, so we can't use it because it is salty, 2 percent of the water is frozen as ice-caps and glaciers and only 1 percent is freshwater we can use.3. Explain to your group that you will try and show them how water is divided in our world. Pour 2200ml of water into a glass or jug, this will represent the total of water on Earth.4. Take 12 spoons of water out of this 2200ml, the remaining water will represent the salty water in the oceans and seas.5. Now the 12 spoons of water will be divided as follows: nine spoons represent the ice caps and glaciers, two spoons represent the groundwater, a half spoon represents the freshwater from lakes and one drop of water represents the water from rivers.
Discussion	<p>Now that you know how much freshwater our world has, do you think you need to change your water habits? Why?</p> <p>Do you think life without water is possible? Why? Can human body work without water?</p> <p>Can you name some benefits of water?</p>

Source: United Nations Environment Programme, Tunza, Children, A Trip With Drip,
http://unep.org/tunza/children/images/flash/a_trip_with_drip/start.swf

The Importance of Water Video

Level 1 2 3

Aim	To have a wider understanding about the importance of water.
Materials	Notebook, pencils, whiteboard, whiteboard markers, internet access.
Time	20 minutes.
How to do it	<ol style="list-style-type: none">1. Tell your group that you are going to watch a WWF video about: <i>The Importance of Water,</i> wwf.panda.org/how_you_can_help/live_green/out_shopping/2. Ask them to write down some key words or facts while they watch the video.3. Once the video is finished, have your group share their main ideas and facts and make a list on the whiteboard. Use the list to encourage discussion.

Discussion

What do you think was the main message of the video?
What part of the video impacted you the most?
What conclusion can you reach after watching the video in order to help conserve water?

Water Inspiration

Level 1 2

Aim

To write a water-inspired poem.

Materials

Paper, colouring pencils, pencils.

Time

40 minutes.

How to do it

1. Ask students to remember a fun and memorable experience involving water, such as a trip to the sea, getting caught in a rain, watering your favorite plant or a family trip to a water park.
2. Have them make a drawing to illustrate that wonderful experience on the top half piece of a paper.
3. Next, ask the participants to write a poem related to that experience on the lower half of the paper. If your group has trouble creating a poem you could tell them to write the word water and assign an adjective to each letter.
4. Have each participant present their work of art!

Discussion

Why can water give you so much fun?
What other human activities involve water? And which animal activities involve water?
Do you know about works of art that were inspired on or are related to water?

Stream Clean-Up!

Level 2 3

Aim

To learn how simple activities can improve the **environment**.

Materials

Poster boards, pencils, colouring pencils, markers, adhesive tape (to publicize the event). You might need different materials for the stream clean-up: rubber gloves, rubber boots, plastic bags, garbage cans, shovels, wheelbarrow to haul trash, truck to take away all the garbage.

Time

A 1 hour lesson (to organize the activity) a whole morning (to develop the activity). You might need some more time to organize everything for the event.

How to do it

1. Explain to your group that you are organizing a *Stream Clean-up* and that you are going to invite everyone at your school or youth group to help; the more the better!
2. Divide the participants into small groups and have each one make a poster to publicize your event. Don't forget to include all the necessary information:
 - Theme of your activity
 - Day, place and hour of the event
 - Needed materials

- Safety issues
Place the posters all around your school or youth group. Make sure everyone hears about it!

For the stream clean-up:

1. Make sure you have any required permits to access your adopted stream before the day of your event.
2. Arrange in advance for the ultimate destination of all the debris collected and means to get it there.
3. The day of the event, arrange for garbage cans (you could also use plastic bags) at the event site.
4. List the tasks to be accomplished, hold meetings and assign tasks to different people.
5. Make a map of where people will be working and keep track of everyone.
6. Make sure everyone is aware of the safety issues: wear rubber gloves, wear rubber boots, don't pick up anything hazardous, work in pairs, call if you need help, etc.
7. When you are finished, record the amount and type of debris collected. Take pictures!
8. Provide information to the local media, you can even invite them to cover your event.

*Make sure you don't take with you anything that belongs to the stream! Here is a simple idea, if the object is more than half buried, a lot of sediment would be stirred up, so leave it there. Have fun!

Be sure to take the necessary safety precautions!

Discussion

Were there a lot of people willing to help? Why do you think this happened?
How did you feel knowing that you were doing something to improve your **environment**?
How do you think the stream clean-up will help the **environment** and the life that it supports?

See by the Sea

Level 1 2 3

Aim

To explore and enjoy a sea shore.

Materials

A beach.

Time

1 hour.

How to do it

1. If you are lucky enough to live near a beach, take your group to have some fun with their friends!

Here are some ideas:

- Seek some treasures. Waves toss up all kinds of interesting things like pretty shells, polished pebbles, smooth beach glass or driftwood. Look at them and then leave them for others to enjoy too.
- Listen to the music. The water, the waves, the wind and the birds, together they make a unique and relaxing sound.
- Get your feet wet. Take off your shoes, wiggle those bare toes, and wade right in.

- Look for creatures. Watch birds swoop and dive. Check tide pools for sea urchins, barnacles and sea stars. Dig into a sandy ocean beach for crabs or clams.
- Follow the footprints. Look for animal tracks left in sand. How many creatures have come this way?
- Chase the waves. As the breakers roll in and out, it's fun to run after them or jump them.
- Sculpt sand. At a sandy beach, make sand castles or different animal figures.
- Run a race. A wide, warm beach is the perfect place to run as fast as you can.
- Eat some good treats. When you need a rest, find a good spot to have a nice lunch with an awesome view. Make sure you take all your trash with you.

Discussion

What is the most particular thing about a sea **environment**?

What are some of the dangers that beaches must face? Can you help prevent these?

What are the differences between animals found in terrestrial **habitats**?

Source: National Wildlife Federation, Kids Ranger Rick Activities, Outdoors, Observing Wildlife, Explore a Shore, www.nwf.org/Kids/Ranger-Rick/Activities/Outdoors/Observing-Wildlife/Explore-a-Shore.aspx

Frozen Fun!

Level 1 2 3

Aim

To understand how water reacts when it freezes.

Materials

Freezer, small plastic bottle, clear bowl, cup, strainer, salt, ice cubes, water, drinkable water.

Time

30 minutes. It is a good idea to put another bottle of water and another cup of salty water into the freezer before you start the activity, so you don't waste time waiting for these to freeze.

How to do it

1. Ask your group the following questions. What happens to water when it freezes? Do the water particles or molecules get smaller and denser? Or do they take up more space or expand when they freeze? Well, you are going to help them find out.
2. Fill a disposable plastic bottle with water, put on the cap and put it in the freezer. As the water freezes into ice, what happens to the bottle's shape and size? Water is different from most liquids. Most of them shrink and get denser when frozen. But water doesn't. It takes up more space when frozen. That is, it expands.
3. Try another idea. Ask your group if they have heard people say, "It's just the tip of the iceberg." That means only a small part of whatever they're talking about is clearly seen. And the saying comes from the fact that most of a chunk of floating ice -icebergs- lies below the surface of the water.
4. Fill a clear bowl with water. Then add some ice cubes. How much of each cube is above and how much is below the water? This happens because water is slightly denser as a liquid than as a solid.
5. Continue by asking your group if sea level rises when an iceberg melts. Put a rubber band around the glass to mark where the water level is. Then wait for

the ice cubes to melt. Does the water level change? But, what happens when a glacier melts? Put some ice cubes in a strainer and suspend it above the water in the glass. As your "glacier" melts, what happens to the water level?

6. Try this last experiment, mix salt into a clean cup of drinkable water and put the cup in the freezer. After the water has frozen, take the ice out of the cup. Rinse the ice off with tap water. Now taste the ice. When salt water freezes, it forms freshwater ice. This happens because ice is formed only from water molecules, that is, tiny particles made of hydrogen and oxygen. Salt is made of other things. So when salt water freezes, the salt itself doesn't freeze.

Discussion

How did your bottle experiment prove that frozen water expands?

Why didn't the water level rise when the "icebergs" melted? And why did it rise when the "glaciers" melted?

Was the ice made from salty water or not?

Source: National Wildlife Federation, Ranger Rick, Frosty Fun,
www.nwf.org/Kids/Ranger-Rick/Activities/Outdoors/Science/Frosty-Fun.aspx

Why aren't marine animals cold?

Level 1 2 3

Aim

To understand how animals keep warm in chilling water.

Materials

Two small thick rubber gloves (that slide on and off your hands comfortably) and two large thick rubber gloves (that you can comfortably put on and take off over the other gloves) for each team (if you can't find thick rubber gloves, you can use thick plastic freezer bags), solid vegetable shortening, rubber spatula, duct tape, bucket (wide enough so you can put both hands in at once), cold water, 12 ice cubes.

Time

40 minutes.

Background

Have you ever wondered how whales and walrus stay warm in bone-chilling water? One thing is the thick layer of fat under their skin, called blubber. Blubber acts as insulation between the animal's inner organs and the chilly ocean.

Marine mammals that live in extremely cold **environments** usually have a thicker layer of blubber than those that swim in warmer places. An animal's behaviour can also affect the thickness of its blubber. Whales that swim slowly tend to have a thicker layer of blubber than faster-swimming whales.

How to do it

1. Explain to your group that in this experiment, you will create two gloves, one that contains a layer of shortening (blubber) inside, and one that doesn't. By putting both glove-covered hands in a bucket of freezing cold water, you will find out if the blubber-covered hand feels warmer than the hand without the fat layer.
2. Divide your group into small teams, so they can all participate in the experiment.
3. Before starting, ask the participants to warm your hands up by rubbing them together.
4. Have the participants put a small rubber glove on their right hand and ask a partner spread a thick layer of shortening on it with the rubber spatula. Make sure they smooth out the shortening as if they were icing a cake until there's

an even layer on the glove.

5. Have a partner help the participants wearing the glove pull the large rubber glove over the shortening-covered glove. Ask them to make a cuff at the wrist, folding the bottoms of both gloves upward. Wrap duct tape around the cuff to seal in the shortening layer.
6. Ask the participants wearing the glove to put the other small rubber glove on their left hands. Then ask a partner to help them pull the other large rubber glove over it. (No shortening between the gloves this time.) Make a cuff, and use the duct tape to seal the bottom of the two gloves.
7. Fill the bucket with cold water and add lots of ice.
8. Ask the participants wearing the gloves to dip both hands in the bucket at the same time, and hold them there for at least 10 seconds. Do they notice any difference?
9. Take off both gloves and dry them off. Have the other participants repeat the experiment. If the participants remove the rubber gloves carefully, they will be able to try this experiment again and again.

Discussion

Which hand stayed warmer? Why?

Why couldn't a human being survive in chilling waters without the necessary protection?

What other animals living in cold **environments** might have a layer of fat under their skins? How does this fat help them?

Source: American Museum of Natural History, *Ology*, Marine Biology, Rubber Blubber Gloves, www.amnh.org/ology/index.php?channel=marinebiology#features/stufftodo_marine/blubber_main.php?TB_iframe=true&height=500&width=750

Those are Some Cool Feet!

Level 1

Aim

To understand how webbed feet work.

Materials

Picture of a duck's webbed foot, a small portable tub, water, plastic sandwich bags, rubber bands, toys that float.

Time

20 minutes.

How to do it

1. Show your group a picture of a duck's webbed foot. What makes it special? Explain that the flaps of skin between the duck's toes form what is known as a webbed foot.
2. Ask each participant to place a plastic bag over one of their hands. Secure the bag in place with a loosely fitting rubber band. Ask your group how the hand that is covered with a plastic bag is similar to a webbed foot. Water cannot pass between the fingers of this hand, just as water cannot pass between the toes of a duck.
3. Put two floating toys in the water. Then ask the participants to do the following:
4. Put both hands in the water behind the toys, spread their fingers apart on both hands and move them slowly back and forth so they try to move the toys by pushing the water with their hands. What happened?

Discussion

Which hand pushed the toys farther, the "webbed" hand or the "non-webbed" hand?

What type of foot do you think would push a duck better through water, a

webbed foot or a non-webbed foot?
How do webbed feet help ducks swim better?

Source: National Wildlife Federation, Ranger Rick, Best Foot Forward,
www.nwf.org/Kids/Ranger-Rick/Activities/Outdoors/Science/Frosty-Fun.aspx

Water Fun Collage!

Level 1 2 3

Aim	To realize how water is needed everywhere and for almost everything.
Materials	Poster boards, magazines, colour markers, glue, scissors.
Time	1 hour.
How to do it	<ol style="list-style-type: none">1. To begin have your group to brainstorm uses of water as a warm-up activity.2. Divide your group into pairs and tell them they will have to create a fun collage containing pictures that show the many ways how water is used by all living beings.3. Have each couple present their collage to the rest of the group and explain what they wanted to transmit through their work of art.
Discussion	Why do we need water? What type of activities is water used for? Why is it important to conserve this water?

Hiding in the Ocean!

Level 1 2

Aim	To learn and discuss about the advantages of camouflage.
Materials	Two pages of newspaper with lots of text, red, blue and green construction paper, many pictures of fish and other ocean organisms , scissors, glue, adhesive tape.
Time	20 minutes.
Background	<p>In the ocean, some creatures live on the sea floor, but many live and move about in the water column. Having a body form and colour that is hard to see or detect helps many ocean dwellers avoid being eaten by hungry predators. However, many predators have evolved some of the same adaptations which help them approach their prey without being seen. Some of the adaptations for hiding in the ocean include:</p> <ul style="list-style-type: none">• Small Size: being small makes visual detection difficult. A disadvantage of small size is the inability to move quickly. For example: zooplankton.• Transparent Body: in the light zone of the ocean, many of the zooplankton are transparent. In addition, many animals, such as fish and crabs, which later have body coloration, are transparent in their juvenile forms.• Cryptic Coloration: many animals have dark colours on their dorsal sides and shading to light colours on their ventral sides. Seen from above, they blend with the dark waters below and seen from below, they blend with light from the sky. For example: dolphins.

- *Disruptive Coloration*: this type of camouflage helps hide the outline of the fish, especially if its **habitat** includes a variety of shapes and colours. For example, the coloration of the clown anemone fish is helpful for its coral reef **habitat**, but it would not help in the open ocean.
- *Mimicry of Surrounding*: some **organisms** are coloured and shaped to appear as part of the surrounding **habitat**. For example, some flatfish can even change their colour by altering the distribution of pigment in specialized cells called chromatophores.
- *Bioluminescence*: some mid-water fishes have specialized cells called photophores, which can emit light. In the lantern fish for example, these cells are arranged along the ventral or bottom side; in dimly-lit waters the bioluminescence from these cells helps mimic the faint light reaching mid-water from above.

How to do it

1. Cut out three fish of red, blue, and green construction paper, and cut out three fish of the sheet of newspaper text.
2. Glue all the fish to the other newspaper page, hiding the newsprint fish as well as possible.
3. Tape your creation to a wall. Cover it before the participants enter the room.
4. Explain to your group that their job will be to count the fish. Tell them they will have 20 seconds to do this.
5. See how many fish the participants were able to find and have a discussion about which fish they think will be eaten first and which will be the last ones to be eaten and why.
6. Show your group a few pictures of ocean creatures and discuss how they avoid being seen.

Discussion

How does adaptation help marine animals to hide?
 Can you give an example of an animal you have seen that was very well camouflaged?
 Which is your favorite form of adaptation and why?

Source: Sea Semester, Lesson Plans, How to Hide in the Ocean,
www.sea.edu/academics/k12.aspx?plan=hideinocean

Build a Kelp Forest!

Level 1 2

Aim

To learn and discuss about kelp forests.

Materials

Pictures of kelp, brown rolled paper or butcher paper, poster board, colouring pencils, colour markers, scissors, adhesive tape, internet access or books (for research).

Time

1 hour.

Background

Kelp is an algae. Algae range in size from 100-foottall giant kelp to microscopic cells. Algae do not have roots, stems, leaves, or flowers. Kelp doesn't grow from seeds. It grows from spores.

Giant kelp forests grow in cool, shallow waters. You can find them along the United States west coast, and the coasts of South America, South Africa, southern Australia, and parts of Europe and Asia. An individual kelp is known as a thallus. It has three main parts: the holdfast, the stipe, and the blades. The holdfast anchors kelp to the ocean floor and

looks somewhat like roots, but it doesn't take in **nutrients** like roots do. The stipe is like the stalk of a plant. It holds kelp upright. The blades are leaf-like appendages that extend from the stipe. Blades at the top of the kelp form a **canopy**. This upper layer of a kelp forest gets the most sunlight. Some kinds of kelp have gas bladders. These hold air and keep the plant afloat. They are located at the base of the blades, where the blades meet the stipe.

There are different kinds of kelp. The giant kelp is a perennial that can live for up to seven years and it can grow up to two feet a day. The Bull kelp is an annual that lives for one year and it can grow up to 4 inches a day. Different kinds of animals live in different layers of kelp. Invertebrates live in the holdfasts. Fish swim along the floor as well as the **canopy**. While some fish live exclusively in kelp forests, many others visit them to swim among the stipes looking for food. These fish and other prey attract marine mammals. Harbor seals, otters, sea lions, and whales may feed in a kelp forest.

How to do it

1. Explain to your group that they will make a model of a kelp plant. Divide the participants into groups of three or four and hand each group a 3 metre by 1 metre sheet of brown rolled paper or butcher paper.
2. Tell the groups that they will make a scale model of a kelp plant, which can grow to be 30 metres tall. Direct each group to draw a giant kelp plant on their paper, making sure they use the whole length. You can use the pictures to make sure they know what they look like.
3. After the groups have finished drawing the kelp plants, ask them to label the holdfast, stipe and blades.
4. Hang each group's paper on the wall to give participants an idea of how tall kelp is. Remind them that kelp can grow up to ten times taller than their drawings.
5. Give the groups more brown paper and ask them to draw blades that can be used to form the **canopy**. Explain that the **canopy** is the uppermost layer of a kelp forest. Hang the **canopy** on the ceiling above the stipes.
6. Have the groups research various animals that live in a kelp forest. After they finish their research, direct them to draw and colour in some of the creatures. Remind students that different sea creatures live in different areas of a kelp forest. Have them glue the creatures to the paper strips, placing them either near the holdfast, stipes or blades.

Discussion

What are some of the functions of kelp forests?
What are the similarities and differences between kelp forests and land forests?
Can you think about a kelp forest food chain?

Source: Disney Nature Oceans, Educator's Guide, Build a Kelp Forest,
http://adisney.go.com/disneynature/oceans/downloads/Oceans_42_Page_Educator_Guide.pdf

Density Test

Level 1 2 3

Aim

To learn about water salinity and density.

Materials

A pitcher, a long spoon, three drinking glasses (all the same size), warm water, table salt, a spoon, blue and red food colouring, two identical soda bottles with a regular neck (not wide), an unsharpened pencil, a funnel (that fits inside the top of the soda bottle), a ruler.

Time

1 hour.

Background

Freshwater and seawater have two important differences. One is salinity, which means how salty a solution is. Ocean water has greater salinity than freshwater. The other difference between freshwater and seawater is their density. Density refers to the amount of "stuff" in a given space or packed in a space. For example, a pan containing a fluffy angel food cake would have a lower density than the same size pan filled with a fudge cake. The salinity of water affects its density. The saltier the water is, the denser it is.

How to do it

1. Explain to your group that you are making an experiment to compare three solutions with different levels of salinity, or salt. By using food colouring they will be able to observe which solution is the densest, and which is the least dense. Tell them that they will also investigate how a liquid's density affects objects that are put into it.
2. Start the activity by reminding them that the place where the lower end of a river meets the ocean is called an estuary. Ask them to think what happens when the gush of freshwater collides with the gush of the ocean's tides? Do the two kinds of water instantly mix?
3. Begin the activity. Half fill the pitcher with warm water. Add a spoonful of salt, stir well and wait until the water is still. Do you see any salt at the bottom of the pitcher? If so, go to the next step. If not, keep adding salt slowly until the salt begins to collect on the bottom. The water is now saturated with salt.
4. Half fill two glasses with the solution. Each glass should have the same amount. Put one glass aside and put enough blue food colouring into the other glass to turn the liquid dark blue and stir well. This glass of blue solution represents salty ocean water.
5. Fill a third glass halfway with warm water. This glass represents fresh river water. Next, take the glass with the blue solution (ocean water) and SLOWLY pour it into the glass of warm water (river water). This thick solution will pour like syrup. The trick is to pour it gradually at the edge of the glass, don't mix the solution, just let it sit. What happens? Which liquid is denser, the blue one (salty ocean water) or the clear one (fresh river water)?
6. Take the other glass that you put aside earlier, half-filled with the saturated solution. Add some warm water to it until the glass is full. Then, put in enough red food colouring to turn the solution into a deep red, and mix well. This glass is filled with a liquid of medium salinity, less salty than the blue water, but saltier than the freshwater.
7. What do you think will happen if you SLOWLY pour a small amount of this red solution into the glass with the blue and clear water? Make a prediction and then try it out. What happened?
8. Make more saturated solution and use the funnel to pour this solution into a soda bottle. Fill an identical soda bottle with warm water (without salt).
9. Put an unsharpened pencil (eraser side down) into each bottle. What happened? Use a ruler to measure the difference. Measure from the base of the bottle up and see which distance is greater. In which condition is the pencil higher in the water column? In which kind of water did the pencil have greater buoyancy, freshwater or saltwater? Buoyancy means how much something will float.

Discussion

What happened when you mixed the freshwater with the saltwater? Did the freshwater float on top of the saltwater? Or did the saltwater float on top? Which do you think is easier for you to float in, a swimming pool or the ocean?

Air-Water Interaction Experiment

Level 2 3

Aim To demonstrate gas exchange at the boundary layer between water and air. Relate this to what happens at the ocean-air interface, and to show how temperature affects this process.

Materials Six salad bowls with the same diameter, distilled water at room temperature, frozen distilled water (ice cubes), matches, 12 white floating candles, white paper to use as background, universal indicator (McCrumb), notebook, pencil.

Time 1 hour.

Background What happens to the surface of a body of water (e.g. lakes or the sea) when **carbon dioxide** is dissolved in it? There is a constant exchange of gases between the air and the water surface. One of the factors which may affect this exchange is temperature. In a large body of water, what happens to the gas that is dissolved at the surface and not transported to deeper layers? It will stay in the surface and equilibrate with the concentration of the gas in the **atmosphere**.

How to do it

1. Explain to your group that you are making an experiment about the interaction at the air-water interface.
2. Place three bowls on top of the white background. Fill these with the same volume of distilled water, about three-quarters full. Cool one bowl using the frozen distilled water (ice cubes). Add several drops of the McCrumb universal indicator to the bowls. You can count how many drops you added to make sure they have the same intensity of green colour.
3. Light eight floating candles; place four into the bowl with the ice cubes and four into one of the other bowls. Put the four unlighted candles in the third bowl. This will serve as your control. Cover the bowls with the remaining three bowls. Take note of the colour of the water at the start of the experiment.
4. Observe the change in the colour of the water in the bowls. To see any changes, look at the air/water interface (boundary between air and water). After some minutes, the candles are extinguished as they have used up all the oxygen inside. The control looks the same as the candles were unlighted.
5. Some minutes after the candles are extinguished, a thin yellow layer of water forms at the surface. This indicates acidification of the surface layer because of dissolved **carbon dioxide** (CO₂). What colour change did you observe?
6. Remove the covering bowl and let the set-up stand for a while. Observe the colour change on the surface of the water. After some minutes, the yellow colour will disappear because of equilibration with the surrounding air, which has a lower concentration of **carbon dioxide**.

Notes:

- The colour change from green to yellow (basic to acidic) occurs only at the surface of the water as it has direct contact with the air above it. The CO₂ produced by the burning candles dissolves at the water surface making it acidic. Consequently, since there was no excess CO₂ (no lighted candles) introduced into the control bowl, there should be no change in the colour of the water there.
- Without agitation, the colour remains at the surface of the water and does not readily

diffuse to the deeper part of the bowl. In the ocean, CO₂ dissolved at the surface is only effectively removed from the **atmosphere** if it is physically transported to the deeper layers by convection. (To demonstrate convection, remove the covering bowl of the set-up without ice cubes. Add ice cubes and then replace the cover. This will cool down a part of the surface water and this will start to sink to the bottom of the bowl.)

- The cooled water in one bowl should be more yellow because of a higher solubility of gases in cold water. However, since the water in the bowl has a uniform temperature, there is no transport of the acidic water to the bottom of the bowl.
- In this experiment distilled water was deliberately used to show the pH change at the surface of the water using the McCrumb universal indicator. Seawater cannot be used for this experiment as the indicator is not sensitive enough to a small pH drop. The buffering capacity of seawater will lead to a smaller change in pH compared to distilled water.

Discussion

Where does the colour change take place? Did all the water in the bowl change colour? What does this imply in relation to the oceans? In which bowl was the colour change more visible? Why do you think this is the case?

Source: CarboSchools, Education, Indoor Hands-on Activities, Interaction at the Air-Water Interface, part 2, www.carboeurope.org/education/CS_Materials/Air-SeaInterfaceGasExchange2.pdf

Ocean Acidification Documentary

Level 2 3

Aim

To gain a deeper understanding about ocean acidification

Materials

Notebook, pencils, whiteboard, whiteboard markers, internet access.

Time

40 minutes.

How to do it

1. Tell your group that you are going to watch a documentary about ocean acidification:

Acid Test: The Global Challenge of Ocean Acidification,
www.oceanacidification.net/go-deeper/

2. Ask them to write down some key words about the documentary while they watch the video.
3. Once the video is finished, have your group brainstorm their main ideas and make a list on the whiteboard. Use the list to encourage discussion.

Discussion

What are the causes of ocean acidification?
What could be the consequences?
What are some things you can do to prevent this?

Climate Change Affects Oceans

Level 1 2 3

Aim

To understand how oceans are affected by **climate change**.

Materials

Information card provided below.

Time

1 hour.

Background

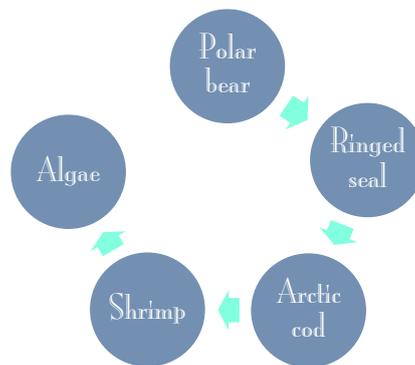
Our planet's **climate** is changing. The average temperature of the Earth's surface has risen by 0.74 °C since the late 1800s and it is expected to increase by another 1.8 °C to 4°C by the year 2100. Many of the world's leading **climate** scientists agree that the increasing amount of **greenhouse gases** (GHGs) released into the air from human activities are contributing to these rapid changes.

GHGs make the Earth warm enough to sustain life by trapping energy in the **atmosphere**, the air that surrounds our planet. This is known as the **greenhouse effect**. But current conditions are far from natural. The blanket of gases is getting thicker as we release GHGs by burning **fossil fuels** at an extraordinary scale, leading to an enhanced **greenhouse effect**.

There are many different **greenhouse gases** responsible for **climate change**. However, only three, CO₂ (**Carbon Dioxide**), CH₄ (Methane) and N₂O (Nitrous Oxide), account for almost 99 percent of all of the GHGs in our **atmosphere**, and CO₂ alone accounts for about 75 percent of all the greenhouse gas emissions in the world.

How to do it

1. Explain to the participants that you are having a group discussion about ocean acidification.
2. Have your group read the information card.
3. Divide the participants into small teams and tell each one that they will represent one of the following groups:
 - A local NGO that develops environmental projects.
 - Representatives from a local community.
 - Local government representatives.
 - A group of scientists.
4. Encourage discussion by asking them how the following food chain might be affected by ocean acidification.



5. Before concluding the discussion, they must come up with a local plan to reduce GHGs emissions.

Discussion

Why is it important to learn about the impacts of **climate change**?
Have you heard about local **climate change** impacts? Are any of them related to water?
What can you do in your school or youth group to reduce GHGs emissions?

Ocean Acidification

The world's leading marine scientists agree that the effects of greenhouse gas emissions, in particular CO₂, are making our oceans more acidic. This is happening so fast that it represents a serious threat to biodiversity and marine life. Ocean acidification has the potential to disrupt ocean ecosystems, fisheries, habitats, and even entire oceanic food chains.

There are three main concepts that must be remembered:

- Scientists have found that oceans are able to absorb some of the excess CO₂ released into the air by human activity. More CO₂ in the **atmosphere** means more CO₂ in the ocean.
- The huge amounts of atmospheric CO₂ being absorbed by the world's oceans is making them more acidic than they have been for tens of millions of years. When CO₂ reacts with water it produces an acid called carbonic acid that changes the sea water chemistry.
- The resulting changes in the chemistry of the oceans disrupt the ability of plants and animals in the sea to make shells and skeletons of calcium carbonate, while dissolving shells already formed.

Although millions of years ago CO₂ levels were higher, today's change is occurring rapidly, so many marine organisms don't have enough time to adapt. Some marine creatures are growing thinner shells or skeletons, for example. Some of these creatures play a crucial role in the food chain, and in ecosystem biodiversity. Within decades, ocean acidification will also start to have major impacts on temperate and polar water ecosystems. In fact, colder water absorbs higher levels of CO₂ than warmer water. Our polar seas are already so acidic that they are starting to dissolve some shells.

The link between climate change and biodiversity is clearly established. Learning about the causes and effects of climate change is a necessary condition to prevent biodiversity loss.

Source: Global Issues, Climate Change Affects Biodiversity, Increasing Ocean Acidification,
www.globalissues.org/article/1122/climate-change-affects-biodiversity#increasingoceanacidification

Convention on Waste at Sea

Level 2 3

Aim	To experience the complexities of an international debate at a leadership level.
Materials	Pencils, paper, internet access or books for research.
Time	Two sessions: a 40 minutes session to explain the activity and to give the participants some time to investigate about their assigned countries, and another 60 minutes session to develop the activity.
Background	The Convention on the Law of the Sea is the international agreement that resulted from the third United Nations Conference on the Law of the Sea and it is considered one of the UN's most outstanding achievements. Coastal countries have exclusive economic rights up to 200 nautical miles from their coast. Beyond that no one country has exclusive rights and use of the seas is managed and monitored by the International Seabed Authority. It is a set of rules governing all uses of the sea, including navigation, research and fishing. The Convention also aims to protect the sea from pollution.
How to do it	<ol style="list-style-type: none">1. Explain to your group that by using a role play they will be able to explore in a simplified way the type of debate that occurs at a United Nations Conference on the Law of the Sea, where different countries represent different points of view. The participants will take on roles as diplomats and involve themselves in a simulated session. Their main objective will be to create a Convention concerning the dumping

of waste at sea.

2. Divide the participants into six groups. Each group will be assigned a different country: Brazil, China, India, South Africa, United Kingdom and United States of America. Remind the participants it is not their own opinions they are expressing, but the country's they are representing.
3. The participants must develop a detailed research about their assigned country. It would be useful to divide the research into three categories:
 - General research on the assigned topic;
 - Research on the assigned country's policies and position with regard to the assigned topic; and,
 - General research on the assigned country's background and culture.
4. Each group must select a spokesperson to play the role. They must have enough time to prepare themselves and to establish their point of view.
5. You will have the role of the chair to make sure the meeting is fluent and that all representatives intervene (you can have them intervene in alphabetical order).
6. The Convention on Waste at Sea should contain five or six points which governments can incorporate in their own laws if they sign up to it. These need to be acceptable to a majority of countries. The countries must elaborate a final document that will contain the conclusions that were agreed. Before elaborating the final document give the groups some 10 minutes for discussion and questions; any participant can intervene.

Discussion

Can you agree on the question "Who owns the seas"?

Do you think all countries are equally responsible for combating sea pollution? Why or why not?

How do you think this type of Conventions affect our **environment**?

Adapted from: Cyberschoolbus, Unit 15: Cleaner Oceans, International Maritime Organization, The Law of the Sea, www.umio.org/cyberschoolbus/bookstor/15cz/english/oceans/page7.htm

Garbage and Sea

Level 1 2 3

Aim

To reflect about sea pollution.

Materials

World atlas.

Time

20 minutes.

Background

Rubbish from ships is not only unsightly and unhygienic for holidaymakers when it is washed ashore on tourist beaches, it is also a threat to fish, birds and other marine life. The substance with potential for the greatest harm is plastic. It is used for a wide range of products and is virtually indestructible. Once it is in the sea it can remain for decades.

The International Convention for the Prevention of Pollution from Ships (MARPOL) has the objective to counter sea pollution from oil, chemicals, sewage, rubbish and other harmful substances. Annex V of the Convention imposes strict controls over the disposal into the sea of rubbish generated on board ships. The controls are stricter the closer a ship is to land. In "Special Areas" the controls against dumping are very severe. Such areas are usually enclosed by land and especially vulnerable to pollution. Examples include the Mediterranean and the Baltic areas. Countries which have signed up to Annex V also have to provide facilities at ports for the reception of rubbish from ships.

How to do it

1. Remind your group how rubbish can be harmful for many marine **species** and also for people when it is washed ashore.
2. Using an atlas ask your group to look for at least four “special areas” that are particularly vulnerable to pollution. Why are enclosed seas more vulnerable to pollution?

Discussion

Why do you think some places are more vulnerable to pollution?
What types of rubbish have you seen at the sea/beach?
Why is plastic so dangerous?

Source: Cyberschoolbus, Unit 15: Cleaner Oceans, International Maritime Organization, Garbage,
www.un.org/cyberschoolbus/bookstor/kits/english/oceans/page5.htm

Our Water Can Get Sick Too!

Level 1 2 3

Aim

To learn about water borne diseases.

Materials

An outdoor setting, copies of the maze, pencils, water, drinking water, chocolate powder, glasses, jar.

Time

30 minutes.

Background

Pollution affects the quality of water, and this can affect all living things because we all depend on water. The quality of drinking water is more of a concern. The water we drink needs to have minerals such as magnesium, calcium, iron and some dissolved gases, in proper proportions. But, it should not have any contaminants, of course!

Contaminated water can lead to serious diseases such as cholera, typhoid, jaundice, diarrhoea, dysentery and malaria. These water borne diseases account for nearly one-third of all deaths in the world. It is estimated that every 20 seconds a child dies from a water-related disease.

How to do it

1. First, have your group play a fun game in an outdoor setting, so they get a bit tired. Have your group go back to the class or meeting room.
2. Mix some water with some chocolate powder to make it look “dirty”. Offer the participants a glass of “dirty” water, but before they drink it, ask them to look at it, does it look crystal clear? No, explain to them that this water might be polluted. How would they feel if this was the only water they had to drink?
3. Explain to them that contaminated water can lead to serious water borne diseases that cause many deaths around the world. Don’t forget to offer them some clean drinking water!
4. Give a copy of the following word square puzzle to each participant, so they can learn about different water borne diseases.
5. Explain to your group that they must look for each of the following words within the puzzle.
 - Cholera
 - Typhoid
 - Jaundice
 - Diarrhoea
 - Dysentery
 - Malaria
 - Hepatitis
 - Fluorosis
6. Tell them to be careful because words may be spelled across, down and diagonally. Have fun!

Discussion

Do you think it is fair that some people do not have access to clean, healthy water?
Do you know someone that has been sick because of any water borne disease?
How do you feel knowing that such a vital liquid can make people sick? Is there something you can do about it?

*Adapted from: United Nations Environment Programme, Tunza, Children, A Trip With Drip,
http://unep.org/tunza/children/images/flash/a_trip_with_drip/start.swf*

Water Borne Diseases Square Puzzle

Q	W	S	H	I	I	K	L	R	Y	A	S	D	F	G	S
J	G	L	Z	P	R	B	J	O	S	D	I	E	S	E	T
A	S	Z	X	C	H	O	L	E	R	A	W	W	R	T	A
U	A	M	K	J	S	G	M	F	D	C	A	F	B	I	T
N	H	B	A	S	V	N	Q	P	P	O	T	D	H	I	I
D	S	H	U	L	S	I	R	J	O	N	O	G	E	L	B
I	I	L	N	R	A	W	K	S	J	G	A	T	P	A	A
C	G	V	D	T	T	R	P	I	H	H	T	N	A	N	H
E	C	B	G	H	Y	G	I	A	R	T	J	H	T	D	V
C	E	C	F	P	C	S	R	A	G	Y	T	E	I	F	J
O	L	D	E	I	A	M	H	F	H	P	Y	L	T	I	G
W	F	L	U	O	R	O	S	I	S	H	I	P	I	T	S
D	A	S	P	T	Y	U	F	D	K	O	O	W	S	L	A
V	W	R	D	F	G	P	S	A	N	I	E	S	Q	S	Q
B	Q	W	E	I	A	C	I	N	V	D	T	S	H	I	W
U	T	G	F	T	A	H	O	W	Y	M	I	A	O	T	W
L	G	R	T	E	R	R	C	K	M	R	T	P	L	E	E
D	F	E	L	O	S	S	R	L	B	E	G	E	Y	R	D
B	R	P	R	I	D	C	A	H	U	I	O	P	A	E	V
N	J	A	Z	X	F	F	T	Y	O	J	I	T	J	U	B
G	F	I	Q	D	Y	S	E	N	T	E	R	Y	H	I	H
A	R	A	T	C	E	N	E	C	Y	C	A	E	G	H	J
I	P	O	A	S	S	R	T	Y	H	G	D	V	C	F	B

Solution:

Q	W	S	H	I	I	K	L	R	Y	A	S	D	F	G	S
J	G	L	Z	P	R	B	J	O	S	D	I	E	S	E	T
A	S	Z	X	C	H	O	L	E	R	A	W	W	R	T	A
U	A	M	K	J	S	G	M	F	D	C	A	F	B	I	T
N	H	B	A	S	V	N	Q	P	P	O	T	D	H	I	I
D	S	H	U	L	S	I	R	J	O	N	O	G	E	L	B
I	I	L	N	R	A	W	K	S	J	G	A	T	P	A	A
C	G	V	D	T	T	R	P	I	H	H	T	N	A	N	H
E	C	B	G	H	Y	G	I	A	R	T	J	H	T	D	V
C	E	C	F	P	C	S	R	A	G	Y	T	E	I	F	J
O	L	D	E	I	A	M	H	F	H	P	Y	L	T	I	G
W	F	L	U	O	R	O	S	I	S	H	I	P	I	T	S
D	A	S	P	T	Y	U	F	D	K	O	O	W	S	L	A
V	W	R	D	F	G	P	S	A	N	I	E	S	Q	S	Q
B	Q	W	E	I	A	C	I	N	V	D	T	S	H	I	W
U	T	G	F	T	A	H	O	W	Y	M	I	A	O	T	W
L	G	R	T	E	R	R	C	K	M	R	T	P	L	E	E
D	F	E	L	O	S	S	R	L	B	E	G	E	Y	R	D
B	R	P	R	I	D	C	A	H	U	I	O	P	A	E	V
N	J	A	Z	X	F	F	T	Y	O	J	I	T	J	U	B
G	F	I	Q	D	Y	S	E	N	T	E	R	Y	H	I	H
A	R	A	T	C	E	N	E	C	Y	C	A	E	G	H	J
I	P	O	A	S	S	R	T	Y	H	G	D	V	C	F	B

Water Uses!

Level 1 2 3

Aim

To identify different water uses.

Materials

Notebook, pencils.

Time

40 minutes.

Background

We all know how little fresh water our world has and we also know that millions of people need to share this water. The world's population is increasing and this means increasing demand for water and use of water for many different activities.

This activities include:

- **Agriculture:** food cannot be produced without water, it is estimated that 70 percent of the water consumed worldwide is used for agriculture.
- **Industry:** almost all industrial processes need water; it is needed for the manufacturing of textiles, chemicals, paper, food, etc. It is estimated that 20 percent of the water consumed worldwide is used for industry.
- **Domestic use:** people around the world use water every day, to wash their clothes, shower, cook, etc. It is estimated that 10 percent of the water consumed worldwide is used for domestic use.
- **Power:** almost all modes of power generation require water, from hydropower where falling water turn turbines to produce power, to nuclear reactors, where water acts as a coolant.
- **Waste disposal:** whether it is domestic sewage or industrial effluents, water provides the medium through which this waste is carried away.
- **Transportation:** most of the traded goods that have to move from one continent to another are transported by ships over water.
- **Recreation:** water is also needed for fun activities such as swimming, fishing or boating.

But, unfortunately a lot of water is misused or wasted, some people are careless about its use or maybe they just don't know how to give it a better use, this is why it is so important to learn about water and the need to preserve it!

How to do it

1. Remind your group that it would be incorrect to think that people everywhere have and use the same amount of water.
2. Give them some examples: In Kenya 13.6 litres of water per day, while in Europe and North America the average daily water use per person is 135 litres of water per day.
3. Have your group analyze this chart:

How is water used in Europe and North America?

Use	Amount of Water
Toilet	40 liters
Shower/bath	40 liters
Washing clothes	15 liters
Washing dishes	08 liters
Washing hands/brushing	08 liters
Cleaning the house	08 liters
Drinking/cooking	05 liters
Washing cars, etc.	11 liters

4. Ask each student to try and calculate how much water they use. Divide your group in small teams and have them compare their water uses.

Discussion

What do you think would happen if everyone used the same amount of water as you do? What changes can you make in your daily life to save water? Why is it important to encourage others to do the same?

Source: United Nations Environment Programme, Tunza, Children, A Trip With Drip, http://unep.org/tunza/children/images/Flash/a_trip_with_drip/start.swf

Water is Not Always Available

Level 1 2 3

Aim

To demonstrate the concept of clean water availability and water **conservation**.

Materials

An outdoor setting, three sheets of paper per group.

Time

30 minutes.

Background

Less than 1 percent of all the water on the planet can be used by people, the rest is salt water (from the oceans) or is permanently frozen and we can't use it. We use water every day, but unfortunately water is not easily available in many parts of the world.

In some places even if communities have water pipes and taps, water is supplied only for a few hours a day, in others places people have to store their water supply from the village well, a community tap or hand pump. And still in other cases women and children have to walk various kilometres each day to haul water. About 1.2 billion people of the world's population don't have access to clean water. As the population grows, more and more people need to use this limited resource. Therefore, learning how to care for it is very important.

How to do it

1. Explain to your group that you are going to challenge them to find clean water and transport it to a location where it can be used.
2. Group the participants into teams of at least six. Place one member, the Tribe Leader, on the opposite side of the activity area from their team. The Tribe Leader must get clean water for his/her family. The remaining team members are drops of clean drinking water from a local river.
3. Provide three sheets of paper to the Tribe Leader; these are stepping stones for carrying the drops of water, make sure you place each of them about a metre away. Both the "drops" and the "leader" must step on these to get from the river to the village. At no point can any team member touch the floor without contact with the paper. If they do, "water" has been spilled, and the member/drop must go to the back of the line and try again, delaying the process of carrying a full "container" of water across the area.
4. Challenge: instruct students that their "container" has now sprung a leak; for every two (or three) drops brought to the village, not including the leader, one drop must be brought back.
5. The first team to transport the most "drops of water" to their "village" in the shortest period of time is the winner.

Discussion

How do you get your water at home? Which difficulties did you have carrying your water back to your families? How can this

relate to the reality of many people in third world countries?
How would you feel if you had to do this every day to get some freshwater?

Source: H₂O!!, Activities, Bringing Water Home,
www.watercan.com/h2oh/1-3.shtml

Before and After Story

Level 1 2 3

Aim	To recall how water is a vital resource.
Materials	Paper (60 cm to 90 cm long and 8 cm to 12 cm wide), colouring pencils, colour markers, pencils.
Time	A 1 hour lesson (to make the books) and a 20 minutes lesson (to discuss about their experiences).
How to do it	<ol style="list-style-type: none">1. Explain to your group that they are going to create two stories about a family from Honduras, a small country located in Central America.2. To begin, have the participants make an accordion book using the long piece of paper, they must fold it back and forth "accordion style".3. Ask your group to read the information card about <i>Water in Honduras</i>. Tell them to think about two short stories: one about a Honduran family that does not have access to fresh and sufficient water and the other one about the same family after their Water Utilities Administration gave them access to good quality tap water.4. Tell the participants they must write and illustrate their stories with the before story going up one side of the accordion and the after story going down the backside. Remind them to choose some nice illustrations for the covers.5. Ask each student to present their stories to their families so they can discuss about how lucky they are to be able to enjoy fresh and safe water at home.
Discussion	<p>How is your water access different from that of many people living in Honduras? What did your family think about your stories? Where you able to reach any conclusion?</p> <p>Is there something you can do to help people from your country that do not have access to sufficient, safe and good quality water?</p>

Water in Honduras

In 1998 Hurricane Mitch left 75 percent of the country without safe drinking water. Families are forced to rely on contaminated water supplies and the prevalence of waterborne diseases like cholera is increasing. In addition, poor access to water also causes overall development to stagnate. Many women and children in the rural areas spend up to six hours each day fetching water and carrying it home on their heads. This prevents women from taking up income-generating activities and prevents children from attending school.

How much water are you wasting?

Level 1 2 3

Aim	To realize how much water can be wasted by a leaking tap.
Materials	Measuring cylinder, notebook, pencils.
Time	20 minutes.
How to do it	<ol style="list-style-type: none">1. Explain to your group that you are giving them a detective task, they must look around their school or youth group for a leaking or dripping tap.2. Once they find a leaking tap, they must place the measuring cylinder under the tap. One participant must keep time with a watch. Once a minute is up, take the measuring cylinder from the tap and note how much water is collected in it. This represents the amount of water that would have otherwise been saved, but now is wasted.3. Now ask them to calculate how much water would be wasted in one hour, one day and one year! <i>1 hour ▶ ... ml wasted in one minute x 60 minutes</i> <i>1 day ▶ ... ml wasted in one hour x 24 hours</i> <i>1 year ▶ ... ml wasted in 1 day x 365 days</i> <p>Make sure you have that leaking tap fixed!</p>
Discussion	<p>Did you think that much water could be wasted by a dripping tap? How do you feel knowing that this wasted water could be precious to other families in the world that do not have access to sufficient water? Can you think of other ways how water can be wasted at school or youth group? What can you do to avoid that?</p>

Source: United Nations Environment Programme, Tunza, Children, A Trip With Drip,
http://unep.org/tunza/children/images/flash/a_trip_with_drip/start.swf

Why is Water Important?

Level 1 2

Aim	To learn why water is important for our lives.
Materials	An outdoor setting, coloured paper, colour markers.
Time	30 minutes.
How to do it	<ol style="list-style-type: none">1. Use the coloured paper to write some ideas about why water is important for our lives. Cut and fold each idea.2. Hide each idea around the garden or playground.3. Explain to the participants that they must look for the pieces of paper you hid. The person that finds more papers is the winner!4. Have each participant read out loud their ideas and discuss with them what they think about them. <p><i>Here are some ideas:</i></p> <ul style="list-style-type: none">• About 70 percent of our body is made out of water.• 90 percent of human blood is water.

- Water regulates our body's temperature.
- We need to drink water to survive and to stay healthy.
- Water helps move **nutrients** through our cells.
- Water keeps the moisture intact around mouth and eyes.
- Human beings should drink at least eight glasses of water each day.
- A human being can spend one month without food, but only five to seven days without water.
- We need water for our everyday activities, such as cooking, cleaning, bathing, etc.
- Water helps our plants and trees to grow.
- Animals need water to grow and be healthy.
- There is more animal and plant life found in water than on land.
- Many of the things we use are manufactured using water, such as clothes, toys, paper, etc.
- The food we eat is also made of water, watermelon, for example, is almost 100 percent water.
- Living beings need water for recreation and fun.

Discussion

Did you know water gave you so many benefits?
 Can you name other benefits all living beings obtain from water?
 Can you tell us about a fun experience you had where water was involved?

Water and Human Health

Level 2 3

Aim

To reflect how access to water affects our lives.

Materials

Papers, pencils, internet access (optional).

Time

Two 40 minutes session, one to explain the activity and to give the groups some time to brainstorm and research some additional information and the other to allow them to write the article.

Background

About 1.2 billion people of the world's population don't have access to clean water and 2.4 billion people don't have toilets. Nearly 80 percent of illnesses in developing countries are linked to poor water and sanitation conditions and one out of every four deaths under the age of five worldwide is due to a water-related disease.

We all need clean water, water is essential for life. This is why everyone must help save water and promote water access for all. Water changes lives!

How to do it

1. Divide the participants into two groups. Explain to them that each group will have to write a newspaper article about water availability and human health. Remind them that if they need further information they can look on the internet or in the library. Tell them they will have to present their work as a newspaper article in order to inform others in the community about this issue.
2. On a future session give the groups enough time to write their articles. Ask each group to present their work to the rest of the participants.
3. Then, you can publish the articles in your school, youth group or library. You can even send the articles to the local media!

Discussion

Has your community been affected by water issues? How?
 Why is it important to inform others about water related issues?

How could your community contribute to help others overcome water scarcity?

Who can Shower the Fastest?

Level 1 2 3

Aim	To have fun with a water-related activity.
Materials	A shower at home.
Time	10 minutes.
How to do it	<p>Explain to your group that you are going to challenge them to take the fastest shower of their lives! As homework ask them to track how much time they need to take a shower, of course, they should try to be very, very fast. But remind them they should shower as they usually do, no cheating!</p> <p>Once at school or youth group, have everyone tell you how much time they spent on their shower. Who was the winner?</p>
Discussion	<p>Do you think you can shower like this every day? What would be the benefits? Who takes the longest showers in your home? Can you encourage him/her to change this?</p> <p>In what other ways can you save water at home?</p>

Water Conservation Time!

Level 1 2 3

Aim	To increase awareness of the impact of water conservation .
Materials	An outdoor setting, two buckets filled with water, two empty buckets, three place markers, cones, rocks or anything that is heavy enough not to blow away, cardboard, colour markers, adhesive tape, two cups, two cups with a small hole in the bottom (try using plastic pop bottles, cut the neck off and cut a hole in the bottom).
Time	30 minutes.
How to do it	<ol style="list-style-type: none">1. Explain to your group that they are playing a game that will test their water conservation skills.2. Use the cardboard to make three signs that read “Washing Machine”, “Shower” and “Leaky Tap”.3. Place the buckets of water beside each other making sure they have the same amount of water in them. Place the empty buckets at the other end of the playing area. Evenly space the three markers between the two buckets and attach one of the signs to each of these stations. The cup with the hole goes at the station marked “Shower” and the cups without a hole go inside the buckets of water.4. Divide your group into two teams. The team members will go through the stations one at a time, doing each activity the number of times they rolled on the dice. Once the player gets to the empty bucket, he/she will dump their water into the bucket and hurry back to hand the cup to the next participant.5. Let the games begin. The object of the game is to get as much water as

possible to the empty bucket. Have the two teams line up behind their bucket of water. To make the game more difficult, enforce the rule that players cannot cover the top of the cup during the game. Decide how long you want your game to last and pick a person to be the timer. Before the game begins, have each team member roll the dice and remember their number – this is how many times the player needs to do the activity at each station.

- *The washing machine:* at this station you will need to spin in a circle just like a washing machine. The higher your number is, the more laundry you do, so the more you spin!
- *The shower:* at this station dump the water from your cup into the cup with the hole in it, and then catch the water back in your original cup. Every pour represents a 10 minute shower. So, if you roll a five, switch the water between the cups five times because you took a 50 minute shower!
- *The leaky tap:* at this station, hop on one foot for every 100 drops of water that gets wasted down the drain. So, if you roll a six, hop six times because you lost 600 drops of water.

6. At the end of the game, see which team gets the most water safely through the day and fills up the empty bucket!

Discussion

Did the team who did less laundry, took shorter showers, and had taps that leaked less get more water to the end?

Which of your everyday activities do you think wastes more water? What can you do to change that?

Is it important to encourage everyone at home to start making changes? Why?

Source: Earth Rangers, Wild Wire, Actions, To the Last Drop,
www.earthrangers.com/wildwire/actions/to-the-last-drop/

Best Water Conservator Ceremony

Level 1 2 3

Aim

To realize how nature really is the best water conservator.

Materials

An outdoor setting, an award ribbon, paper, pencils, colouring pencils.

Time

A 30 minutes lesson to organize the activity and another 40 minutes lesson to carry it out.

Background

Have you heard that mother nature is very wise? Well this is completely true. Nature has thought about everything, including how to conserve water. Nature provides one of the best ways of conserving rainwater, which is the source of all fresh water in our world. Any vegetative cover, whether mere grass or a big forest, helps to slow the water running off the land. This helps check soil erosion.

The **canopy** of **vegetation**, by absorbing the impact of raindrops, minimizes the destructive effects of the beating action of rain on soil. Moreover, roots of plants hold the soil together and prevent it from being washed away. They also help keep the soil porous thus helping rainwater percolate into the ground. The roots and stems also filter the silt out of the run-off water, slow it down and take the erosive power away.

The vegetative cover also provides decaying organic matter which forms an additional

protection layer over the soil. This layer reduces the impact of raindrops. It also absorbs water and allows it to seep through the soil to be stored as groundwater.

Source: United Nations Environment Programme, Tunza, A Trip With Drip,
http://unep.org/tunza/children/images/flash/a_trip_with_drip/start.swf

How to do it

1. Explain to your group that you are organizing a *Best Water Conserver Ceremony* in order to honour Mother Nature with an award for being the best water conserver. Tell them this will be a symbolic ceremony to encourage everyone to start preserving water.
2. Make sure you invite all the classes or groups from your school or youth group and all the teachers and leaders, you want everyone to start making a change! You can send out some invitations, you can have your group make them.
3. Prepare some words with the help of your group, so you can give a nice message to the assistants.
4. Hold your event in an outdoor setting where everyone can admire how great nature is. You can choose one of the prettiest trees you find there to put the award ribbon!
5. Don't forget to take pictures, so you can always remember this great day. To finish, encourage everyone to follow Mother Nature's example and to conserve water by wasting less, collecting more, storing more efficiently, by recycling waste water and by not polluting.

Discussion

How was your event? Were people enthusiastic about it?
Who in your classroom/group do you think deserves an award for saving more water?
How can your school or youth group conserve water?

Role of Plants in Water Filtration

Level 2 3

Aim

To understand the role of plants in filtering the water moving through a **watershed**.

Materials

- Six potted plants, with pots roughly 15 to 20 cm in diameter, and holes in the bottom. These plants need to be moderately dry, as if they had not been watered for a couple days. Plants with saturated soil will not absorb water, and very dry plants will absorb it all.
- Six clear containers, such as cups, which will support the plants and allow drainage to be viewed. You will need separate plants and cups for each of the materials you will put in the water.
- Soil from outside. The best soil is loamy, with smaller particles than sand.
- Unsweetened powdered drink mix, preferably grape or cherry for colour.
- Vegetable oil.
- One or two different household cleaners (such as an all-purpose cleaner and dish or laundry soap). One should be liquid and the other powder.

Time

1 hour.

Background

Experiments can be done to show how a plume of dissolved materials can move through soil and enter a groundwater **aquifer**. But soil and plants have something of a dual role in this process. Depending on whether materials are dissolved or suspended in the water, soils and plant roots can remove some or all of this material as the water moves down through soil.

Most suspended materials will adhere to the soil. These may then be broken down and

used as food by the plants. Dissolved **nutrients**, such as nitrogen or phosphorus, chemically bond with some types of soil particles. They are then taken up by plants, thus removing them from the soil before they can enter an **aquifer**. For the plants, these elements are food, for an **aquifer**, they are pollution.

Not all materials are absorbed by plants and not all water pollutants are food for plants. However, sediments from eroding soil, **nutrients** in human and animal wastes, and some components of household wastewater (“grey water”) are excellent plant **nutrients**. Plants also use different **nutrients** at different rates, so that the amount of material they take up will depend on how much is dissolved in the water and how fast the water moves through them.

How to do it

1. Explain to your group that this experiment is a very simplified way to show whether plants will take up certain kinds of materials from water moving relatively quickly through their root systems. Have the participants help you with the experiment.
2. Place the potted plants into the top of their cups. Pour 250 ml of clean water slowly through one of the pots and watch it percolate through the bottom of the pot. The water should look as clean as what was poured. Loosen or tighten the soil so that water percolates at about one ounce per minute. The rate should be fast enough to prevent long waiting periods, but slow enough not to carry very much soil through the pot.
3. Add a gram of soil to 250 ml of water and stir so that the soil is well suspended and distributed in the water. Pour slowly into another flower pot. The water percolating through should look much cleaner than the dirty water that was poured.
4. Add about one ounce of vegetable oil to 250 ml of water, stir (they won't mix completely) and pour into a third pot. See if the vegetable oil percolates through or is caught up by the plant roots.
5. Add some powdered drink mix to 250 ml of water and pour through a fourth pot. See if the water percolating through retains the colour.
6. Add some powdered cleanser to 250ml of water and pour through a fifth pot. Is the cleanser retained in the soil?
7. Add some liquid soap to the water (30ml or so in 250ml water). Does the soap percolate through the soil?
8. Using the “contaminated” plants, pour some clean water at the same rate through each one (simulating a rain shower). Is more of the “pollutant” rinsed away from the soil by the clean water?

Discussion

In what ways can plants and soil benefit drinking water quality?

We saw plants and soil remove some types of impurities from water. How might the plants remove larger quantities?

What other **organisms** in the soil-plant system might aid the uptake of water pollutants?

What is the role of rainwater moving through contaminated soil?

Source: United States Environmental Protection Agency, Environmental Education, Role of Plants in Water Filtration, http://water.epa.gov/learn/kids/drinkingwater/upload/2005_03_10_kids_activity_grades_4-8_plantsinwaterfiltration.pdf

Water-related Facts

Level 2 3

Aim

To learn and discuss about different water-related facts.

Materials

Notebooks, pencils.

Time

40 minutes.

How to do it

1. Divide your group into six teams and assign each one any of the following ideas:
 - It is estimated that 90 percent of the world's available fresh water is used for agriculture and 15 percent of this water ends up as grey water (polluted).
 - It is estimated that 7 percent of the world's available fresh water is used for industry and 3 percent for household.
 - It is estimated that 50 percent of the world's wetlands have been lost.
 - It is estimated that 35 percent of freshwater **species** have declined between 1970 and 2007.
 - It is estimated that 24 percent of marine **species** have declined between 1970 and 2007.
 - It is estimated that 2 million tonnes of sewage and effluents drain into the world's water every day.
2. Ask each team to discuss about their topic and to reach some conclusions.
3. Have each team present their topic and their conclusions. Encourage discussion.

Discussion

Which fact surprised you the most?

What can you do to help prevent the loss of different aquatic **species**?

Can you think of any concrete activity you can develop to help prevent water pollution?

Source: World Wildlife Fund, Living Planet Report 2010, Biodiversity, Biocapacity and Development, wwf.panda.org/about_our_earth/all_publications/living_planet_report/2010_lpr/

Water, Health and Biodiversity Web

Level 2 3

Aim

To reflect about the interdependency between water, health and **biodiversity**.

Materials

An outdoor setting, ball of yarn, paper, pencil, scissors.

Time

30 minutes.

How to do it

1. Take your group to an outdoor setting. Have them form a circle and give each participant one of the titles below.
2. Ask your group to think about the connections between water, health and **biodiversity**. Give the ball of yarn to one of the participants and, keeping hold of the beginning of the thread, have him/her pass it to another participant across the circle that is related to his/her title. Remind your group that they should always hold their part of the thread, so they can form a web. Continue until everyone is holding a part of the web.
3. Ask the first participant to pull on his/her piece of yarn. Do the others feel the pull? Help them understand how everything is interconnected.

Titles:

- All living creatures need water
- Good quality water
- Vulnerable populations
- Access to safe drinking water
- Increases risks of diseases

- Water cycle
- Only a small amount of the water in the world is freshwater
- Growing and producing food
- Keeps children out of school
- Human activities affect water quality
- Lack of basic sanitation resources
- Wasting water
- Health problems
- Unsustainable human activities
- Freshwater is being used faster than it can be replaced
- A person can live without food but not without water
- Women and children collecting water
- **Habitat** preservation
- Protection of the **environment**
- **Watersheds**
- Water pollution
- Water **conservation** activities
- Recreation activities
- Clean air
- Prevent soil erosion
- Plant growth and soil retention
- Healthy soil
- Home and shelter for animals

Encourage your group to think further! Ask the participants to add more titles that they think are related to the topic.

Discussion

What is the connection between water and health?
 What is the connection between water and **biodiversity**?
 And how does **biodiversity** contribute to maintaining a good health?
 So, what would happen if our water supply was reduced?

World Water Day

Level 1 2 3

Aim

To celebrate water and focus attention on its importance.

Materials

Poster board, colour markers, adhesive tape. Additional materials might be needed if your group organizes a special event too.

Time

A 40 minutes lesson to organize the activity and a 1 hour lesson to review the outcomes of the different activities that were developed. Some additional time might be needed if your group organizes a special event too.

Background

International World Water Day is held annually on March 22 as a means of focusing attention on the importance of freshwater and advocating for the sustainable management of freshwater resources.

An international day to celebrate freshwater was recommended at the 1992 United Nations Conference on Environment and Development (UNCED). The United Nations General Assembly responded by designating March 22, 1993 as the first World Water Day.

On this day many people from all over the world organize different events to celebrate water. The theme for the year 2011, *Water for cities: responding to the urban challenge*, aimed to spotlight and encourage governments, organizations, communities, and individuals to actively engage in addressing the challenges of urban water management.

How to do it

1. Explain to your group that you are having your own *World Water Day* celebration at your school or youth group.
2. Ask your group to make some posters to encourage and invite everyone to organize an event in celebration of World Water Day. Give them some ideas, maybe a conference, a contest or a sports event could be a good choice. Don't forget to include all the necessary information:
 - Day of the event – March 22
 - The objective
 - Where to register the activity (make sure you ask the necessary information to contact the participants once they have developed their activity in order to review their outcomes).Of course, your group can also organize a special event for World Water Day!
3. Don't forget to register your event on the World Water Day web page. You can also invite the local media to cover your event.
4. Visit the participants that registered their World Water Day activities and discuss with them about their outcomes.

Discussion

How many activities were developed on World Water Day at your school or youth group? How do these activities contribute to water protection and **conservation**? Did you make an activity of your own? How did it come out?

Water and Sugar Art!

Level 1 2 3

Aim

To make a nice work of art using water and sugar.

Materials

Sugar, hot water, blue construction paper, cups, cotton balls, colour markers.

Time

30 minutes.

How to do it

1. Explain to your group that you are making an *Under the Sea* picture using an amazing technique that involves water and sugar!
2. Mix together two parts sugar and one part hot water. You may want to add sugar or water as needed to get the right syrupy consistency. It should be thick enough to be used as finger paint. You will still be able to feel the grittiness of the sugar.
3. Give each participant a piece of blue construction paper on which to paint. Offer some cotton balls to dip in the mixture and stick on the paper.
4. Let your group's creations dry flat. As they dry the sugar will turn white and sparkly. When the sugar is totally dry, they can colour over it with markers.

Discussion

Why did you choose to draw what you did?
How can art help you express your ideas and feelings?
In what other fun ways of painting is water involved?

Underwater Globe!

Level 1 2

Aim To create an aquatic world.

Materials Clear glass jars (ones with a shorter and wider lid work the best), hot glue-gun and glue, sparkles or small beads, different colours of craft foam, green and brown pipe cleaners, scissors, markers, pencils.

Time 1 hour.

How to do it

1. Ask your group to think about what lives inside a lake or river from your city. Tell them they will use this information to create their own underwater globe!
2. Have your group use the craft foam and the pipe cleaners to make some plants and animals.

Here are some ideas:

- **Lily pad:** cut out teardrop shapes from the foam and hot glue them to a green pipe cleaner. Glue a flower shape to the top of the pipe cleaner, and then attach the whole thing to the lid of the jar. Make sure the pipe cleaner is long enough so that when you add water your lily pad will float on the top.
- **Pond Weed:** take a green pipe cleaner and make long loops with it, then wrap its base with a brown pipe cleaner and glue it inside the lid of the glass jar.
- **Fish:** cut out a teardrop shape and two small circles. Glue the circles onto either side of the teardrop to make eyes. Cut out two triangles and glue them to either side of your fish for fins. Glue your fish to a plant to keep them from floating on the surface of the water.
- **Plankton:** add sparkles to represent tiny **organisms** in your freshwater globe.

3. Once all the creatures are ready, help the participants to glue them on the lid.
4. Fill the jars with tap water and make sure the lid is tight enough. Encourage your group to tilt their **ecosystems** back and forth to get inspired to protect the world's many lakes, rivers, and streams.

Discussion

Which are some famous lakes, lagoons, rivers or streams you can find in your country?
What makes them so special?
What other animals and plants can you find there?



Useful resources

National Environmental Education Week

www.eeweek.org

Worldwide Water Education

projectwet.org

American Museum of Natural History

www.amnh.org/ology/index.php?channel=water

The Groundwater Foundation Kids Corner

www.groundwater.org/kc/kc.html

United Nations Environment Programme TUNZA

www.unep.org/Tunza

World Wildlife Fund

wwf.panda.org

Convention on Biological Diversity - Biological Diversity for Kids

<http://kids.cbd.int>



Our Land

Introduction

Biodiversity is the variety of all living things, and it is precisely all the amazing things we can find in our planet that allow us to lead a healthy and happy life. **Biodiversity** today consists of nearly 10 000 000 different **species** of plants, animals, and **microorganisms** and the way they connect to each other into an interdependent **ecosystem** in which all **species** have their role, including human beings. It is the web of life!

Our land is heaving with life; we can find lots of incredible **species** in different **habitats** which range from deserts to forests, from tundras to prairies, or from mountain slopes to savannas. All these wonderful places, with its physical and environmental features, provide food, water and shelter to different **organisms** around the world and allow them to thrive. Moreover, it is important to remember that **biodiversity** possesses a scenic beauty and recreation value as it provides people with magical places where they can have fun and relax.

We cannot forget about one of the world's most important natural resources, soil. Because it lies beneath our feet we may not often consider how much it affects our lives and how much we depend on it. Soil enables farming and food production, and it also helps to filter water and to regulate its flow through the landscape. Soil supports the growth of a fantastic variety of plants and trees and it is home for billions of **organisms**. Soil is also the foundation for our buildings, houses and roads.

Food is essential for life as it provides a range of different **nutrients**. Without adequate nutrition, children and young people cannot develop their potential to the fullest. Well-nourished, healthier people are more productive and can make a greater contribution to the development of their communities and the **conservation** of their **environment**. **Biodiversity** for food and agriculture includes the variation within plant and animal **species** that are used directly or indirectly for food production. It comprises the diversity of genetic resources (plant varieties and animal breeds) and **species** used for food, including non domesticated or wild resources. Genetic diversity can provide access to seeds and planting material better adapted to diverse growing conditions. Different food is grown in different countries around the world depending on the **weather** and **climate** in a particular area. Thanks to the hard work of farmers all around the globe, we all have different types of food to eat!

Unfortunately, our world has begun, relatively recently, to lose many **species** and **habitats** at an ever-increasing rate, and all of this is happening because of us. **Habitat** loss and degradation represent the biggest single source of pressure on **biodiversity** worldwide. For terrestrial **ecosystems**, **habitat** loss is largely accounted for by conversion of wild lands to agriculture. Humans are currently using more natural resources than the planet can sustain. In general terms, population growth and consumption are the reasons for this enormous loss and damage to the **environment**. A reduced **biodiversity** means people face a future where food supplies and livelihoods are increasingly threatened.

We obtain invaluable services from the natural world, but we often take them for granted. These include water purification, soil formation and protection, food production, pollution breakdown and absorption, **climate** stability, and recovery from natural disasters, among many others. **Biodiversity** decline has a damaging effect on **ecosystems** as these are the finely balanced systems in which different **organisms** in nature interact. Changes in **ecosystems** can have unforeseen and serious consequences. Environmental integrity is critical for maintaining and building positive options for human well-being as **biodiversity** offers

key opportunities for sustainable livelihoods, and for the **conservation** of the amazing plants and animals that make our lives healthier and happier.

It is time for all of us to make a difference, by protecting **biodiversity** we will be helping to look after the things upon which all life depends, and of course after us. Encourage your group to go outside, explore some yucky dirt, smell some flowering plants, follow a fascinating creepy crawly, or eat some mysterious vegetables. The activities that are presented below aim to help young people know and appreciate the land-based **species** and **ecosystems** of our world, learn about the many uses humans give to **biodiversity** and, in consequence, how these affect different aspects of our land.

Biodiversity on the menu

Fun with Fruits

Level 1 2 3

Aim

To discover some facts about fruits.

Materials

An open space, paper, pencils, scissors, facts about fruits provided below.

Time

30 minutes.

Background

In broad terms, a fruit is the part of a flowering plant that contains the seeds. There are hundreds of fruits in our world. They not only taste great, but they give many benefits to human beings. Fruits are generally high in fibre, water, vitamins and sugars. Moreover, many scientists believe that fruit is the healthiest food on Earth and that regular consumption of fruit can reduce the risk of different diseases such as cancer, strokes, cataracts, etc. So, choose your favorite fruit and start eating it!

How to do it

1. Write all the facts in small pieces of paper. Draw all the fruits on other small pieces of paper (if you prefer you can use pictures).
2. Hide all the facts and fruits around the activity area.
3. Explain to the participants that they must look for all the facts and for all the fruits that you hid around.
4. Once they find all of them, ask them to match each fact with the correct fruit. Encourage discussion.

Discussion

Which fact did you like the most? Why?

Do you know any other curious facts about other fruits?

How does the great diversity of fruit we have on our world help you stay healthy?

Fun Fruit Facts

Fruits

1. Orangutans love this fruit, and it is considered to be the world's favorite fruit.	Watermelon
2. This fruit floats in water because it contains 25% air.	Peach
3. Sometimes people think this is a vegetable, but it is really a fruit, and it is the most popular fruit in the world.	Lemon
4. This fruit has in average about 200 seeds, and it is the only fruit that grows seeds on the outside.	Bilberry
5. This fruit was named after the national bird of New Zealand.	Strawberry
6. The tree that produces this fruit is not actually a tree; it is the world's largest herb!	Apple
7. This fruit can kill bacteria as it has a high content of acid, for this reason, it is suitable for cleaning.	Kiwi
8. Many years ago, before the invention of canteen, explorers used the skin of this fruit to carry water on long expeditions.	Mango

9. This fruit is supposed to help improve nighttime vision.	Tomato
10. In China this fruit is a symbol of longevity and good luck.	Banana

Answers: 1. Mango, 2. Apple, 3. Tomato, 4. Strawberry, 5. Kiwi, 6. Banana, 7. Lemon, 8. Watermelon, 9. Bilberry, 10. Peach.

Which plants do we eat?

Level 1 2

Aim

To learn that only a limited number of plants are used for food production.

Materials

Visit to the supermarket.

Time

1 hour.

How to do it

1. Once you reach the supermarket, explain to your group that not all plant **species** are eaten by human beings. There are around 250 000 plants **species** in our world, but only about 5 000 are used for food. And it is also important to remember that not all food products can be harvested in all countries, so this narrows up our choices.
2. Next, take your group on a tour around the different natural foods sections. Can they identify all the types of food they see? Even if they live in the same place, every family has its own food preferences.
3. Have your group find some food that is not produced locally and that is transported from abroad. How does this food reach your supermarket?
4. Take your group on a tour around the processed foods sections. Can your group tell you from which natural product each processed food comes from?

If it is difficult for you to visit a supermarket, you can use pictures of the different products you can find there.

Discussion

Which is your favorite natural food? Can you find different varieties of it?
 What are the advantages and the disadvantages of transporting food from abroad?
 How can processed food contribute to harm our **environment**?

Fruit and Veggie ABC

Level 1 2

Aim

To realize that our planet has a great variety of fruits and vegetables.

Materials

Poster board, colour markers, whiteboard, whiteboard markers, books or internet for research.

Time

40 minutes.

How to do it

1. Remind your group what an amazing quantity of fruits and vegetables we can find in our world! Many of them might still be unknown for your group as they grow in different countries around the world.

2. Explain to them that you are creating your own *Fruit and Veggie Alphabet*. For example: A is for Apple, B is for Banana, C is for Cabbage... If you have a hard time finding a fruit or vegetable with any letter, you can use the internet or some books to help you.
3. You can also have your group make a nice poster board with the alphabet and hang it in your class or meeting room, so when they see it they remember how many delicious fruits and vegetables they can eat every day.

Discussion

Why might some people prefer one fruit or another?
Which is the weirdest looking fruit or vegetable you have ever seen? What made it so special?
Why do different fruits and vegetables grow in different places?

Bird Nest Salad

Level 1 2 3

Aim

To make a healthy and fun salad.

Materials

Lettuce, carrots, grater, cream cheese softened at room temperature (use the type that comes in a block), blue food colouring (optional), salad dressing of your choice, mixing bowl, plates, forks.

Time

30 minutes.

How to do it

1. Explain to your group that you are making a delicious and fun bird nest salad. Ask them to help you!
2. Use a grater to shred the carrots.
Make sure you take the proper safety precautions to avoid anyone getting hurt!
3. Tell the participants to place two or three lettuce leaves on their salad plates. Next, tell them to put half a cup of shredded carrots in the middle of each lettuce bed, and to arrange the carrots into nest shapes.
4. Put the cream cheese in the mixing bowl. Add a few drops of blue food colouring and mix until the colour is consistent. Ask each participant to scoop one-half teaspoonful of blue cream cheese and roll it between their palms to form an egg shape. Tell them to place three eggs in their nests.
5. Drizzle the "nest" with your favorite salad dressing and enjoy lunch!



Discussion

Why is it good to eat different types of vegetables?
What other types of food could you add to your nest?
Why do you think chefs inspire themselves in nature when preparing and decorating their creations?

Source: National Wildlife Federation, *Get Outside, Be Out There, Activities, Cook and Craft, Bird Nest Salad*, www.nwf.org/Get-Outside/Be-Out-There/Activities/Cook-and-Craft/Bird-Nest-Salad.aspx

Agricultural Diversity

Level 2 3

Aim

To learn what agricultural diversity is.

Materials

A visit to a farm, pencils, notebooks.

Time

4 hours.

Background

Agricultural diversity, or agrobiodiversity, refers to the variety and variability of plants, animals and **microorganisms** that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises the diversity of genetic resources (plant varieties and animal breeds) and **species** used for food, fodder, fibre, fuel and pharmaceuticals, including non domesticated or wild resources that are hunted or searched in different **ecosystems**.

Agricultural diversity includes also the diversity of non-harvested **species** that support food provision, such as soil **microorganisms**, predators and pollinators, and those in the wider **environment** that support food production **ecosystems** (agricultural, pastoral, forest and aquatic), as well as the diversity of these agro-ecosystems.

It is also important to know that agrobiodiversity is the result of natural selection processes and the careful choice and inventive developments of farmers, herders and fishers over millennia. This is why not all crop varieties and livestock breeds are harvested or produced. Agrobiodiversity is actively managed by male and female farmers around the world.

Source: Food and Agriculture Organization of the United Nations, What is Agrobiodiversity?, <http://ftp.fao.org/docrep/fao/007/y5609e/y5609e00.pdf>

How to do it

1. Once you reach the farm, divide your group into small teams and ask them to look around in order to discover all the elements that are involved in food production (plant and animal products). Tell them to write down all their ideas.
2. Have your group sit in a circle and ask them to help you make a list of all the elements that contribute to produce food. Next, using this knowledge, have them describe what an agro-ecosystem is and ask them to elaborate the meaning of agricultural diversity, or agrobiodiversity.
3. Take your group around the farm so they can identify all the elements that compose agricultural diversity:
 - An agro-ecosystem as a whole.
 - Crop **species**/varieties used for food.
 - Livestock and fish **species**.
 - Wild **species** that are hunted or searched for.
 - Non-harvested **species** that support food provision: soil **microorganisms**, pollinators and other insects.
 - Other plants used for fodder, fibre, fuel or medicines.
 - Local knowledge and culture that intervene in agrobiodiversity management.

If it is difficult for you to visit a farm, you can use pictures that can help your group to understand what agricultural diversity refers to!

Discussion

What is the difference between **biodiversity** and agro-biodiversity?
What do you think is the role of agro-biodiversity?
What could be some threats to agro-biodiversity?

Fruit and Veggie Farm

Level 1

Aim

To learn about different products that are cultivated on a farm.

Materials

A circle of chairs with a clear space in the middle of the circle and enough room for children to move.

Time

15 minutes.

How to do it

1. Explain to your group that you are telling a story about a trip to the farm, where you are able to learn about the many products that are cultivated there.
2. To play the game, assign the name of a fruit or vegetable to each participant.
3. Ask the children to sit in the circle of chairs and start telling your story; don't forget to mention all the fruits and vegetables you assigned to your group. Every time the participants hear their names, they must stand up quickly, turn around jumping in one leg and sit.
4. To get everyone to move all at once, you must call out "fruit and vegetable farm". Everyone must stand up and change chairs. There should be one less chair in the circle than the number of participants, so you can eliminate some fruits or veggies.
5. Once the children understand the game, speed up the time between children standing up and turning and changing chairs.

Discussion

What other types of food are grown on a farm?
How important is a farmer's job regarding food production?
How can a farmer help prevent **biodiversity** loss?

Livestock Farming

Level 1 2

Aim

To discuss livestock farming.

Materials

Poster board, colouring pencils, adhesive tape, pictures of livestock farms (optional).

Time

1 hour.

Background

Livestock refers to domesticated animals that are raised in a farm by human beings, that is, animals that have become accustomed to human provision and control. Therefore, livestock farming is raising animals for food and to sell. Some of these animals might be: cattle (beef and dairy), pigs, sheep, goats, buffalos, mules and horses, among others.

Farmers feed livestock by letting them graze and giving them feed which helps them grow and stay healthy. Depending on what kind of livestock it is, farmers give the animals places to live. Sometimes it is in a building that has a controlled temperature and sometimes it is just a place where they can get out of the rain.

Livestock can give different products to human beings:

- Meat.
- Dairy products such as milk, which can be easily transformed into yogurt, cheese or butter.

- Fibres; people can obtain wool and mohair from sheep and goats, for example.
- Fertilizer, manure or animal excrements can be spread on fields to increase crop yields.
- Labour; animals such as horses or mules can be used to help human beings with their work, for example, ploughing fields or transporting goods.
- Land management; the grazing of livestock is sometimes used as a way to control weeds.

How to do it

1. Ask your group what a livestock farm is and help them elaborate a complete meaning. You can show them some pictures of livestock farms to help them.
2. Explain to your group that they are going to make a drawing of a livestock farm, where they will have to identify the different animals that can be raised, how these animals live and the food they eat.
3. Hang the poster board in a place where your group can see it, so they can remember how many benefits animals give to human beings.

Discussion

What is the role of a livestock farm regarding the provision of food for the world's population?
 What different uses do human beings give to the animals that are raised in these farms?
 What could be some negative effects of livestock farming?

Where does your food come from?

Level 1 2 3

Aim

To understand that food is produced all around the world.

Materials

Whiteboard, whiteboard markers, yarn.

Time

A 10 minutes lesson to explain the activity and another 30 minutes lesson to develop it.

Background

The food we eat everyday comes from all over the world. Different food is grown in different countries depending on the **weather** and **climate** in a particular area. So, your food comes from farms all over the world! If farmers can't grow a certain kind of food in their country, people in that area can import it from other places that can grow it. Farmers can also export the extra food they grow to other places that need it. Thanks to the hard work of farmers all around the globe, we all have different types of food to eat!

How to do it

1. As homework ask the participants to choose their favorite food and find out where it comes from. Tell them they can check the labels to obtain this information. Ask them to record the country of origin. Alternatively, you can bring some food labels.
2. The next session, explain to your group that not all types of food can be grown in one place. Some food might have travelled from other countries before it reached your local shops.
3. Tell the participants to write the names of the different countries of origin of their foods on the whiteboard and assign a country to each participant (different from the country of origin of his/her food product).
4. Ask your group to make a circle. Have a participant say which is his/her product and where it comes from. Give the ball of yarn to one of the participants and, keeping hold of the beginning of the thread, have him/her pass the yarn ball to the participant that is representing the country of origin of this product. Remind your group that they should always hold their part of the thread, so they can form a web. Continue with the activity until everyone is holding a part of the yarn.
5. Ask the first participant to pull on his/her piece of yarn. Do the others feel the pull?

Help them understand how, thanks to **biodiversity**, we can find lots of different foods from all around the world.

Discussion

What are the benefits of importing food from other countries?
What could be some negative impacts of importing food from other countries? What would happen if some types of food couldn't be grown anymore because of **biodiversity** degradation?

Which foods are more popular?

Level 1 2 3

Aim

To discover which food is the most popular one in your school or youth group.

Materials

Survey provided below, pencils.

Time

1 hour.

How to do it

1. Explain to your group that they are going to make a survey about the food their school or youth group level prefers.
2. Make some copies of the survey, 20 copies should be enough, but you can make some more according to the size of your school or youth group level.
3. Divide your group into couples, and give each couple some copies of the survey. Tell them to apply the survey to different classmates or friends from their school or youth group level.
4. Help your group to tabulate the surveys, and answer the following questions:
 - Which is the favorite cereal grain?
 - Which is the favorite vegetable?
 - Which is the favorite fruit?
 - Which is the favorite legume?
 - Which is the favorite meat?
 - Which is the favorite dairy product?

Maybe you could even apply the survey to your entire school or youth group!

Discussion

Why do you think your friends from your school or youth group level prefer those types of foods? Does culture influence these preferences?

How might the food preferences in another group from a foreign country change?

Do you have any foreign students in your group? Does he/she have any favorite food from his/her country of origin?

Food Preferences Survey

1. Which cereal grain is your favorite?

Maize Oat Millet Rye
Rice Wheat Quinoa Barley

2. Which vegetable is your favorite?

Potato Lettuce Broccoli Mushroom
Onion Carrot Sweet-corn Spinach

3. Which fruit is your favorite?

Apple Watermelon Strawberry Peach
Orange Grape Banana Melon

4. Which legume is your favorite?

Lentil Lupine Soybean
Peanut Pea Bean

5. Which meat is your favorite?

Turkey Beef Pork
Chicken Lamb Fish

6. Which dairy product is your favorite?

Milk Cheese Butter
Yogurt Cream Ice-cream

**You can modify the survey according to the food that is produced and found in your country.*

Yummy Rainforest!

Level 2 3

Aim

To learn that many products we eat today originated from rainforests.

Materials

Cardboards, colouring pencils, colour markers, books and/or internet for research.

Time

1 hour.

Background

Life is like a spider's web, and this web of life is made up of millions of different kinds of plants and animals and the interactions between them, and all of the different **habitats** in which they live. All **species**, including us human beings, from the tiniest **microorganism** and insect to the tallest tree and the biggest whale, all depend on a healthy natural world for survival. For both people and wildlife, the web of life is extremely important as it provides the air we breathe, the water we drink and the food we eat.

Think for a moment about all the different foods we eat, all the kinds of fruits and vegetables, wheat, rice, coffee, tea, chocolate... Well, many of the foods that are common in our households today originated from rain forests. Avocado, banana, black pepper, Brazil nuts, cashews, chocolate/cocoa, coffee, cola, ginger, jalapeno, lemon, orange, peanut, pineapple, potato, tomato and vanilla all came to us first from the rain forest! So forests, trees and plants, in addition to giving us shade and fresh air (and medicines too!), give us great things to eat!

How to do it

1. Divide your group into couples and ask each one to research food products that have rainforest roots.
2. Ask them to choose a product and to find a recipe with that product as an ingredient.
3. Tell each couple to use the cardboard to type up their entire recipe, including an interesting fact about the rain forest product!
4. Ask them to compile all the recipes into a cookbook; don't forget to make a nice book cover. You could then make some copies, so each participant can take home a fun cookbook and be able to share with his/her family some delicious rainforest goodies!

Discussion

Were you surprised to know that all those products had rainforest roots?
How did those products arrive to your country?
Are some of those products already harvested in your country?

Source: EcoKids Canada, Teachers, Resources, Activities, Rain Forest Roots,
www.ecokids.ca/pub/teachers/resources/activities/rain_forest_roots.pdf

From Natural to Processed

Level 1 2

Aim

To distinguish between natural and processed foods.

Materials

Paired sets of foods, each containing one natural and one processed food (for example strawberries and strawberry jam).

Time

50 minutes.

Background

Food is one of the four basic needs of **organisms** that cannot make their own food like plants do through photosynthesis. These **organisms** that trap light energy and use it to manufacture their own food are known as "producers". Some animals eat plants for food.

Other animals eat animals that eat plants. All living things that rely on producers for food are known as “consumers.” Food sources are important in all **environments**.

People use a variety of food resources, both natural and processed, to meet their energy and nutritional needs. With a few exceptions (for example, bees and wasps), people are the only animals that process their foods. Processed foods are foods that are no longer in their natural state, because they either have been cooked and/or combined with other ingredients. For example, an apple is a food in its natural state. However, applesauce is made by processing the apple (steaming, mashing and adding flavoring) to make a new mixture.

How to do it

1. Gather your group together in a semicircle in front of you and show them several unprocessed foods. For example, an apple, a cucumber and a peanut. Ask, where did these foods come from? Can you eat them just the way they are? Can some other animals eat them in the form you see here? As the participants answer, make sure they understand these unprocessed foods are natural resources that may be eaten just as they are.
2. Now show the processed counterparts of the same foods, for example, a jar of apple jam, a pickle, and a jar of peanut butter). Ask, where did this apple jam come from originally? (Is there an apple jam tree?) Make sure your group understands that apple jam is a processed food. Ask, Can you eat the apple jam just the way it is? How has it changed from the apple? Point out that since the apples in apple jam are cooked and mashed, apple jam is a processed food. Ask, do animals eat apple jam? Point out that people process foods, but animals do not.
3. Repeat the steps above, comparing a cucumber and a pickle, and the peanut and peanut butter.
4. Divide your group into small teams. Explain that each team will be given a food to identify as either “natural” or “processed.” Also, explain that someone in the room has a “match” for each participant’s food sample that is the opposite category (“natural” or “processed”), and that each participant should find that food “match”.
5. Distribute one food item (either natural or processed) to each team. Since the participants will be seeking to match their items with the foods’ natural or processed counterparts, make sure that everyone will have at least one match.
6. Allow time for the teams to examine, discuss and identify their foods. Then line the participants up with their foods. One at a time, ask the teams to step forward, show their foods, decide if the foods are natural or processed, and explain why they think this is. Ask questions to lead to the correct classification - Do you think this could be growing on a tree just like it looks? Ultimately, the participants should form two lines, one for natural and another for processed. Next, encourage the teams in the “natural” line to find their food match or matches in the “processed” line. Have the teams discuss what they know about their foods and identify any other possible foods that could be created from the natural food.

Examples of food sets:

- Potato - potato chips
- Grape - raisins
- Strawberry - strawberry jam
- Brown rice - rice cereal
- Dried beans - canned beans
- Orange - orange juice
- Wheat - macaroni
- Tomato - pizza
- Milk - cheese
- lemon - lemon candy

- Cinnamon stick – cinnamon bread
- Avocado – guacamole

Discussion

Can you name the steps you think are taken to transform a natural food into a processed food that you enjoy eating?

Can you name some of the foods you can prepare with one of the ingredients you used (for example, tomato – pizza, spaghetti, soup, ketchup)?

Think about your kitchen, can you find more natural or processed foods?

Source: Bioed Online, Food: From Natural to Processed,
www.bioedonline.org/k-5/pdfs/Food_from%20Nat%20to%20Processed.pdf

Think Green at the Supermarket!

Level 1 2 3

Aim

To understand that individual choices can help **biodiversity**.

Materials

Packaged food (one for each team, try to find products with too much packaging), poster board, colouring pencils, colour markers, adhesive tape.

Time

40 minutes.

Background

Unsustainable agricultural practices are a very serious threat to **species** and **habitats** around the world, and overfishing is the greatest threat to ocean life. But the problem is not just how food is produced; it is also what kinds of food we eat, and how much we waste.

Every day millions of people around the world buy all kinds of food that come with a packaging. The packaging is the container or group of materials used to wrap a product. Packaging is good as it helps protect and prevent a product from decay, but this can become a problem because it produces a lot of rubbish. These containers, such as glass, metal, plastic and paper are made from natural resources which are mined or cut down, transported and then transformed. This process releases **greenhouse gases** and, therefore, promotes pollution. So, by thinking green when buying you can reduce the amount of garbage you produce and help conserve our natural resources.

How to do it

1. Remind your group how they can use their ability to buy things to help **biodiversity**. Tell them that individual choices about what they eat and buy can really make a difference.
2. Divide your group into small teams. Give a packaged food to each team and ask them to discuss it. How is it packaged? Why do you think it is packaged like that? Would more or less packaging make a difference? Could you find a better packaging that is less harmful for the **environment**?
3. Have your group sit in a circle and think about ways how they can make better food choices and lead a more environmentally friendly lifestyle.
4. Write down the ideas they come up with and make a nice poster that you can hang on the wall.

Here are some ideas:

- Buy local food with no packaging.
- When possible choose sustainably produced foods.
- In the supermarket choose food with less packaging.
- Choose food made closer to home.
- Purchase foods in-season to avoid food miles.

- Grow your own food.
- Compost your organic waste.
- Cook more at home and eat less junk food.
- Buy in bulk to avoid packaging.
- Use reusable bags when you go to the supermarket.
- When shopping, buy products from companies that value the **environment**.
- Companies sell what people want to buy, so with your choices you can tell companies that you want products that do not harm **biodiversity**.

Discussion

Where does all the packaging go?

How does it harm our planet?

How can you and your family change your food choices to reduce the amount of garbage that is produced worldwide and that is harming the planet?

Ladybug Snack

Level 1 2 3

Aim

To have fun with fruits and **biodiversity**.

Materials

Red apples, grapes, peanut butter, O-shaped cereals, raisins, plates, knife.

Time

20 minutes.

How to do it

1. Remind your group that ladybugs are good for their gardens as they are one of the most popular enemies of pests, and that they are good for them too as they will prepare a fun, delicious and nutritious ladybug snack.
2. Help your group to wash the apple and slice it in half. Cut out the core.
3. Tell your group to place the apple, peel side up, on a plate. Ask them to dab small blobs of peanut butter onto raisins and stick as many as they like onto the apple to make the ladybug spots.
4. Next, help the participants to slide a large grape in half lengthwise and use one half to make the head. Slice three smaller grapes in half, and tell your group to arrange them around the apple to make the ladybug's feet.
5. Tell the participants to dab a bit of peanut butter onto two pieces of o-shaped cereal and to stick them on the head as shown.
6. You can serve with extra peanut butter for dipping.



Discussion

Have you seen other animal shapes made with fruits or other food products?

Could you come up with other fruity animal snacks?

Why is it important for chefs to have all kinds of products in their kitchens?

Source: National Wildlife Federation, *Your Big Backyard*, Recipes, Fruity Ladybug Snack,
www.nwf.org/Kids/Your-Big-Backyard/Fun/Recipes/Fruit-Snacks/Fruity-Ladybug-Snack.aspx

The Nose knows

Level 1 2 3

Aim

To identify different food smells.

Materials

Different types of food (for example, apple, peach, pineapple, lemon, onion, potato, celery, chili, nut, honey), papers, pencils, scissors, adhesive tape, five labels (spicy, sweet, acid, earthy, bitter) to help sort your food items, whiteboard, whiteboard markers, two scarves.

Time

40 minutes.

How to do it

1. Remind your group how different types of food have different and delicious smells! Explain to them they will use their sniffers to identify different food items.
2. Divide your group into couples. Have one participant of each couple cover his/her eyes using the scarf. The other participant will make his/her partner smell five food items, so the blindfolded participant can guess. Make sure they write down the answers. No touching is allowed!
3. Next, have the couple change places, so the other participant can smell the other five food items. Reveal the correct answers and see who has the best sense of smell!
4. Arrange the aromas. Place the labels on the whiteboard. Ask the couples to smell each food item once more and put it into the category that best describes its fragrance. If you need to, cut the item to boost its odour. When your group is through sorting, try to find some candidates for categories that might not have any items in them.

Discussion

How did you decide which items belonged in each category? Which were the hardest to label?
Do you wish you had a whole different category? If so, what would it be?
Imagine which scents you would combine to make perfume. How would you name those combinations?

Prepare a Healthy Menu

Level 2 3

Aim

To reflect about good nutrition.

Materials

Notebooks, pencils, books and/or internet for research.

Time

40 minutes.

Background

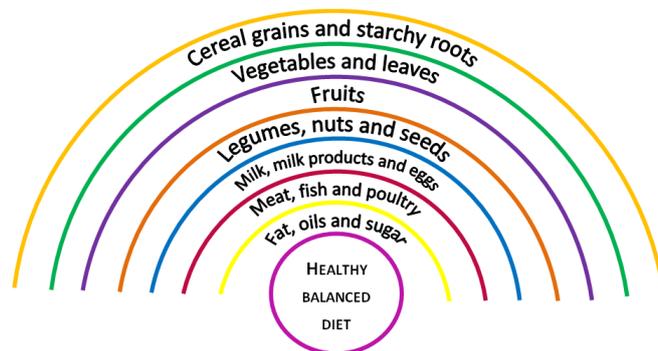
Food is essential for life as it provides a range of different **nutrients**. Without adequate nutrition, children and young people cannot develop their potential to the fullest. Some **nutrients** provide energy, while others are essential for growth and maintenance of the body. We need different kinds of **nutrients** for all of our body processes.

Energy is provided by the carbohydrates, proteins and fats in the food and drinks we consume. Carbohydrates, proteins and fats are macronutrients that we need to eat in relatively large amounts. Carbohydrates are the most important source of energy for the body. We all need energy to grow, keep warm and be active. Vitamins and minerals are

micronutrients which are only needed in small amounts, but are essential to keep us healthy. Water and fiber are non-nutrients, but are also very important for our body. Different food and drinks provide different amounts of **nutrients**, this is why it is so important to have diversity in our diet.

How to do it

1. Remind your group how every living being, including every human, needs a great variety of foods to grow healthy. Have them reflect how we can find all those different types of foods thanks to **biodiversity**.
2. Tell them they are becoming nutritionists, and explain that they must create a menu for a two day excursion. Make sure their meal choices contain a good balance of nutritious foods.
3. Tell them to use the food rainbow provided below to create a **healthy diet** with the right mix of foods to grow and be healthy.



Source: The Right to Food: A Window on the World, Resource and Activity Guide,
www.feedingminds.org/cartoon/rtf_en.htm

If you decide to go on an excursion, you do not have to worry about the food you need to take anymore!

Discussion

- Can you name some benefits of having a healthy balanced diet?
How do human diets differ from the diets of other animals?
Why do some **species** need to eat a bigger quantity of a particular food?

Lunch Time Around The World

Level 1 2 3

Aim

To learn about food preferences in other countries.

Materials

Computer, internet access.

Time

40 minutes.

How to do it

1. Remind your group how every country has different traditional dishes according to the food that is produced there and, of course, according to the culture and traditions from that place.
2. Ask your group to help you choose a traditional food from your country (or city) and to help you write down the recipe using a computer program, you could even include photos. Try to choose an easy one.
3. Using the internet, contact some schools from other countries and share your traditional dish recipe with them, ask the other school to do the same so you can also receive recipes from other parts of the world.
4. You could even try to prepare a recipe you received, and don't forget to tell

the other school how good it was!

Discussion

Were there any food items you hadn't eaten before?
Can you learn something about a country's culture according to the food they eat?
Why is it that sometimes popular food products in some countries are not well received in others?

Food Preferences Over Time

Level 1 2 3

Aim

To discover how food preferences have changed with time.

Materials

Notebooks, pencils.

Time

A 10 minutes lesson to explain the activity and another 1 hour lesson to review the outcomes.

How to do it

1. Remind your group how food preferences have changed with time, different generations prefer different types of food.
2. Explain to your group that they will have to make a conduct an interview to two people from different generations, maybe a grandparent and a parent, in order to find out how their food preferences have varied with time and the development of new food processing technologies.
3. Have each participant present his/her interviews and say which food each member of their family prefers to eat.

Here are some questions they might want to ask:

- Which was your favorite food when you were my age?
- How did you prepare it?
- Can you find that food nowadays? Does it taste the same?
- Do you prefer the food we eat today or the food you used to eat in the past? Why?

Discussion

What is your favourite food?
How does **biodiversity** influence the food we eat?
And how does the production of the food we eat influence **biodiversity**?

Food and Culture

Level 1 2 3

Aim

To find out about food preferences from other countries.

Materials

Video camera (a digital camera, a mobile phone with a camera or voice recorder could work if you do not have access to a video camera), notebooks, pencils.

Time

Two 1 hour lessons (1 hour to begin the activity and 1 hour to present their work), this activity might require some extra work at home.

How to do it

1. Remind your group how different reporters present their topics through videos or voice recordings.
2. Tell your group that they can work individually or in small groups. Explain to

them that they are going to become culinary-reporters and that they will make their own videos or voice recordings about someone who has emigrated, or whose parents emigrated, from another country to yours. This could be a family member, a friend from school or a neighbour.

*If they can't locate a person to help them, they might interview a chef who specializes in an ethnic cuisine.

3. In preparation for interviews, ask students to pose questions that can help them gain a better understanding of a culture's food heritage.

For example:

- Which foods, herbs and spices are typically found in dishes from your culture?
- What drinks are characteristic?
- What special cooking techniques are used?
- Can you tell me about a favourite dish and any story or folklore that goes with it?
- What food crops are commonly grown in the country and how do they influence the cuisine?

4. Ask each participant/team to present their videos or voice recorders.

Here are some ideas to help the participants with this activity:

- Greet your interviewee by reminding them who you are, why you want to talk with them and what you hope to find out.
- Ask questions that require more than a "yes" or "no" answer. Choose more open-ended questions that allow the interviewee to answer in his/her own words.
- Be sure to take cues from your interviewee. Ask questions based on answers they give you. Follow your question sheet, but don't be afraid to expand on the questions.
- If the person is telling a story and you think of another question, don't interrupt; write it down and come back to it.

Discussion

Does your interviewee use any ingredient you hadn't heard about before? Or that we do not usually use in our cuisine?

Have you ever tasted a food from another country that was really different to yours? How was it?

How does the **climate** or geography of a country influence what's grown and eaten?

Source: Kids Gardening, Classroom Projects, Food and Culture, Conducting Community Interviews, www.kidsgardening.org/classroom-projects/food-and-culture

Berries Watercolour

Level 1 2

Aim

To make watercolours using natural resources.

Materials

Newspaper to cover your work area, black markers, sheets of watercolour art paper, ½ cup blueberries, ½ cup strawberries or raspberries, ½ cup water, a potato masher, a medium-size bowl, a strainer, paintbrushes, glasses of water for rinsing the paintbrushes, two plastic margarine tubs.

Time

50 minutes.

How to do it

1. Remind your group how, before the invention of artificial chemical dyes, food products and even clothes were coloured with natural dyes from roots, nuts, berries, flowers and other things found in nature.
2. Tell the participants to use the black marker to draw the outline of a picture on the watercolour paper.
3. Ask your group to help you make the watercolours. Put half a cup of blueberries into the bowl. Add $\frac{1}{4}$ cup of water. Mash with the potato masher until juicy.
4. Place the strainer over a margarine tub. Strain the berry mixture so that the juice goes into the tub. This is your purple (blue) watercolour.
5. Repeat this process for your red berries. Consider using other coloured berries to produce additional watercolours.
6. Have fun painting your works of art!

Discussion

What other types of food do you think you could use to make watercolours?
What other uses do humans give to food items, other than serving as food?

Source: National Wildlife Federation, Be Out There, Activities, Cook and Craft, Make Your Own Watercolor Paints
www.nwf.org/Get-Outside/Be-Out-There/Activities/Cook-and-Craft/Make-Your-Own-Watercolor-Paints.aspx

What do animals eat?

Level 1

Aim

To learn how different insects feed themselves.

Materials

An open space, animal list provided below, papers, pencils, scissor.

Time

40 minutes.

Background

Just like human beings need food to help their bodies grow and live, all animals need food to survive. Different animals eat different types of food. Therefore, we can classify animals according to three diet types:

- Carnivore: these animals like to eat meat.
- Omnivore: these animals combine meat with plants; and,
- Herbivore: these animals like to eat only plants.

How to do it

1. Remind your group how different animals have different food preferences.
2. Write the name of each animal from the list and the food it eats on a small piece of paper.
3. Take your group to an open area and divide them into small teams. Give one of the animal papers to each team.
4. Explain to your group that each team will have to represent what their animal likes to eat. So, when it is their turn, have each team stand up, say out loud which animal they have and represent what this animal likes to eat, so everyone else can guess. No talking allowed. Give the teams some time to prepare themselves before starting!
5. After they have guessed what each animals likes to eat, ask your group to divide these animals according to their diets: carnivores, omnivores or herbivores.

Animals:

- *Walrus*: some of their favourite foods are clams, fish and octopuses.
- *Celebes apes*: some of their favourite foods are berries, grains and insects.
- *Flamingoes*: some of their favourite foods are seeds, shrimp, and snails.
- *Great horned owls*: some of their favourite foods are rabbits, bats and frogs.

- *Nyasa lovebirds*: some of their favourite foods are seeds, flowers and leaves.
- *Tayras*: some of their favourite foods are birds, insects and fruit.
- *Camels*: some of their favourite foods are leaves, shrubs and grasses.
- *Emerald boas*: some of their favourite foods are squirrels, monkeys and lizards.
- *Lemurs*: some of their favourite foods are fruit, leaves and flowers.

Discussion

Why do you think animals have different diets?
Does the shape of their body and mouth influence what they eat?
Does the place where they live determine their food preferences?

How do animals eat?

Level 1 2

Aim

To learn how different animals feed themselves.

Materials

An outdoor setting, notebooks, pencils, colouring pencils.

Time

20 minutes.

How to do it

1. Remind your group how human beings eat; they use their mouth, of course! But animals' mouths are not all the same!
2. Take your group to an outdoor setting and ask each one to try and follow any animal they find in order to see how its mouth is shaped and how it eats. They can use their notebooks to take some notes or make some drawings regarding their observations.
3. Have your group sit in a circle and ask each one to present their findings. If it was difficult for them to find different animals, you can ask them to remember one they saw in the past.
4. Next, ask them to make a drawing of themselves, but with a different kind of mouth, how about a platypus' mouth or a toucan's beak! Have each one present their drawings.

Discussion

What are some similarities between the way we feed ourselves and the way other animals do?
What are some differences?
How can maintaining a good diversity of plants, bushes and trees in your garden help animals find the food and shelter they need?

Ant Picnic

Level 1 2

Aim

To find out what food ants prefer.

Materials

An outdoor setting, big paper plate, marker, six different foods (sugar, cracker crumbs, lettuce, crumbled cheese, banana, peanut butter, for example).

Time

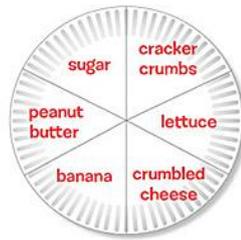
40 minutes.

How to do it

1. Explain to your group that you are going to invite some ants to a delicious picnic. That's right, ants!
2. Plan your menu. Ask the participants to use the marker to divide the paper

plate into six sections. Tell them to put a different food in each section of the plate.

3. Have them set the plate outside on a warm day, in a spot where they have seen ants.



4. It will take the ants a while to find their picnic. So, keep checking back until they do. Once the ants have discovered their good luck, ask the participants to start watching what they do.
5. Talk about what they see. What foods are the ants' favourites? How do you know? Are they eating the food now or just carrying it away? If they're eating it, describe how they do it.
6. Ask the participants to make an obstacle course. Ants leave drops of scent as a roadmap to tell each other how to find the food. That's why they travel in a line. What happens if that scent trail is disturbed? Tell your group to put an object over the path. What do the ants do? Wipe away a bit of the trail with your hand. What do the ants do now?

Discussion

How do the worker ants carry the food back home? What do they do with food that's hard to handle?

Were you able to find the soldier ants guarding the trail and the opening to their mound? How do they look different? How do these differences help them with their jobs? (Soldier ants are bigger and have bigger jaws. They are built to be good fighters.)

Source: National Wildlife Federation, Kids, Your Big Backyard, Fun, Outdoors, Observing Wildlife, Ant Picnic, www.nwf.org/Kids/Your-Big-Backyard/Fun/Outdoors/Observing-Wildlife/Ant-Picnic.aspx

How do insects feed?

Level 1 2

Aim

To learn that different insects have different kinds of mouths.

Materials

Pictures of insects with different kinds of mouths (beetle, mosquito, fly and butterfly), nutcrackers (one per group), paper towel (one per student), turkey baster (one per group), straws (one per student), clothespin (one per group), cookies, juice, cups, coloured water in cup/bowl.

Time

50 minutes.

How to do it

1. Remind your group about the kinds of food insects eat so they can understand how the mouth types help the different insects to feed themselves.
2. Hold up a picture of a beetle, which has a nutcracker/pliers mouth. Demonstrate how an insect with this kind of mouth would eat using the nutcracker and a cookie. Ask the participants to use their nutcracker to "tear" the cookie apart, like a beetle would do with his mouth.

3. The next mouth to explore will be a needle mouth. Use a picture of a mosquito to show your group how a needle mouth looks like. Demonstrate how mosquitoes use their mouth by using the baster to soak up coloured water from a cup. Allow time for the participants to do this as well.
4. The third type of mouth is a sponge mouth. Use a picture of a fly to show a sponge mouth. Demonstrate how a fly's mouth works using a paper towel clipped with a clothespin and water, how the water soaks up into the paper towel is very similar to how the food soaks into the fly's mouth. Allow the participants to use their materials to explore the sponge mouth.
5. Finally, demonstrate how a straw mouth works. Use a picture of a butterfly to show this type of mouth. Use a straw to suck juice up out of a cup to show how a butterfly eats. Allow the participants to use their straws and juice.

Discussion

Can you name other insects and identify their type of mouths?
How does the form of their mouth influence the type of food they eat?
If you were an insect, how would you prefer to eat? Why?

Source: Learn NC, Classroom, lesson Plans, Incredible Insect Mouths,
www.learnnc.org/lp/pages/3788

Share the Christmas Cheer!

Level 1 2 3

Aim

To feed animals outside and learn what food they prefer.

Materials

To decorate your tree: pine cones, scooped out orange halves, apple and orange slices, whole carrots, peanuts and raisins, wool, scissors, a thick needle (to make the holes to pass the wool through the foods).

For the bird mix: ½ cup lard or suet, 1 cup birdseed, ½ cup peanut butter, 2-3 cups cornmeal, ½ cup dried fruit (such as raisins or currants).

Time

A 1 hour lesson and six 10 minutes lessons.

How to do it

1. Tell your group that you are sharing the Christmas cheer with the creatures outside!
2. Explain to them that you are going to decorate a tree outdoors with edible ornaments for birds and other backyard visitors. Use pieces of wool to hold the items in place on the tree, but make sure to remove these once the food is gone. If you live in a snowy area you could also decorate a snowman with some yummy stuff. Here are some ideas:
 - Pine cones stuffed with winter bird mix (see recipe below).
 - Scooped-out orange halves, filled with birdseed.
 - Peanut and raisin garlands.
 - Apple and orange slices.
 - Whole carrots.
3. To make the bird mix, melt the lard and the peanut butter together. Stir in the seeds, the fruits and enough cornmeal to soak up the melted lard. Let it cool. Spread the mix under the scales of pine cones or onto cardboard cut-out ornaments. Chill feeders in refrigerator to harden the mixture.
4. Make sure to check your tree at least two times a day during three days to see if your outdoor friends have been hungry!

Discussion

Which animal likes what?

Did you find any signs of midnight-snackers? (See what disappears overnight or check for fresh tracks).

What was the most popular item on the menu? And which was the least popular?

Source: National Wildlife Federation, Ranger Rick, Attracting Winter Birds and Other Wildlife,
www.nwf.org/Kids/Ranger-Rick/Activities/Help-Nature/Birds/Attracting-Winter-Birds-and-Other-Wildlife.aspx

Menus for Picky Eaters

Level 1 2 3

Aim

To learn what different animals eat.

Materials

Notebooks, pencils, books and/or internet for research.

Time

40 minutes.

Background

While there are some animals that eat different types of foods, there are others that do just fine on only one kind of food. For example, the giant panda from China, who eats bamboo and not much else. These animals have evolved to survive on one kind of food and couldn't easily switch to another. This is one reason why many animals, like pandas, become **endangered** as their food sources disappear.

Another example is the African egg-eating snake who, as its name suggests, eats only bird eggs; or the black-footed ferret who usually prefers prairie dogs for dinner. The problem is that lots of prairie dogs got wiped out when settlers turned prairies into ranches. Because of that, the ferret nearly went extinct as well. So, remember, being a picky eater only works when you can survive on what you pick, and when there is enough of it around!

How to do it

1. Remind your group how some animals have varied diets, while others eat just one type of food.
2. Divide your group into couples and have each couple choose an animal to make a restaurant menu of dishes appropriate for that **species**. For example, a panda bear might like a bamboo juice and a bamboo salad, while a jaguar might enjoy a turtle soup and some cubed deer meat with rice.
3. Ask each couple to share their menus. Encourage them to find menus for both particular and easy-to-please eaters. Discuss how a non-specialized diet generally provides a survival advantage.

Discussion

What if an animal runs out of its favourite food? Could that animal survive without it?

How does **habitat** destruction affect picky eaters as their food source is affected?

Do you consider yourself a picky eater? Could a limited diet present any problems for humans?

Source: National Wildlife Federation, Kids, Ranger Rick, Animals, Mixture of Species, Picky Eaters,
www.nwf.org/Kids/Ranger-Rick/Animals/Mixture-of-Species/Picky-Eaters.aspx
www.nwf.org/Kids/Ranger-Rick/Parents-and-Educators/Ranger-Rick-Educators-Guide.aspx

Food Chains & Food Webs

Level 1 2

Aim

To reflect about food chains and food webs in your school/youth group backyard.

Materials

An outdoor setting, notebooks, pencils, poster board, colour markers, string.

Time

50 minutes.

Background

Food chains and food webs form the basis of all **ecosystems**. They demonstrate the interconnectedness of all living things. Therefore, the relationships between **species** are essential to sustaining an **ecosystem**. Often the role of a particular **species** does not become apparent until that **species** is lost. For example some insects are responsible for pollinating some particular plants, if the insects become extinct then the plants will be lost as well, any other animals that depend on those plants will then disappear, and so on.

A food chain shows the flow of food at a very simple level, for example: grass – wallaby – dingo. A food web is far more detailed as it shows the flow of food between many **species**. Because one animal often eats multiple **species** a food web can become very complex. Drawn food webs often resemble a spider's web, hence the name.

How to do it

1. Take your group to an outdoor setting and divide them into small groups.
2. Ask each group to find an animal in their school or youth group ground and to complete the following information:
 - The animal is:
 - It lives in:
 - It eats:
 - It is protected by:
 - It is eaten by:
3. Have each group present their animal.
4. Next, use the food chains completed by your group to create a class display on food chains/webs. Make a drawing of a tree, shrub or groundcover on the middle of the poster board as the basis for a food chain.
5. Ask the participants to draw around the tree/shrub any animals that feed on it, and then to draw any predators next to their prey. Label each animal as it is placed in the food web.
6. Finally, tell your group to link each animal to its prey/food using string. This completed food web helps to demonstrate the interconnectedness of living things in the playground, that is, your school or youth group **ecosystem**.

Discussion

What would happen if the tree was removed?
Are any animals eaten more than others?
Why do plants and animals need each other?

Source: NSW Biodiversity Strategy, Biodiversity for Kids, Teacher's Guide, Food Chains and Webs, www.environment.nsw.gov.au/resources/education/BiodiversityTeachersGuide.pdf, page 30.

Butterfly Feeder

Level 1

Aim

To make a butterfly feeder to attract butterflies to your garden.

Materials

Cardboard, plastic bottle top, glass, scissors, a straw or cane, sellotape, a pot with soil in it, cotton, colouring pencils, sugar, water.

Time

30 minutes.

How to do it

1. Ask your group to draw a flower on the cardboard and to colour it with bright colours. Tell them to cut out the flower.
2. Have them stick the plastic bottle top on the centre of the flower.
3. Tell them to stick the straw or cane onto the back of the flower, and stand it in the flower pot.
4. Finally, ask the participants to mix some sugar with some water and soak the cotton in the solution. Have them to put the cotton wool inside the bottle top.
5. Put your feeder outside, in a sunny place!

Discussion

What do butterflies generally eat?
How is a butterfly's mouth shaped?
Which flowers attract butterflies to your garden?

Source: Wildlife Watch, Images, Activity Sheets, How to make a butterfly feeder,
www.wildlifewatch.org.uk/images/activity_sheets/butterfly_feeder_activity_sheet.pdf

The Story of Food

Level 2 3

Aim

To gain a deeper understanding about the food system.

Materials

Notebook, pencils, whiteboard, whiteboard markers, internet access.

Time

30 minutes.

Background

For 10 000 years, farmers have selected, saved, planted, and conserved seeds. In this way, through thousands of growing seasons, they have expanded and safeguarded the world's agricultural diversity. Over time they have acquired a remarkably deep knowledge about their seeds, soils, and local **ecosystems**. Today, this extremely important knowledge is in peril.

In recent decades, there has been major shift toward large-scale agriculture and mass food production for international markets. This has profoundly changed farming and the food we eat. In the process, the farmer's role in the world's food system has diminished. With this diminishing role, we are also losing nature's greatest resource for ensuring a reliable and healthy food supply: agricultural **biodiversity**. **Biodiversity** is held in the rich variety of farmers' seeds -all over the world- that have been treasured and passed on through generations. Small farmers are still doing their part to maintain diversity (since 1960, they've bred more than 25 times as many plant varieties as industrial plant breeders), but they need support from the rest of us; the people who rely on them!

Source: USC Canada, The Story of Food, Farmers,
<http://usc-canada.org/storyoffood/farmers/>

How to do it

1. Tell your group that you are going to watch a documentary about the food system:
The Story of Food,
<http://usc-canada.org/storyoffood/>
2. Ask them to write down some key words and information while they watch the video.
3. Once the video is finished, have your group brainstorm their main ideas and make a list on the whiteboard. Use the list to encourage discussion.

Discussion

How important is the role of farmers for the development of crucial plant diversity, the maintenance of healthy local **ecosystems**, and the provision of food for us all?
What is the “power” that seeds hold and what is its relation to farmers’ knowledge?
What can you do to help small-scale farmers and protect agricultural **biodiversity**?

Biodiversity Loss

Level 1 2

Aim

To experience how it feels to not have the resources we need.

Materials

3 cups of soil, 1½ cups of water, 9 seeds, 2 containers (for the soil and the water), plates, cups, whiteboard, whiteboard markers, paper, scissors, pencil.

Time

20 minutes.

Background

Everyone is responsible for creating a green and blue healthy world. We all depend on it; we get our food, fuel, medicine and other essentials that we simply cannot live without from nature. But we, human beings, are beginning to put too much pressure on our planet and we are stretching it further than it has ever been stretched before. As a consequence, some of the **extinctions** we are causing may have deep and irreversible effects on how we live our lives. It is time for all of us to start caring for what our planet already gives us.

How to do it

1. Explain to your group that they are all farmers who depend on their production to gain the money they need to sustain their families and to lead a happy life.
2. Divide your class into four teams. Explain that you will play a guessing game related to agriculture and farming. Have each group select a representative; each one will have to pick a word and draw it on the whiteboard so all the teams can guess, no talking allowed!
3. Write the words in small pieces of paper and have them ready for each representative to choose one.
For example:
 - Crops
 - Harvest
 - Planting
 - Watering
4. Every time a group wins, as a price they earn the soil, water and seeds they need to grow their crops – a cup of soil, half a cup of water and three seeds.
5. Repeat the activity until you run out of resources! People have caused a considerable threat to the **environment**; modern farming methods include **biodiversity** loss, exploitation of natural resources and contamination of soil, water and air.

Discussion

How did the team that had no resources left feel?
What options might real farmers going through a similar situation have?
How would you feel if you did not have the resources you need to lead a healthy and happy life?

Ecological FOODprint

Level 2 3

Aim

To discuss our food's ecological footprint.

Materials

Chart provided below.

Time

30 minutes.

Background

'Ecological Footprint' refers to how much land is used to produce each food item. It includes the land required to grow the food and to absorb the wastes associated with its production. It is a great way to compare different lunches and to see the different sized footprints that each one leaves on the Earth.

Whatever you are eating, it is incredibly important to eat enough! If we want to make positive changes in our lives and the world around us, we have to take care of ourselves. We have to feed ourselves lots of healthy food so we can develop our everyday activities. Choosing organic food, local food, or vegetarian options sure makes a difference though, check it out!

How to do it

1. Remind your group what the Ecological Footprint is and explain to them that they will have a discussion about food production and how much land (in this chart, how many square meters) is used to produce some food items.
2. Divide your group into two teams, some that are in favor of eating as many burgers as they can and others that prefer vegetables in order to help prevent a bigger **habitat** destruction.
3. Encourage discussion by having them read the following text and facts:

Many small family farms may not harm the **environment** if they raise cattle. But many large industries cut down forests to clear space for cattle ranching. Forests produce oxygen, absorb **carbon dioxide** and ensure water and soil **conservation**. When forests are cut down, **carbon dioxide** is released.

Raising animals for meat leaves a big footprint. Meat is the most energy-intensive of all foods to produce and it takes up larger amounts of water than any other food production. If everyone committed to eating less meat, our world could save a lot of energy, land, and water, and we could help preserve forests because they wouldn't have to be cut down!

ECO-FOOTPRINT OF A LUNCH	
Burgers (one 250g burger per week)	
Grain-fed beef burger	3,598 m ²
Pasture-fed (free-range) beef burger	2,829 m ²
Chicken burger	716 m ²
Tofu burger	177 m ²
Vegetables (1/2kg per week)	
Local and organic (mechanized)	152 m ²
Home grown	128 m ²
From the supermarket	104 m ²
Local	64 m ²

4. You will act as the chair; make sure the discussion is fluent and organized. Ask the

participants to raise their hands before talking, so they won't interrupt each other. At the end they will have to reach an agreement. Can they find a balanced diet that satisfies everyone's food preferences, but that also contributes to make a difference?

Discussion

How important do you think small actions can be in order to prevent **habitat** destruction? Can you substitute meat products with other types of food? Have you tried them? Can you create a meat free menu for your house? Do you think your family would like it?

Source: The Otesha project 2005, The Otesha Book – From Junk to Funk!, www.otesha.ca/files/the_otesha_book.pdf; page 117.

Food and Biodiversity Route

Level 2 3

Aim

To understand our dependence on food and **biodiversity**.

Materials

An open space, coloured cardboards, coloured chalk, dice.

Time

1 hour.

Background

Biodiversity for food and agriculture includes the components of biological diversity that are essential for feeding human beings and, thus, improving the quality of life. It includes the variety and variability of plants, animals and **microorganisms** at the **genetic, species** and **ecosystem** levels, which are necessary to sustain human life as well as the key functions of **ecosystems**. Environmental integrity is critical for maintaining and building positive options for human well-being as **biodiversity** offers key options for sustainable livelihoods.

How to do it

1. Ask your group to help you draw a giant board game on the floor using the chalks. They should draw a route of 40 cells. Mark the first cell "Start" and the last one "Finish".
2. At random, colour eight empty cells in one colour, eight in another colour and ten in a third colour. The colours should be mixed all over the board. Write the words fruits and vegetables, cereal grains and meats in the rest of the cells.
3. Have the participants prepare cardboard cards in the same colours as the cells. On one set write eight positive events related to food and **biodiversity**.

For example:

- **Biodiversity** contributes directly to **food security**, nutrition and well-being by providing a variety of plant and animal foods. Move three cells forward.
- Diverse diets contribute to the fight against problems of under-nutrition and obesity, in both developing and developed countries. Move two cells forward.
- Child growth improves with the consumption of greater food diversity. Research suggests the health benefits of varied diets, particularly in fruits and vegetables. Move one cell forward.
- Genetic diversity can provide access to seeds and planting material better adapted to existing conditions (for example, drought-resistant traits, or resistance to pests and disease). Move three cells forward.
- Thanks to **biodiversity** the rural poor can diversify their agricultural production to allow easier access to nutrient-rich foods. Move two cells forward.
- Since agriculture began some 12 000 years ago, approximately 7 000 plant **species** and several thousand animal **species** have been used for human food production. Move one cell forward.

- Many medicinal plants that help maintain and promote good health can be found in our world thanks to biological diversity. Move three cells forward.
- The collection and growth of food **species** contributes to the livelihoods of rural people, meeting subsistence needs and providing cash income through market sale. Move two cells forward.

On another set write eight negative events.

For example:

- Today, certain traditional and indigenous communities continue to use many plants **species** in their diets, but the general global trend has been towards diet simplification, with consequent negative impacts on human **food security**, nutritional balance and health. Move three cells back.
- Farmers have been using too many chemical fertilizers and now, mainly through run-off from cropland, water sources have become polluted around the world. Move two cells back.
- The condition of our soils ultimately determines human health by serving as a major medium for food production, but, currently, scientists are increasingly aware that declining soil fertility is becoming a major concern worldwide. Move one cell back.
- **Habitat** loss and degradation create the biggest single source of pressure on **biodiversity** worldwide. For terrestrial **ecosystems**, **habitat** loss is largely accounted for by conversion of wild lands to agriculture, which now accounts for some 30 percent of land globally. Move three cells back.
- Well-nourished, healthier people are more productive and can make a greater contribution to the development of their communities and the **conservation** of their **environment**, but many people around the world do not have access to sufficient and diverse food. Move two cells back.
- Some industrial farms mass-produce a few selected breeds in their quest to produce more meat, milk or eggs. This practice is leading to a decline in livestock diversity. Move one cell back.
- Overexploitation is the major pressure being exerted on marine **ecosystems**, with marine capture fisheries having quadrupled in size from the early 1950s to the mid 1990s. The FAO estimates that more than a quarter of marine fish stocks are overexploited (19 percent), depleted (8 percent) or recovering from depletion (1 percent) while more than half are fully exploited. Move three cells back.
- Farming usually changes the landscape, the water, the air and **biodiversity**. Construction workers build roads so that trucks can pick up farm produce and take it to markets. When farmers cut trees to create space for growing crops or raising livestock, they also reduce natural water filtration (cleaning). Move two cells back.

And on the third set write ten funny tasks for the participants.

For example:

- Jump around on one leg.
 - Act like an orangutan.
 - Make a hip-hop dance.
 - Sing your favorite song.
 - Imitate one of your teachers or leaders.
4. Then, have the participants prepare another set of 12 cards. Write the words fruits and vegetables on four cards, cereal grains on other four and meats on the last four cards. On the back of each card write the name of a fruit or vegetable, cereal grain or meat, respectively.
 5. Divide your group into two teams and play the game. Each team throws the dice and

moves one to six cells forward, the members of the team can take turns to throw the dice. Each time a participant stops on a funny task, the whole team has to do it. If a participant stops on a fruits and vegetables, cereal grains or meats cell, he/she must choose one of the corresponding cards, read it without showing it to his or her team and depict the fruit, vegetable, cereal grain or meat by mime, so the rest of team can guess. If the team guesses, it can throw the dice again. If a team stops on a coloured cell, they have to pick up a card, read it out and act accordingly. The team who gets to the “Finish” first wins.

Discussion

What do you think is the world’s major concern regarding **biodiversity** loss?
Who do you think is most responsible for taking action on **biodiversity** protection and **conservation**?
What can you do at a local level to help protect your natural resources?

Facts sources: Convention on Biological Diversity, Agricultural Biodiversity, Biodiversity for Food and Nutrition,
www.cbd.int/agro/food-nutrition/

Current Pressures on Biodiversity and Responses

<http://gbo3.cbd.int/the-outlook/gbo3/biodiversity-in-2010/current-pressures-on-biodiversity-and-responses.aspx>

Gardening for goods

Food Explorer!

Level 1 2

Aim

To discuss local fruits and vegetables.

Materials

Different fruits and vegetables produced locally, copies of the fruits and vegetables list, notebooks, pencils, knife, paper plates.

Time

A 30 minutes lesson (to develop the activity), and another 10 minutes lesson (to review the outcomes of the homework).

How to do it

1. Start a discussion about food preferences by asking students to name their favourite and least favourite fruits and vegetables. Ask them to identify what factors affect food preferences (place of birth, family, culture, personal preferences, etc.).
2. Bring a wide assortment of fruits and vegetables to your class or meeting that are cultivated in your country. You could also choose different varieties of the same fruit or vegetable.
3. Make a list of all the fruits and vegetables you brought to your class or meeting, and hand out copies of the list you made.
4. Show your group all the fruits and vegetables you brought, hold them up one by one. Using the list, ask the participants to check off the ones they have already tried.
5. Next, have the participants sample at least one fruit and vegetable they have never tasted before and ask them to write their observations, comparing them to other flavors. This part of the activity can be done in small groups. Finally, have each group present their observations.
6. As a homework assignment, ask the participants to try at least one more fruit and vegetable they and their families have never tried. Discuss their experience on the next lesson.

Discussion

Are you a food explorer or are you 'afraid' to try new foods?
Could you describe the new fruit or vegetable you tried using all your five senses?
Was the food cooked or raw?
Did this fruit or vegetable taste similar to something you had tried before?

Adapted from: Oklahoma Ag in the Classroom, Lessons, Be a Food Explorer,
www.clover.okstate.edu/fourh/aic/lessons/intermed/explore.pdf

Explore Plant Growth

Level 2 3

Aim

To identify and describe some major stages of plant growth.

Materials

An outdoor setting, lunchboxes, notebooks, pencils.

Time

30 minutes.

How to do it

1. Take your group to an outdoor space; ask them to bring their lunchboxes with

them!

2. Ask the participants to explore the nature around them, tell them to find plants in different growth stages. They can use their notebooks to sketch their findings.
3. Next, find a plant where you can identify all its parts: root, stem, leaf, fruit, and flower. Use this discussion as an opportunity to describe the importance of sunlight, water and soil to plants. Explain that after the food contained in the seed runs out, the young plant needs to use its leaves and sunlight to make more food. The plant obtains water and **nutrients** from the soil using its root system.
4. Ask your group to get their lunch bags, open them and take a look at what's for lunch. Tell them to raise a hand if they have any plants in their lunches. If anyone doesn't raise their hand, check the lunch and point out any foods that contain plants (check the ingredients list if needed). Explain that we eat plants every day! They are very important in our lives because they help to keep us healthy.
5. Ask for a few volunteers to tell the class what kinds of plants they have in their lunches: vegetables, legumes, fruit, etc. Write them on a piece of paper.
6. Next, have the participants classify each food item in the correct category: root, stem, leaf, fruit, or flower. Some foods will take some explaining, for example, ginger and white potatoes are classified as stems. Some stems are actually found underground and are fat because they hold the plant's food. So even though they look like a root, you can tell they're stems because you can see where the real roots will sprout. Broccoli is another tricky one. They are flowers, but not the kind you usually see! They are green, and if you look closely you can actually see tiny petals.

Discussion

How do plants change as they grow? Does the growth happen to different parts of the plant? Which ones?

What happens to their size? Their shape? Their colour?

What part of the plant do we usually eat?

Can you think about other things we get from plants (clothing, beauty products, fuel, etc.)?

Adapted from: Eco Kids, Our Planet Our Future, Teachers, resources, Lesson Plans, Growth and Changes in Plants: What's for Lunch?, www.ecokids.ca/pub/teachers/resources/esl_lesson_plans/what_s_for_lunch.pdf

Seed Banks!

Level 1 2 3

Aim

To learn about seed banks.

Materials

Freezer, paper towel for each participant, sealable plastic bag (sandwich size) for each participant, five seeds for each participant (select seeds with a shorter germination time, such as wheat), thermometer, papers, pencils, stapler, water, cup.

Time

A 20 minute lesson (to explain and to start the activity), four 5 minute lessons (to check the temperature in the freezer) and five 10 minute lessons (to check the seeds germination progress).

Background

Seed banks store our world's seeds! A seed bank is a facility that stores seeds that are grown and saved by communities all around the world. Placing seeds in a seed bank helps

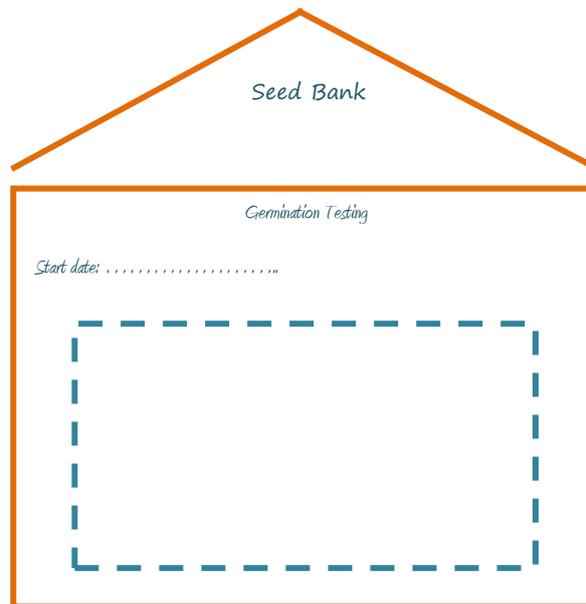
people to protect seeds of various crops and plants in an effort to preserve **biodiversity**. Seed banks also contribute to protecting plant **species** that may be otherwise lost in case seed reserves elsewhere are destroyed or in the event of a catastrophe.

Moreover, as farmers tend to cultivate certain types of crops that are, for example, more drought tolerant or disease resistant, seed banks are established to save samples of other crop variations in order to maintain the diversity of global crops and prevent them from disappearing forever. Seeds have a dormancy feature which allows us to preserve them for long periods of time with little or no damage.

How to do it

1. Give each participant a paper towel, five seeds and a sealable plastic bag.
2. Ask the participants to describe the purpose of a vault or safe. What kinds of things belong in a vault or a safe?
3. Explain to the participants the importance of keeping seeds safe. Ask them to brainstorm ways that seeds could be saved. Draw some diagrams to show how seeds were kept by early settlers or pioneers. Seeds were kept dry, cool, and away from rodents and other insects that might have tried to eat them.
4. Relate to your group that just as food does not come from the grocery store, seeds also do not come directly from a store in a package. There are many people involved in developing, packaging, and growing plants specifically for seed harvest. Scientists also help develop varieties that are resistant to diseases and insects. They rely on seeds that are preserved in seed banks to help them find better ways for these plants to survive.
5. Tell the participants to place their seeds in the sealable plastic bag, and have them place the bags in the freezer for one week with a thermometer. Ask your group to observe the thermometer in the freezer every day to monitor the temperature.
6. After one week, have the participants remove their seeds from the freezer. Tell them that they will now grow the seeds that have been stored. This is similar to how a seed bank works. Seeds must be re-grown periodically to maintain their viability or ability to grow.
7. Ask your group why they think that monitoring the temperature in the freezer would be important. What might happen if the electricity went out? Could it possibly damage the seeds?
8. Have the participants fold their paper towel in half and then in half again, so it is one-quarter of the original size. Next, have them dampen their paper towel with water. Avoid getting too much water on the towel; water should not pool up in the plastic bag. Tell them to lay the seeds onto the paper towel, put it inside the plastic bag and seal it.
9. Ask the participants to draw the seed bank template provided below on a sheet of paper, to cut it out and to staple the bag to the seed bank.
10. Ask your group to predict if the cold storage will have an effect on their seeds. Have the participants observe the germination of their seeds. Ask them to record in a journal the seeds' progress for at least a week. You could then sow some seeds.

Seed Bank Template



Discussion

Was the seeds' germination affected by the cold temperature?
What are some of the benefits that a community could get from a seed bank?
Why would we say that banking dormant seeds gives people a type of heritage preservation insurance?

Source: National Gardening Association, Kids Gardening, Activities, My Seed Bank,
www.kidsgardening.org/activity/my-seed-bank

Biodiversity Begins with a Bee

Level 1 2 3

Aim

To realize bees play an important role in **biodiversity**.

Materials

Notebook, pencils, whiteboard, whiteboard markers, computer with internet access (if available) or books.

Time

30 minutes.

How to do it

1. Tell your group that you are going to watch a short video about bees and pollination:

Biodiversity Begins with a B,

www.youtube.com/watch?v=v_otglflQw4

*Ask them to write down some key words while they watch the video.

2. Once the video is finished, have your group list their words on the whiteboard. Use this list to encourage discussion.

Discussion

How important is the role of bees in the preservation of **biodiversity**?
Which do you think is the main benefit human beings obtain from bees?
Can you think of other ideas of how you can help bees carry out their important job?

Farming Around You

Level 1 2 3

Aim

To learn about agriculture and food production in your area.

Materials

Notebooks, pencils, guest speaker.

Time

A 10 minute lesson to explain the activity and to prepare some questions for the farmer's visit, and another 40 minute lesson to receive him/her.

Background

Where do you think all the food you can find in the supermarket comes from? Well, it does not all come from your local farms. Different food is grown in different countries around the world depending on the **weather** and **climate** in a particular area. So, your food comes from farms all over the world! If farmers can't grow a certain kind of food in their country, people in that area can import it from other places that can grow it. Farmers can also export the extra food that they grow to other places that need it. Thanks to the hard work of farmers all around the globe, we all have different types of food to eat!

How to do it

1. Invite a farmer from your community to visit your school or youth group, so he or she can talk about the crops and animals that are raised in your area.
2. Before that day, make sure you encourage your group to think about the things they might want to know and help them prepare some questions.

Discussion

Why is farming important to people?
Why do farmers grow the kinds of food they grow?
Can you name some differences between farming in your area and in other parts of the world? Can you name some similarities?

Soil Fun!

Level 1 2 3

Aim

To examine and observe soil.

Materials

An open space, paper, magnifying glass, soil, samples of: sand, silt, clay and loam, a clear jar, water.

Time

30 minutes.

Background

Soil is a combination of different materials, both living and nonliving. One part of soil is broken down rock, and another is organic matter made up of dead plants and animals. Water and air are also a part of soil. These materials help support plant life by providing them with **nutrients**. Healthy soil is one of the most important factors in growing healthy plants.

Soil differs from place to place. There are various types of soils, which have four different components: sand, silt, clay, and loam.

- **Sand** is the largest particle found in soil. When you rub it, it feels rough and gritty. Sand does not contain many **nutrients**, but it is good for providing drainage.
- **Silt** falls between sand and clay. Silt feels smooth and powdery when it's dry. Silt also feels smooth when it's wet but not sticky.
- **Clay** is the smallest particle found in soil. Clay is smooth when it is dry but it is sticky

whenever it gets wet. While clay can hold many **nutrients**, it does not allow much air or water to pass through. Therefore, too much clay in the soil can make it heavy and unsuitable for growing most plants.

- **Loam**, on the other hand, consists of a good mix of the three, making this type of soil the best for growing plants. Loam breaks up easily, encourages organic activity, and retains moisture while allowing drainage and aeration.

How to do it

1. Take your group to an outdoor setting and remind them how important soil is for plant growth. Scoop up some soil and spread it out on a piece of paper.
2. Ask the participants to use the magnifying glass to examine the fine particles that make it up, they should be able to see tiny pieces of rock and sand, as well as pieces of leaves, branches, and plant roots.
3. Explain that soil is alive as it contains many different living creatures, such as bacteria, worms and insects, which are responsible for keeping the soil healthy. The most common living creature in soil is the earthworm. Earthworms create tunnels in the soil, helping with the circulation of air and water. They also eat decaying plant materials, which pass through and fertilize the soil. Can you find any earthworm?
4. Next, show the participants the sand, silt, clay, and loam samples. Ask them to touch and compare them.
5. Have your group prepare a soil shake! Tell them to put equal parts of each sample of soil into the jar until it is a quarter full. Have them add water until the jar is two-thirds full.
6. Ask them to shake the jar vigorously for two minutes. Then, allow the contents to settle for about 30 minutes.
7. Let your group observe their 'shake'. The larger particles, like sand, will have settled to the bottom first, while the smaller ones will be closer to the top. There will also be some particles that will stay suspended in water, these are the lightest particles.

Discussion

Can soil have different colours? Why do you think this happens?
Why is it important for soil to be rich in organic matter (humus)?
How does this affect plant growth?

Source: The Kids Garden, Learning, Teaching Kids About Soil,
www.thekidsgarden.co.uk/teachingkidsaboutsoil.html

Gardening Path

Level 1 2 3

Aim

To reflect on the benefits of growing your own garden.

Materials

An open space (with a hard surface for drawing on), chalks, cardboard, pencils, dice.

Time

30 minutes.

How to do it

1. Take your group to an open space. Ask them to use the chalk to draw a path on the floor that consists of 30 spaces or squares. Tell them to number the spaces and to name the first space as **Soil** and the last space as **Garden**.
2. Ask the participants to assign the following statements to 10 different spaces:
 - Your garden looks beautiful as you have planted many different flowers. Go forward three spaces.
 - No animal life visits your backyard as you do not have any plants and trees. Go back three spaces.

- You just picked fresh tomatoes from your garden and you made a delicious salad. Go forward two spaces.
 - As you do not have a garden, you spent all morning watching TV. Go back two spaces.
 - Some birds ate your strawberries, so you helped them find their food. Go forward one space.
 - You haven't watered your garden for three days! Go back one space.
 - You just helped your friend start a vegetable garden. Take another turn.
 - You did not take good care of your garden, there are too many weeds. Miss one turn.
 - Your plants are providing home for different insects. Go forward three spaces.
 - You replaced your garden with a swimming pool. Go back three spaces.
3. Then, tell your group to think about ten funny activities they can carry out and to assign them to other ten spaces.
 4. To play, throw the dice and have that participant move that number of spaces. If you land on a space with text, read it out loud and do what it says. The first to the Garden wins!

Discussion

Could you think of other benefits of growing your own food?
 What would happen to wildlife if no houses had gardens?
 Do you have a vegetable garden? How fun is it to work on it?

Yummy Worms

Level 1

Aim

To make a delicious worm recipe.

Materials

Clean plastic bags, small paper cups, cardboard, colouring pencils, scissors, chocolate cookies, rolling pin, gummy worms.

Time

20 minutes.

How to do it

1. Give a small paper cup to each participant, this will be the flower pot.
2. Tell your group to put some chocolate cookies in a clear plastic bag and to use a rolling pin to crush them. Tell them to keep crushing until they have enough to fill the pot. This will be the soil.
3. Then, have them put the mixture into the pot, and ask them to decorate it using the gummy worms to make it look as if they were crawling out of the pot.
4. Have the participants make a cardboard flower, so they can decorate their pot.
5. Enjoy your wormy snack! You can also serve it with some ice-cream.

Discussion

Have you ever found an earthworm in your garden? How does it look?
 Why are earthworms good for your garden?

Source: National Wildlife Federation, Ranger Rick, Recipes, Yummy Worms,
www.nwf.org/Kids/Ranger-Rick/Activities/Recipes/Yummy-Worms.aspx

SHELL-ebrate with flower pots!

Level 1 2 3

Aim

To decorate flower pots using recycled egg shells.

Materials

Clay flower pots, acrylic paints, paintbrushes, eggs: hard-boiled and dyed, clear-drying glue, small container (such as an old can or jar), pencil, nontoxic clear craft glaze or finish (optional).

Time

Two 20 minute lessons (as the glue must be well dried before continuing to the next step).

How to do it

1. Explain to your group that you are decorating some flower pots using eggshells!
2. Tell them to paint the flower pots any colour they want. Let the paint dry.
3. Ask them to carefully peel the eggshells and to crush them into different-sized bits.
4. Have the participants lightly draw the outline of a simple design, such as a butterfly or flower, on the pot.
5. Pour some glue into a small container. Tell your group to use a paintbrush to spread the glue over their designs. Then ask them to gently press the eggshell bits on the wet glue until the design is filled in.



*When the glue is dry, if you wish you can paint over the whole pot with clear craft glaze or finish.

6. Now the participants can take home their beautiful pots so they can plant a flower and place them on their windowsills.

Discussion

Which flowers do you think would be good for your windowsill?
How important do you think flowers are in our lives?
How are flowers used for decoration?

Source: National Wildlife Federation, Kids, Ranger Rick, Activities, Crafts, Plants, Shellebrate Spring,
www.nwf.org/Kids/Ranger-Rick/Activities/Crafts/Plants/SHELLebrate-Spring.aspx

Worm Hotel

Level 1 2 3

Aim

To learn how worms help introduce air and water into the soil.

Materials

4 litre (1-gallon) glass jar, loose garden soil, sand, water, shovel, piece of paper, plastic container, leaves, lettuce, brown paper bag (big enough to fit over the jar), some worms, of course!

Time

One 20 minute lesson (to begin the activity), two 5 minute lessons (to change the worms' food), and another 20 minute lesson (to discuss the outcomes).

How to do it

1. Explain to your group that you are building a worm hotel so they can see earthworms at work.
2. First, ask your group to help you build the hotel. Ask them to loosely layer the soil and sand in the jar until it is three-quarters full. Tell them to moisten the soil mixture lightly.
3. Then have your group check-in your new guests. Ask them to dig up four to six worms and put them in the plastic container with a little soil. Have the participants place the worms in the jar and put a few dead leaves and pieces of lettuce over them.
4. Next, tell your group to set the paper bag over the jar so it blocks light, but still lets in air.
5. Remind your group about the importance of room service! Worms need a little water (but too much will drown them) so ask your group to water the soil by flicking some drops off their fingers. Every two days, have them remove any rotting food and add new lettuce, leaves or potato peelings.
6. After a week, tell your group to visit their guests. Have them remove the bag. Discuss what they see. Do you see any tunnels? How have the layers of sand and soil changed?
7. Time for check-out. Have the participants let the earthworms go back to the garden so they can enrich the soil.

Discussion

So, why do gardeners love earthworms?
 Have you ever touched an earthworm? How does it feel? (Remind the participants that worms have stiff bristles called setae.)
 How are the earthworms able to move through soil and make tunnels?

Source: National Wildlife Federation, Kids, Your Big Backyard, Fun, Outdoors, Observing Wildlife, Worm Hotel, www.nwf.org/Kids/Your-Big-Backyard/Fun/Outdoors/Observing-Wildlife/Worm-Hotel.aspx

Seed Socks!

Level 1 2 3

Aim

To discover which plants grow in local fields.

Materials

An outdoor setting, notebooks, pencils, for each team: one sock, one shoebox, one plastic bag, one pair of scissors, potting soil and scoop, one marker and some water.

Time

A 50 minute lesson (to collect the sock seeds and plant them), and a 5 minute lesson every day for two weeks (to examine the seed socks).

How to do it

1. Invite your group to grow their own plants from *Seed Socks!* Divide your group into teams of three.
2. Take the participants to an outdoor area with plants. Explain that each team should walk around wearing a sock so they can collect their own sock seeds. The participants should wear the sock over one of their shoes to protect their feet while outdoors. If it is not possible to take your group to gather their own sock seeds, visit an outdoor area before the lesson to gather the sock seeds yourself.

3. After the participants have collected their sock seeds, ask them to look at the different kinds of seeds they collected and predict how many different kinds of plants they might grow. Then ask the teams to plant their seed socks following these steps:
 - Take a shoe box and cover it with a plastic bag to make it waterproof.
 - Put some soil into your shoe box so that it covers all the bottom.
 - Cut a slit down the side of your sock, unroll it and cut the part that does not have any seeds on it.
 - Place your sock inside the shoebox and extend it well so it covers the bottom of the box; make sure the seeds are facing upwards.
 - Put a thin layer of soil on the top of your sock, spread it out so it covers all the sock.
 - Water your seed sock!
4. Once the seed socks are planted, instruct the teams to place their shoeboxes in a location that is exposed to sunlight. In a week or so, the seeds will begin to sprout. This is a fun activity to do in different **environments** because you get different results every time, for example, in a backyard in the city or a wildflower field in the suburbs.
5. Allow teams to observe their seed socks for at least two weeks, watering the seeds as needed. The participants should make drawings and measurements of their plants each time they make observations, instruct them to always write the date (day 1, day 2, etc.) for each round of observations.
6. Ask the teams if the appearances of their seedlings support or refute their predictions about how many different kinds of seeds they planted. If their predictions were not supported, why do they think that is the case?
7. Conclude the activity with a discussion about seed dispersal. Discuss how the structure of seeds is related to their method of dispersal. For example, some are designed to be carried by the wind, while others have barbs that help them attach to passing animals.

Note: for best results, this activity should be carried out during late summer or early fall.

Discussion

Which different plants grew in your shoebox?

How different would the plants in your shoebox be if you walked in a field in the countryside (or in a park in the city)?

Can think of any other examples of seed dispersal? How are the seeds contained inside fruits dispersed?

Source: Teacher's Domain, Resources, Sock Seeds,
www.teachersdomain.org/resource/tdc02.sci.life.stru.sockseeds/

Got any bugs?

Level 1 2 3

Aim

To learn about beneficial garden-bugs.

Materials

Magnifying glass, notebooks, pencils.

Time

40 minutes.

How to do it

1. Remind your group that even if it is true that some “bugs” are bothersome, most of them aren’t pests at all. Explain to the participants that they will set off on a quest for the best kinds of bugs they can find in their yard.

2. Take your group to an outdoor setting. Ask them to grab a magnifying glass and to go find some good bugs! Here are some things to look for:
 - *Predator insects*: such as lacewings, ladybugs, praying mantises, and ground beetles, which eat the “bad guys”
 - *Parasitic wasps*: which lay eggs on certain troublemaking caterpillars and other pests.
 - *Pollinators*: such as bees, butterflies, and moths.
 - *Recyclers*: such as carrion beetles.
3. Next, have your group think how they can make their yards or gardens a cozier place for good bugs to hang out in.

Here are some ideas:

 - Skip the pesticides; they kill the good guys along with the pests (and aren’t healthy for the **environment**, people, or pets).
 - Plant flowers that provide food for helpful insects. Try herbs such as dill, cilantro, fennel, and parsley, as well as flowers including sweet alyssum, yarrow, lavender, cosmos, zinnias, and sunflowers.
 - Aim for variety. Choose lots of different kinds of flowers. That way, there is a good chance something will be blooming to attract good bugs all season long.
 - Provide shelter for good bugs. Trees, shrubs, ground covers, and grasses make safe places to rest. Mulch and stepping stones are nice to hide under.
 - Add water. Place some rocks in a saucer and keep it filled with fresh water during dry spells.

Discussion

Were you able to find good bugs? Where did you find them?
 Do you think your garden is providing a cozy home for good bugs? If yes, why?
 If not, what are you going to do about it?

Source: National Wildlife Federation, *Get Out There, Activities, Observe and Explore, Got Good Bugs?*, www.nwf.org/Get-Outside/Be-Out-There/Activities/Observe-and-Explore/Got-Good-Bugs.aspx

An Eye on the Garden

Level 2 3

Aim

To observe the colours and forms of a garden.

Materials

An outdoor setting, cardboard frames (at least 3 cm wide with an opening the size of a standard print photo: 10 by 15 cm) for each participant, scissors, photo cameras, computer, notebook and pencils.

Time

50 minutes.

How to do it

1. Remind your group how many photographers capture the beauty and lush life of plants in a garden by taking pictures with their cameras. These are all amazing images that fill garden books or magazines.
2. Explain to them that they are becoming photographers and that each one of them will have to present a final photo which represents a fascinating scene or object in their school or youth group garden.
3. To help your group explore how our eyes take in scenes and begin to ‘think like a photographer’, have them first spend some time sharpening their focus

without using a camera.

4. Take your group to the garden and send them on a safari with a notebook and a pencil to find and note several objects or areas in the garden that grab their attention. Suggest that they look for something unusual, such as the intricate patterns of fern foliage, the arrangement of a flower's sepals and petals or the amazing distribution of a strawberry's seeds.
5. Ask them which object or scene sparked their interest (a flower, a fruit, a tree?). You might push their thinking further by asking them to describe colours, lights, shadows, shapes, textures, or patterns they noticed.
6. Give each participant a cardboard frame at least 3 cm wide with an opening the size of a standard print photo (say, 10 by 15 cm or 4 by 6 inches). Have them return to the place where they found the object that attracted their attention, this time to view them through the frame. Ask the participants to note the difference in how the scene or object appears when limited by the opening in the cardboard.
7. Tell your group that they should try shifting the field of view by moving closer to or further from the subject or moving the frame to include or exclude certain elements (for example, shift so the camera 'sees' only the butterfly garden bed and not the parked cars or school building). Ask, how does what is inside or outside of the frame affect the quality or 'feel' of the image? Suggest that they explore other aspects of the object or scene through their imaginary lenses. For instance, they might look at the same object from above or below, at an angle, or with a light shining from behind.
8. Discuss with your group about how the framing exercise changed how they looked at and perceived the image they chose.
9. Once the participants have envisioned their photos, send them out to snap away. You could ask your group to bring some cameras or maybe they could share one. When they are done, go back to the class or meeting room and enjoy your own Photo Exhibition. You could use these photos to create your very own School or Youth Group Garden Guide!

Discussion

How would you describe your photograph? Why did you choose that image? What did you want to show?
How does the mix of colours on a photograph affect the mood it inspires?
Would you take a photograph differently based on the how you plan to use it (for example, for a field guide vs. an artistic post card)?

Source: National Gardening Association, Kids Gardening, Activities, An Eye on the Garden, www.kidsgardening.org/classroom-projects/eye-garden

Intensive & Sustainable Farming

Level 2 3

Aim

To understand the similarities and differences between intensive and sustainable farming.

Materials

Notebooks, pencils, books and/or internet access for research.

Time

1 hour.

Background

People are increasingly opting for lifestyles that are more health-centered. Caring for our health should mean caring for the health of the planet too. Changes in lifestyle should benefit the planet as well as us. Food is a key link between the two. Many people are

choosing food products that are healthier and that have also been produced in a way that does minimal damage to the **environment** and treats animals in a humane way.

How to do it

1. Explain to your group that they will be discussing and researching intensive and sustainable farming.
2. Divide your group into two teams and assign a type of farming to each one. Have each team read their corresponding information card, so they can get an idea about their topic.
3. If possible, ask the teams to use books or the internet to deepen their knowledge. Make sure they cover the following points:
 - How crops are grown.
 - How many different types of crops are grown.
 - Pesticide use.
 - What wildlife visits the farm.
 - How crops are transferred to where they are sold.
4. Ask each team to provide feedback to the whole group on what they have researched. Discuss which type of farming has the lowest impact on the **environment**.

Discussion

What are the similarities and the differences between both types of farming?

How is **biodiversity conservation** different in each farming type?

Can you name the advantages of sustainable farming for the protection of the **environment** and human health?

How can you help make a difference?

Intensive Farming

Intensive or industrial farming around the world is causing several damages to the environment. It is associated with the increasing use of modern practices and agricultural mechanization – and, thus, uses a large amount of **fossil fuels** - and it is characterized by the significant use of inputs to maximize the production. Fertilizers and animal waste can pollute our land and water supplies and destroy wildlife habitats. Generally, this type of farming puts profit above wildlife and animal welfare. For this reason, more and more people are starting to consider sustainable farming.

Sustainable Farming

Sustainable farming uses non-polluting methods as close as possible to those found in nature. Soil fertility is improved using manure and compost, and artificial fertilizers are avoided. Reliance on **fossil fuels** is reduced by cutting out man-made chemicals and reducing food miles. Food production, processing and distribution are carried out as close together as they can be. Sustainable farming methods promote environmental stewardship, biodiversity can be much higher in sustainable farms than in intensive farms. Sustainable farming seeks to provide more profitable farm income and enhance quality of life for farm families and communities.

Source: Friends of the Earth, Resources, Factsheets, Food and Farming,
www.foe.co.uk/resource/factsheets/food_farming.pdf

Speak up for Soil!

Level 2 3

Aim

To learn how individual actions can help promote healthy soils.

Materials

Poster boards, colour markers, scissors, adhesive tape.

Time

40 minutes.

Background

Plants grow in it. Pigs wallow in it. And termites build with it. Healthy soil supports a great part of life on Earth. That's why scientists are concerned about soil erosion and the loss of **nutrients** caused by certain farming practices, cutting down forests, and building homes and roads.

Soil issues affect all of us, especially because we need fertile soils to grow our food. Because of that, it is important to remember that there are many ways that each of us can help to maintain healthy soils and solve the problem of soil erosion. Actions we can take range from simple consumer choices, to a more active role in community decision making and to more responsible activities in the workplace.

How to do it

1. Explain to your group that they are creating a *Speak Up For Soil Campaign* to encourage everyone at school or youth group to make responsible choices in order to prevent soil erosion.
2. Have your group sit in a circle and think about actions and choices they can personally take to help.

Here are some ideas:

- Leave grass cuttings on the lawn, they serve as a moisture-retentive mulch and a natural fertilizer.
 - Cover your soil with a layer of mulch to prevent soil erosion and to conserve soil moisture, this can be grass clippings, bark chips or stones.
 - Prevent soil erosion in your yard by raking your leaves rather than using a leaf blower. Not only do leaf blowers contribute to noise pollution and **fossil fuels** use, but they also degrade topsoil.
 - If your school or youth group is surrounded by landscaping or open space, evaluate how well the soil is being conserved. If you find places where the soil can be improved, talk with the director about how you think they can make improvements.
 - Add organic matter to enrich your garden soil. Healthy soils grow healthy plants, and it lessens the need for insecticides and herbicides.
 - If you have a vegetable garden, rotate crops to prevent the depletion of **nutrients**.
 - Make your own compost. You can enrich your soil with the organic waste from your kitchen rather than use up landfill space. Kitchen scraps, leaves, and grass clippings make up about 25 percent of the waste in landfills and incinerators.
 - Avoid the use of toxic pesticides in your garden, they not only kill pests, but also often kill beneficial **organisms** your soil needs to stay healthy. Instead use some natural alternatives.
 - Buy organically grown produce, or try growing some yourself, to help reduce the amount of toxic pesticides that harm soil **organisms**.
 - Encourage your school or youth group to cut down on pesticide use in your gardens or backyards.
3. Divide your group into small teams and have each team write some of the ideas on

separate pieces of poster board.

4. Next, place the ideas all around your school or youth group - inside, outside, everywhere! So everyone can learn how to promote fertile soils.

Discussion

How does supporting soil health help sustain productive farmland?
Why are healthy soils key to sustaining diversity of life for the future?
Why is it important to encourage others to make a difference?

Source: World Wildlife Fund, Taking Action for Soil,
www.biodiversity911.org/soil/pdfs/soil_actions.pdf

Why is Crop Diversity Important?

Level 2 3

Aim

To learn about the importance of crop diversity.

Materials

Notebooks, pencils, 'Why is Crop Diversity Important?' information box.

Time

1 hour.

How to do it

1. Explain to your group that they will transform themselves into radio reporters and that they are going to broadcast a two to four minute radio talk on a local station.
2. Divide the participants into two or three teams. Explain to them that each one will have to present a report that explains the importance of crop diversity for small-scale farmers and their families.
3. Ask each team to choose an announcer to read their report. It would also be a great idea to read it for the rest of school or youth group.

Discussion

Can you name some of the negative consequences of monoculture?
What do you think is the role of small-scale farmers regarding crop diversity **conservation**?
Do you think local farmers need to be stimulated to increase crop diversification?
Who do you think is responsible for doing that?

Why is Crop Diversity Important?

Today, for many small-scale farmers, growing many different crops and crop varieties means improving their chances of having enough food to meet their needs. By growing many different crops, farmers get foods that they can sell on the local market, foods that provide energy and foods that keep their families strong and healthy. Different varieties may have different flavors or different cooking qualities. Some varieties of a particular crop may be good to eat right away, while other varieties may be easier to store, and eat later on. By planting varieties that mature at different times, farming families have food supplies for eating and for selling over a longer period of time.

Different crops and crop varieties need different growing conditions. Some crops grow well in dry soils, while others will die if they don't get abundant water. Not all the land that a farmer works is likely to be the same. Perhaps, one field slopes steeply and is exposed to strong winds, while another field has fertile soil and receives plenty of sunshine. A single variety of a single crop is unlikely to suit both growing conditions. Therefore, farmers are more likely to have better harvests if they vary their crops. Varieties of crops that have been grown by local farmers for generation after generation are well suited to local **weather** conditions and soils. They are likely to be able to resist diseases and pests that are common in the region. These varieties will grow and produce a crop even if the farmer does not use chemical pesticides or fertilizers.

The more crops and crop varieties grown, the greater the chance that some will survive under **weather** or pest problems. One type of crop may get damaged if the **weather** gets very dry, or if there is a heavy rain or frost. But there is a good chance others will survive. Most insect pests and diseases attack only certain kinds of crops. They spread more quickly if a large area is planted with a single kind of crop. When farmers grow small areas or rows mixed with other crops, it is more difficult for pests to spread and cause damage. Different varieties of crops have different abilities to tolerate pests and diseases. If a farmer grows several varieties of a particular crop, they stand a better chance of reducing the losses from a pest outbreak. Moreover, by growing several different crops, farmers have greater protection against low prices in the market. If they cannot get a good price for one crop, they have the possibility to harvest and sell other crops that will give them a higher income.

It is important to continue planting traditional varieties of crops, which have evolved to suit local growing conditions and cultures. Currently, farmers are benefiting from science and new crop varieties that have been developed. But, today's farmers need to be able to protect the knowledge and legacy handed down by their parents, grandparents and ancestors, and add to it. They can draw on the knowledge of their forefathers, experiment for themselves, and draw upon modern science to grow new crops that serve their purposes.

Sources: Outreach Information for Educators and Communicators, Biodiversity Series, Why Crop Diversity is Important to Today's Small-Scale Farmers and their Families, www.nrel.colostate.edu/projects/ibop/kids/OUTREACH1.pdf

Seed Maze

Level 1

Aim

To learn about seed banks.

Materials

Copy of the maze provided below.

Time

10 minutes.

Background

Seed banks store our world's seeds! A seed bank is a place where people can store the

seeds that are grown and saved by communities all around the world. Placing seeds in a seed bank helps people to protect the seeds of different crops and plants in an effort to preserve **biodiversity**. Seed banks also contribute to the protection of plant **species** that may be otherwise lost in case seed reserves elsewhere are destroyed or in the event of a catastrophe.

Moreover, as farmers tend to cultivate certain types of crops that are, for example, more drought tolerant or disease resistant, seed banks are established to save samples of other crop variations in order to maintain the diversity of global crops and prevent them from disappearing forever.

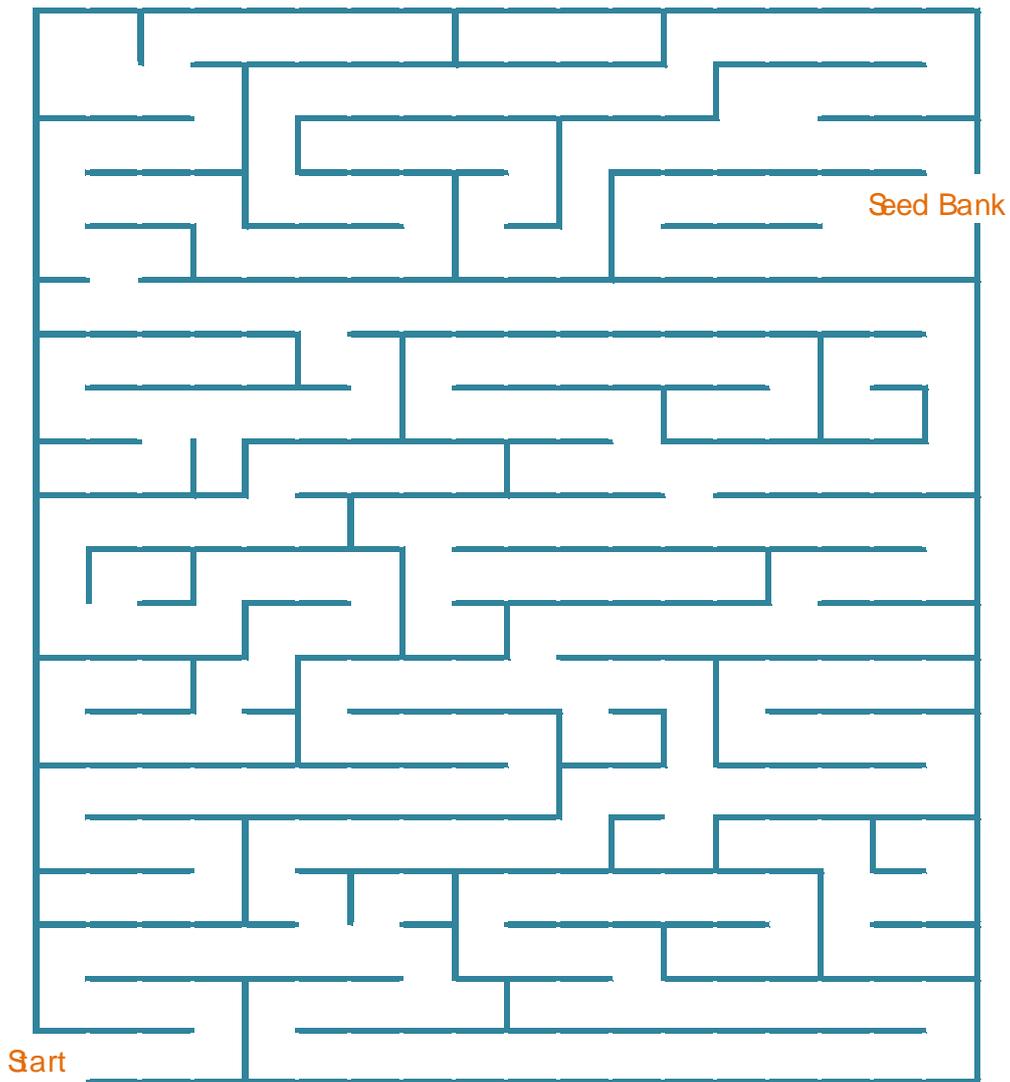
How to do it

1. Explain to your group that two children from a small community in India want to get the seeds they have collected to the community seed bank. Ask them to help them find their way through the maze.

Discussion

Which seeds do you think these children might be taking to the seed bank?
How does this help their community?
Why is it important to preserve different crop varieties?

Seed Maze



Harvest-Time Celebration!

Level 1 2 3

Aim

To learn about harvest time in your country.

Materials

Books and/or internet for research, cardboards, colouring pencils, colour markers, scissors, thread, different items for decoration: leaves, seeds, barriers, nuts, flowers, twigs, etc.

* Your group might need some extra materials according to their planned games and activities.

Time

A 40 minute lesson (to explain and organize the activity) and another 1 hour lesson (to carry it out).

Background

A harvest festival is a celebration of the food grown on the land. Therefore, this is an annual celebration which occurs around the time of the main harvest of a given region. Because we can find different **climates** and crops around the world, harvest festivals can be found at various times throughout the world. Thanksgiving ceremonies and celebrations are very ancient, and they typically feature feasting, both family and public, with foods that are drawn from crops that come to maturity around the time of the festival.

How to do it

1. Explain to your group that you are having a *Harvest Festival* to celebrate the rich colours, appealing scents and delicious flavours of harvest-time.
2. First, have your group investigate harvest-time in their country. Is there a traditional festivity?
3. Then, have them make some nice invitations to invite other classes or groups to their event. Make sure they include the title of the event, the reason why they are having this celebration, the date and the hour.
4. For the decoration, have the participants thread colourful leaves, seeds, berries, nuts, flowers, twigs and other things they might find in the garden. Ask them to hang them throughout the place of their event.
5. Have your group think about some fun games for the party time! Use some traditional games.

Discussion

How do farmers in your country celebrate harvest time? Have you heard about celebrations in other countries?

Is there a traditional food that people eat in your country during this time?

Why do you think these traditional festivities are important?

Organic Fun

Level 1 2 3

Aim

To learn about organic farming and crop diversity.

Materials

Notebooks, pencils.

Time

3 or 4 hours (depending on the location of the organic farm).

Background

Some farms produce food organically. Organic food is produced without using artificial chemicals and it is managed in a way that treats farm animals better. Organic farming is better for the planet and wildlife, and reduces pollution.

How to do it

1. Explain to your group that you are visiting an organic farm.
2. Once you get there, encourage your group to find out as much as possible about products that are produced organically.

For example:

- What varieties of fruits and vegetables are grown?
- How are animals raised?
- How is the cheese produced?
- How does the farmer or producer look after his/her land?

3. Next, tell your group that they are going on a plant scavenger hunt to explore crop **biodiversity**. Divide your group into three or four teams and give the following list to each one:

- Look for two varieties of the same crop.
- Find a crop that grows well in poor soil.
- Find a plant that is being eaten by insects or other pests.
- Find a plant variety that has a large fruit and a variety of the same crop that has a small fruit.
- Find a plant that thrives in drought conditions.
- Find a plant that thrives in wet soil.
- Find a plant variety that has a long growing season and a variety of the same crop that has a short growing season.
- Find a crop that has a high yield.
- Find a crop that shows signs of disease.
- Find a plant variety which is distinctly different in appearance from other plants of the same **species**.

4. The teams should try to find all the items from the list. When they find one, they should register its location in their notebook, sketch it and if possible ask the landowner/farmer for a sample leaf or fruit from the plant. The first team to complete the task is the winner. If the teams cannot find all the items from the list, the team that found the most is the winner!

5. Finally, have the teams compare their findings.

Discussion

How can your food choices help protect our planet and, thus, preserve **biodiversity**?

Did you find an example of all the plants described in the list?

Which were the easiest and the most difficult items to find? Why do you think so?

Which crop from the farm had the greatest diversity? Why do you think this is so?

Adapted from: Outreach, Information for Educators and Communicators, Biodiversity Series, Scavenger Hunt for Plant Varieties, www.nrel.colostate.edu/projects/iboy/kids/OUTREACH.pdf, page 12.

Veggie Art

Level 1 2

Aim

To use different vegetables to create art.

Materials

White construction paper, water colours, celery, broccoli, bell pepper, eggplant, knife.

Time

30 minutes.

How to do it

1. Explain to your group that they are using some vegetables to create some

colourful and fun works of art!

2. Show the vegetables to your group and explain that by cutting them you will obtain some cool shapes:
 - Cut the base off the celery, dip in paint and press it on white construction paper. This creates a rose.
 - Use a broccoli spear to dab in paint. Lightly press over the paper to create small bunches of tiny flowers.
 - Use a strip of bell pepper to 'paint' stems for flowers.
 - Use the leaf from a celery stalk to make a leaf print on the picture.
 - Cut off a wide section of an eggplant and cut out small wedges to leave a flower design. Dip in paint and press on paper.
3. Have each participant show their work of art.

Discussion

Which other vegetables could you use for this work of art?

For what other types of decorations do people use fruits of vegetables?

Source: Clover OKState, Lessons, Be a Food Explorer,
www.clover.okstate.edu/fourh/aite/lessons/intermed/explore.pdf

Pollination Time!

Level 1 2 3

Aim

To learn about flower pollination and to investigate ways living things interact with each other in the garden.

Materials

Non-noise-making party blowers to make the proboscis of the hawkmoth - 1 per student, double-sided sticky tape to attach to the tip of the blower, 8 white plastic drinking cups, 1 sheet of white poster paper, 80 small (1 cm or 1/4 inch) yellow pom-poms for hawkmoth feeding, if you also want to look at flower pollination you will need 12 blue pom-poms (you can make the pom-poms using some wool), string, glue gun (you could use adhesive tape instead), hole punch.

Time

1 hour.

Background

Insects, and some other animals, regularly visit flowers for the sugary nectar and protein-rich pollen they produce. During these visits, a vital service is performed for the plant as the visitors transfer pollen from the male part of the flower (anthers) to the female part of the flower (stigma). The act of pollination is the first step in fruit and seed production.

Many insects, birds and bats act as pollinators. Both the plants and their animal pollinators have developed unique relationships and structures that allow them to successfully interact. For example, the long tongue (proboscis) of moths and butterflies allows them to reach the nectar produced deep inside the flowers. In many cases both the animal and the plant benefits from this interaction as the animal obtains food and the plant is pollinated. However, some animals may steal nectar or pollen without pollinating the plant, and some plants can trap and kill pollinators.

Without the services of pollinators, the plants that animals depend on for food, shelter or nest sites would not exist. Humans are also dependent on insect-pollinated plants for foods, medicines and clothing. Worldwide, three-fourths of all food and feed crops require pollinators to reproduce.

Successful pollination depends on pollinators finding the right flowers at the right time.

Pollinators locate appropriate flowers by visual and chemical cues. Since the structure of the mouth parts of pollinators differ greatly, as do flower structures. The pollinator also has to locate the right type of flower.

How to do it

1. Explain to your group that in this activity they will become hawkmoths and that they will attempt to collect pollen from the moonflower. Tell them that while feeding, they must also avoid being eaten by the bats and other predators in the garden.
2. Ask the participants to help you construct moonflowers before doing the activity:
 - Use the white cups for the moonflowers. Use a hole punch to punch two holes in the side of the cup so that you can put a string through the holes and hang the flower from a string tied across the class or meeting room between two chairs.
 - Cut flower shapes from the white poster paper, and cut a hole the size of the top of the cup in the center of the flower.
 - Place a bead of hot glue around the entire cup just under the lip of the opening and quickly insert the cup into the flower opening. You can add heart-shaped dark green leaves to make it look more like a moonflower vine.
 - Put ten yellow pom-poms in each cup (the nectar). If you want to include flower pollination, add three blue pom-poms to three of the cups.
 - Cut strips of sticky tape large enough to cover 1 to 2 cm of both surfaces of the party blower tips. This will allow them to pick up pollen using their proboscis.
3. Assign four participants as predators, two should be bats while the other two can select the type of predator they would like to be.
4. Explain the activity to your group:
 - While the hawkmoths are feeding the bats should fly around in the vine, quietly clicking their tongues to simulate a bat's echolocation sounds. The bats must move slowly using a heel-to-toe step. When a hawkmoth hears a bat approaching it can avoid being eaten by sitting down until the bat passes. If a bat tags a standing hawkmoth, it is eaten. When this happens the moth must leave the garden area. The other predators are ambush predators and should choose a location to sit near the vines. These predators cannot move, but if a feeding hawkmoth comes too close they can tag them and they are also out of the activity.
 - All the other participants are hawkmoths who will feed on the moonflowers. The moths will try to obtain the nectar (yellow pom-poms) found in the flowers. While getting the nectar, they might also collect some pollen (blue pom-poms) that must be transferred to flowers that only have yellow pom-poms. The participants acting as moths cannot use their hands to steady the moonflowers. They have to use the party blowers as their proboscis and blow it to straighten it out, insert it into a flower and collect some nectar. The nectar will stick to the tape. Each time they get some nectar they must remove it from their proboscis and put it in their pockets. If they get a blue pom-pom on their proboscis, they must go to a flower that only has yellow pom-poms, pick the blue pom-pom off of the proboscis and drop it into the flower. If a proboscis is broken it should not be replaced because that moth has been injured and dies.
5. Start the game! Allow the moths to feed for about two minutes and then have them sit down on the floor. They should then count the number of nectar pom-poms each one collected. They must have collected at least five nectar pom-poms to have obtained enough food to survive.

Discussion

How did you feel having to compete for food while having the threat of a predator? How many moths were able to survive? How difficult was this task? How important is the pollinators' role in food production?

Seed Gathering Adventure

Level 1 2 3

Aim

To identify and gather different seeds.

Materials

Flat surfaces (trays or screens) for drying seeds, envelopes and glass jars for storage, hand lenses (optional), markers and/or labels, small paper bags (for gathering small seeds), an outdoor setting.

Time

50 minutes.

Background

For most of human history, people needed to save and replant seeds in order to survive. Seeds from favorite plants were saved from year to year and generation to generation. When people emigrated to new parts of the world, they brought with them seeds from plants with qualities they valued: the tastiest tomatoes, the longest beans or the biggest strawberries.

Today, people are saving seeds for more ecological reasons. With the growth of commercial seed companies new varieties were created, but many old ones vanished. These lost seeds had qualities that people savoured and contained a wealth of potentially valuable **genetic** information. Therefore, many gardeners and farmers are committed to preserving **biodiversity** and living history by growing and saving 'heirloom' seeds.

How to do it

1. Take your group to an outdoor setting and have them sit in a circle. Explain to them that most garden seeds either mature in pods (e.g. beans), capsules (e.g. columbine), flowers (e.g. lettuce), or fleshy fruits (e.g. tomatoes, squash, cucumbers). The ideal time for gathering seeds varies from crop to crop. Melon seeds, for instance, are mature when the fruits are ready to eat, but squash and cucumbers should be left on the plant for weeks after you would normally eat them. Generally, let vegetable garden seeds dry on the plant as long as possible. If annual and perennial flowers and herbs (including wild ones) intrigue your group, they may need to look even more carefully for signs that seeds are ripe. Withering and drooping flowers indicate that their job of attracting pollinators is done and that seeds are beginning to form. Flower stalks that have dried and turned brown or seedpods that have turned from green to dark colour are good indicators that seeds are mature. If the participants hear a rattle or if seeds fall when they tap lightly on flower stalks, it is probably time to harvest. Try to harvest seeds on a sunny day, once the dew has evaporated, and remove all pulp and fiber from their surfaces. Certain seeds (such as lettuce, dill, and many flowers) will scatter when the seedhead is dry or lose seeds gradually as they ripen. Explain to your group that they can shake their stalks over a paper bag to collect the ripe seed before it's lost. Sunflower, bean, and pepper seeds, on the other hand, are fun to harvest by hand.
2. Send your group on a *Seed Gathering Adventure*. Once they are done, have them consider what might be ideal seed storage conditions and examine the seeds they have gathered. Before storing the seeds, you will need to make sure that they are completely dry by spreading them out on a screen or tray in a dry, airy place. Seeds that are borne in fleshy fruits, such as tomatoes, should be rinsed or sat in water for several days and left to ferment before being spread out to dry. Seeds that are borne on capsules or flowers may need to be separated from the chaff (seed covering and other debris) before storage. Have the participants do this by

tossing seeds lightly on a screen or tray and blowing or letting a breeze remove the lighter debris.

3. Once the seeds are dry, tell the participants to put them in envelopes and then in small glass jars (such as baby food containers) with tight lids, and label them. Some people prefer using plastic bags or just glass jars, which work fine if the seeds are absolutely dry. Store the seeds where it's cool, dark, and dry. Below you will find a chart with some seed saving ideas.

**Older participants may want to test how storing seeds under different conditions affects germination.*

Note:

- Remind your group that long before plants produce seeds, their flowers reveal secrets about what's to come. If you have a chance early in the season, consider inviting your group to explore garden flowers or wild ones with a hand lens and, if appropriate, dissect them. Can your young detectives predict where seeds might develop? Whether your students are gathering seeds from annual garden vegetables, flowers, and herbs; perennial garden flowers; or nearby wildflowers and native plants, have them keep their eyes peeled for signs of seed development. What evidence do their observations reveal?

Your eagle-eyed participants should also begin to think like gardeners and farmers did historically, and like plant scientists, by considering which plant characteristics they most value. Does one marigold plant seem to have more brilliant flowers? Tie a ribbon on it while it is still in bloom, to mark it for seed saving. Since healthy plants are most likely to produce a healthy new generation, they will also want to identify garden plants that seem robust and free of pests and diseases.

Discussion

Which seeds were you able to gather? What made you realize they were ready to harvest?

What differences can you find between some seeds and others (size, shape, colour)?

What do you believe is the main objective of people that are committed to gathering and preserving seeds?

Source: National Gardening Association, Kids Gardening, Activities, Finding, gathering, Saving Seeds, www.kidsgardening.org/classroom-projects/finding-gathering-saving-seeds

Seed Saving Ideas

<i>Plants</i>	<i>Gathering Time</i>	<i>Processing</i>
<i>Beans and peas</i>	Leave in pods on plant until they rattle.	Remove seeds from pods and spread them out to dry.
<i>Pepper</i>	Gather from a mature pepper (if possible, one that is fully red).	Scrape out seeds and spread them out to dry. They are ready to store when they break rather than bend.
<i>Tomato</i>	Harvest when fruits are fully ripe. Seeds have a gelatinous coating to prevent them from sprouting inside the fruit. Squeeze seeds into a bowl when tomatoes are fully ripe.	Ferment mixture by adding water and letting it stand at room temperature for three to four days, stirring a few times a day to prevent mould. The good seeds will sink to the bottom and can be spread out to dry.
<i>Eggplant</i>	Leave fruit on vine until it is hard, dull, and off-coloured.	Cut the fruit in half and pull flesh away from the seed area. Wash and rinse seeds before spreading them out to dry. If seeds are hard to remove, grate or blend the bottom part of the fruit (with the ripest seeds), put the pulp in a bowl of water, and squeeze the gratings with your fingers. Good seeds will sink to the bottom.
<i>Cucumbers</i>	Seeds are ready once fruits have turned golden/orange and are getting mushy.	Cut fruit in half, scrape the seeds into a bowl, and remove their slimy coating by rubbing them in a sieve with water. Rinse before spreading them out to dry.
<i>Summer squash</i>	Seeds are ready once fruits are hard (cannot dent with a fingernail). This may be after frost.	Cut open and scrape the seeds into a bowl; wash and rinse them before spreading them out to dry.
<i>Watermelon</i>	Harvest seeds from ripe fruit.	Before drying, rinse seeds in a strainer using a drop of dish soap to remove sugar.
<i>Lettuce</i>	Gather seeds once the plant sends up a stalk and half of the flowers have turned white with fluff. (If you wait too long, the seeds may fly away.)	Rub out and separate the seeds from the seedheads. Shake the seeds up and down on a tray or screen and gently blow away the lighter chaff.
<i>Annual flowers (calendula, cleome, cosmos, impatiens, marigold, morning glory, sunflower, sweet pea, zinnia)</i>	Gather seeds once the flowers have wilted and seed capsules or pods appear dry.	Separate chaff by hand or by shaking on a screen, as above.

Source: National Gardening Association, Kids Gardening, Activities, Finding, gathering, Saving Seeds,
www.kidsgardening.org/classroom-projects/finding-gathering-saving-seeds

Flower Fashion

Level 1 2 3

Aim

| To make some nice springtime pins.

Materials

Colourful fabrics, paper, lightweight cardboard (such as a cereal box), scissors, glue (thick glue works best), buttons and pinbacks for each participant.

Time

Three 15 minute lessons (as the glue must be well dried before continuing to the next step).

How to do it

1. Remind your group how many clothes designers inspire themselves with nature and explain to them that they are going to make their own *flower pins!*
2. Tell them to glue a piece of colourful fabric to a sheet of paper. After the glue has dried, have them cut out flower petal shapes. Tell them to be creative, encourage them to create different flower shapes!
3. Ask them to cut out a 4 cm square from some lightweight cardboard. Tell them glue the flower petals on top of the square, with the fabric side facing up. The participants can also glue on bits of thread, ribbon, colour feathers, or other decorations to the front center of the flower. Then, have them glue on a button or two.
4. After the glue has dried, tell the participants to give more shape to the petals by creasing each one down the middle.
5. Finally, ask them to glue a pinback to the back of the square.



Discussion

Can you find fabrics with different nature designs?
Why do you think clothes designers inspire themselves with nature?
Can you think of other fun 'nature-inspired' pinbacks you could make?

Source: National Wildlife Federation, Kids, Ranger Rick, Activities, Crafts, Plants, Bloom Time,
www.nwf.org/Kids/Ranger-Rick/Activities/Crafts/Plants/Bloom-Time.aspx

What is happening to agrobiodiversity?

Level 3

Aim

To learn about the decline of agrobiodiversity.

Materials

The information box provided below, paper, pencils.

Time

1 hour.

Background

Agricultural diversity, or agrobiodiversity, includes the variation within plant and animal **species** that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. This variation enables them to evolve and adapt to different growing conditions. It comprises the diversity of genetic resources (plant varieties and animal breeds) and **species** used for food, fodder, fibre, fuel and pharmaceuticals, including non domesticated or wild resources that are hunted or collected in different **ecosystems**.

Agricultural diversity also includes the diversity of non-harvested **species** that support food provision, such as soil **microorganisms**, predators and pollinators, and those in the

wider **environment** that support food production **ecosystems** (agricultural, pastoral, forest and aquatic), as well as the diversity of these agro-ecosystems.

It is also important to know that agrobiodiversity is the result of natural selection processes and the careful choice and inventive developments of farmers, herders and fishers over millennia. This is why not all crop varieties and livestock breeds are harvested or produced. Agrobiodiversity is actively managed by male and female farmers around the world.

How to do it

1. Divide the participants into two or three groups.
2. Explain to each group that they work in the Ministry of Agriculture, in the Department for the Preservation and Sustainable Use of Agricultural Diversity and that they are in charge of producing an *Agrobiodiversity Preservation Plan* for their community. Remind them that they are responsible citizens aware of the relation between agricultural practices and the maintenance of the biological resources that contribute to food supply all around the world.
3. Give the participants enough time to discuss and elaborate their Plan. Each group must come up with a program that encourages the farmers from their community to change their behaviour and habits, so they contribute with the preservation and maintenance of local crop varieties. Use the information box provided below to help your group learn about the need to preserve agrobiodiversity.
4. Ask each group to present their Plan to the rest of the participants and encourage discussion.

Discussion

Do you think your community needs programs like the ones you have presented? Why?
What do you think your community would like about these programs?
What are the negative effects of agrobiodiversity loss?

What is happening to agro-biodiversity?

Locally varied food production systems are under threat, including local knowledge and the skills of women and men farmers. With this decline, agrobiodiversity is disappearing; the scale of the loss is extensive. With the disappearance of harvested species, varieties and breeds, a wide range of un-harvested species also disappear.

Some trends and figures:

- Since the 1900s, some 75 percent of plant genetic diversity has been lost as farmers worldwide have left their multiple local varieties for genetically uniform, high-yielding varieties.
- 30 percent of livestock breeds are at risk of extinction; it is estimated that six breeds are lost each month.
- Today, 75 percent of the world's food is generated from only 12 plants and five animal species.
- Of the four percent of the 250 000 to 300 000 known edible plant species, only 150 to 200 are used by humans. Only three - rice, maize and wheat - contribute nearly 60 percent of the calories and protein obtained by humans from plants.
- Animals provide some 30 percent of human requirements for food and agriculture, and 12 percent of the world's population live almost entirely on products from ruminants.

More than 90 percent of crop varieties have disappeared from farmers' fields; half of the breeds of many domestic animals have been lost. In fisheries, all the world's 17 main fishing grounds are now being fished at or above their sustainable limits, with many fish populations effectively becoming extinct. Loss of forest cover, coastal wetlands, other 'wild' uncultivated areas, and the destruction of the aquatic environment exacerbate the genetic erosion of agrobiodiversity.

There are many reasons for this decline in agrobiodiversity. The principal underlying causes include:

The rapid expansion of industrial and Green Revolution agriculture ▶ this includes intensive livestock production, industrial fisheries and aquaculture. Some production systems use genetically modified varieties and breeds. Moreover, relatively few crop varieties are cultivated in monocultures and a limited number of domestic animal breeds, or fish, are reared or few aquatic species cultivated.

Globalization of the food system and marketing ▶ the extension of industrial patenting, and other intellectual property systems, to living organisms has led to the widespread cultivation and rearing of fewer varieties and breeds. This results in a more uniform, less diverse, but more competitive global market.

The replacement of local varieties by improved or exotic varieties or species ▶ this is the main cause of the genetic erosion of crops. Frequently genetic erosion occurs as old varieties in farmers' fields are replaced by newer ones.

Source: Food and Agriculture Organization of the United Nations, *What is Agrobiodiversity?*
<ftp://ftp.fao.org/docrep/fao/007/y5609e/y5609e00.pdf>

Defend Your Interests

Level 2 3

Aim

To encourage young people to express their views about food issues.

Materials

Paper, pencils.

Time

40 minutes.

How to do it

1. Remind your group how it is their right and their responsibility to express their points of view regarding food issues, such as animal cruelty, pesticide use, farmland protection or the availability of organic food options. These are all subjects related to the protection and preservation of a healthy **environment** where plant and animal **species** can thrive.
2. Ask the participants to choose a topic so they can write a letter to express their ideas and let others know what they care about. Maybe they could start with their own school or youth group:
 - They could ask their school or youth group director to include an organic meal on the menu once a week or ask them to serve chips made from organic potatoes.
3. Make sure all the participants sign the letter and send it!

Discussion

Which topic would you like to write about? Who would you like to send that letter to?

How important do you think your voice is in order to encourage a change in favour of **biodiversity**?

Protect habitats

What does a habitat look like?

Level 1 2 3

Aim

To understand what a **habitat** is and be able to describe its four elements.

Materials

An outdoor space, notebooks, pencils.

Time

40 minutes.

How to do it

1. Take your group to an outdoor setting and have them sit in a circle. Remind your group what a **habitat** is, the space where an animal or plant lives in a natural state, and explain that you are going to look at the elements that make up an animal **habitat** and how they relate to the **species** that live there.
2. After defining what a **habitat** is, relate that information to your group's **habitat** or where they live. Point out that their **habitats** differ and also that their **habitat** preference may be different. Make sure they understand the concept.
3. Explain that the four elements of a **habitat** are: cover, food, water and space. Before explaining the meaning of each one, ask the participants to give you some ideas. Tell them to write down the main ideas and any questions they might think of.
 - Cover usually refers to just what it sounds like, something to cover the animal. These include, breeding area, nesting site, hiding place, resting place, safe place to sleep, feeding area, and travel route. Cover may be provided by **vegetation** or rock outcroppings or, sometimes, by old abandoned buildings in the middle of the forest. Cover is an essential component of a **habitat** - if the other three elements exist without cover, the animal won't thrive.
 - All animals must eat just as we do. Therefore, sufficient food must be available for a **species** to thrive. Sometimes we humans provide food for wildlife. This, however, can backfire if we make wild animals, such as deer, dependant on this food source. We can also elevate a population to a dangerous level and cause other problems.
 - Water is essential for animals to survive. Many animals are dependant on streams or intermittent water holes. Often, we can improve these water sources without impacting the size of a population or causing negative consequences. Watering holes are also excellent places to observe wildlife.
 - Space is the fourth element of a **habitat**. **Species** of wildlife vary widely in the amount of space they need to live. The range of a squirrel is very different from that of a black bear or a lion. The abundance of the other three elements may also impact the amount of space needed by an animal. The more concentrated the food, water, and cover, the less total space an animal may need.
4. Next, explain that, in addition to these elements merely existing, they must also be:
 - available in adequate amounts;
 - high enough quality to meet the needs of animals; and
 - distributed where animals need them.Try to determine if the animals you see around have an adequate **habitat**

where they can satisfy all their needs.

5. Tell your group that all these elements affect the carrying capacity of an area. Explain that the carrying capacity refers to the number of animals a **habitat** can support over a given period of time. The larger the abundance of the four elements in a **habitat**, the larger the carrying capacity of an area is. This can be related to people and how many houses can be built in an area.
6. Ask, what makes a given **habitat** suitable for a particular animal? They already know that different animals need different types of **habitat**, so, what can they look at to see if it suits various animals? 'Plant succession'! This refers to the process that occurs when one plant community replaces another over time. A grassy field will grow shrubs, then small trees, and taller trees, and these will eventually shade out the smaller trees and shrubs. The whole process takes many years and can be set back to any point by a disturbance. Different **species** like different stages of succession. Some like a shrubby forest, like deer; and some songbirds require a mature forest with tall mature trees.
7. Have your group observe the plants and trees. Explain that the vertical structure refers to how plants are layered in a forest. The three layers include the ground layer, the shrub layer and the **canopy** layer. Different types of wildlife require and live in different layers.
8. Have your group imagine what the boundary where two types of **vegetation** meet looks like, this is called the edge. An example is the boundary between a hay field and a forest. These areas attract many types of wildlife because of the variety of food and cover. However, human beings can sometimes create too much edge by breaking up larger expansive areas some animals need.
9. Ask, do **species** need only one type of **habitat**? Explain that some do require more than one type of **habitat**. They may need one type for nesting and another type to feed in. Obviously these two types need to be close together. An example of this would be having cornfields, mature forests, and shrubby woods all in the same area.
10. Next, ask the participants what they think 'fragmentation' refers to. Ask, what happens when humans break up large areas of **habitat** by developments, roads, and agriculture? Well this is fragmentation! If this is done on a large scale, it can lead to less food, water and shelter for animals. It can also cause dangerous circumstances for animals from roads, as well as disrupt the food chain.
11. Finally, ask how do animals travel from one **habitat** to another? Corridors are areas of secure cover that permit animals to travel from one patch of **habitat** to another. The presence or absence of corridors also can impact **habitat** suitability. Without them, some animals wouldn't use some areas because they wouldn't feel safe traveling between them.
12. If the activity area allows you, have your group explore it and find examples of the different concepts you have discussed.

Discussion

Why can't we find all kinds of plants and animals in one area?

How does an area's **habitat** suitability vary with different **species** of wildlife?

Which human activities in your community do you think affect **habitats** the most?

Is it possible to make a compromise so people can enjoy many types of wildlife and obtain economic benefits as well?

Source: Penn State, College of Agricultural Sciences, School of Forest Resources, Lesson Plans, Wildlife Lesson Plans, Wildlife Habitat, <http://sfr.psu.edu/youth/sftrc/lesson-plans/wildlife/9-12/habitat>

Habitat Sweet Habitat

Level 1 2

Aim

To learn about **habitats** and **ecosystems**.

Materials

Whiteboard, whiteboard markers, cardboard, colouring pencils, adhesive tape, posters or images of different **ecosystems**.

Time

1 hour.

Background

A **habitat** refers to the specific place where a plant or animal lives, for example, under a rock, in a tree hollow or in a rotting log. An **ecosystem** describes a community of plants and animals interacting with each other and their surrounding **environment**, for example, a grassland **ecosystem** or woodland **ecosystem**. An **ecosystem** can be as small as a field or as large as the ocean. The word **ecosystem** is used to describe the world's major **habitat** types.

How to do it

1. Explain to your group that this activity uses human settlement as a comparison to introduce the concept of **habitats** and **ecosystems**. In this case a home is a **habitat** and a town is an **ecosystem** as it is made up of lots of **habitats** and people that rely on the interaction between one another for survival.
2. To begin this activity, ask the students to close their eyes and visualize what their home looks like. How many windows does it have? What colour is it? What features does it have? etc. Have the participants draw the home they have just visualized on the cardboard. Once complete, ask the participants to label the top of the paper with 'My **Habitat**'. Have the participants attach their drawing to the board and arrange them so that they represent a town.
3. Emphasize that the word **habitat** is just another word that describes the place a person, animal, or plant lives. **Habitat** = Home. Ask students why their home or **habitat** is important to them. Discuss what other features should be added to the town to make it complete, for example: roads, parks, schools, shopping centres, creeks, bus stops, plants and animals. Ask your group to draw in the missing features.
4. Use the following discussion to help establish the analogy of a town operating like a natural **ecosystem**. Ask the participants to describe the ways people and places interact in the town, for example:
 - the **habitats** provide shelter and a safe place to live
 - people move between **habitats**
 - people move out of their **habitat** to find food
 - people move out of their **habitat** to play
 - some people have jobs that help other people
 - some people have jobs that help keep the town healthyEmphasize the fact that people in the town need their **habitats** and each other to survive. Have them realize that this is similar to what happens between animals, plants and their **habitat** in natural areas.
5. Next, show your group one of the **ecosystem** posters you have. Explain to your group that we call towns or cities to some of the places we live in. Ask them, how do we call the place where plants and animals live? One word that can be used to describe the poster is '**ecosystem**'. This word is used to describe natural places that have a variety of plants and animals that rely on each other and their **habitats** to survive. Emphasize that our cities, suburbs and towns are home to native plants and animals, as well as people. We live in an 'urban **ecosystem**'.
6. Ask the participants to imagine they are an animal, for example, a bird, a fish, or a lizard. Tell them to identify where would these animals fit into the displayed

ecosystem. Remind them **habitats** for animals include bark, rocks, trees, lakes, rivers, shrubs, grasses, logs, etc. Ask them to also think about the kinds of **habitats** the plants in the poster require. **Habitats** for plants might be next to a rock or river, on a hill or a branch, the ocean floor, etc.

7. Divide your group into small teams and give an **ecosystem** poster to each one; the **ecosystems** shown in the posters might be: arctic, alpine, grassland, woodland, wetlands, rainforest, desert, marshlands, mangroves, agricultural and urban. Ask the teams to examine their poster and identify plant **habitats** and animal **habitats**, ask them to list these in their notebooks and to name one example of an interaction in the **ecosystem**, for example, a bird needs a hollow in a tree to nest in. Have each group present their work.
8. Finally, ask your group to describe some of the parallels between the interaction of plants and animals in an **ecosystem**, and their own interactions with their town, for example:
 - Some animals move between **habitats**
 - Some animals move out of their **habitat** to find food or play
 - Some plants and animals help to keep the **ecosystem** healthy
 - Animals eat plants and other animals

Have your group develop a class definition for the words '**habitat**' and '**ecosystem**'.

Discussion

Why is your home or **habitat** important to you? So, how important is an animal's or plant's **habitat** to them?

Can you describe some similarities between your **habitat** and their **habitat**?

How are different **habitats** interrelated?

Which values should people have regarding the respect for life on earth?

Source: NSW Biodiversity Strategy, Biodiversity for Kids, Teacher's Guide, Habitats and Homes, www.environment.nsw.gov.au/resources/education/BiodiversityTeachersGuide.pdf, page 14.

Habitat Features!

Level 1 2 3

Aim

To document signs of particular **habitats**.

Materials

An open space, paper, pencils.

Time

40 minutes.

Background

A **habitat** is a place where an animal lives. This place provides the animal with food, water and shelter. There are many different types of **habitats** in our planet, from deserts to forests, from rivers to prairies, and mountain slopes to tundras. All these places depend on a specific balance of rainfall, temperature and soil type to remain healthy and suitable for their inhabitants. This is the reason why different **habitats** contain different but all equally amazing animal **species**.

How to do it

1. Remind your group how different plants and animals live in different places that provide them with food and shelter, places where they can grow and be healthy.
2. Assign each participant a plant or animal **species** that can be found in the activity area.
3. Explain to your group that they are going to document signs of particular **habitats**; ask them to draw any element of the **organism's habitat**, such as shelters, food sources, water sources, sunlight and other **habitat** features particular to their **species**.
4. Have your group sit in a circle and ask each one to present their work to the group.

Discussion

How many different **habitats** were you able to identify?
Where were you able to find the most appropriate **habitat** elements?
How would these elements change if you lived in another city or country different from yours?

Habitats All Around

Level 1 2

Aim

To realize that different animals need different **habitats** to survive.

Materials

An open space, paper, pencils, cardboard, colour markers, adhesive tape, books and/or internet for research (if needed).

Time

30 minutes.

Background

A **habitat** is a place where an animal lives. This place provides the animal with food, water and shelter. There are many different types of **habitats** on our planet, from deserts to forests, from rivers to prairies, and mountain slopes to tundras. All these places depend on a specific balance of rainfall, temperature and soil type to remain healthy and suitable for their inhabitants. This is the reason why different **habitats** contain different but all equally amazing animal **species**.

How to do it

1. Explain to your group that they are playing a **habitat** scavenger hunt. Tell them that each one will assume the identity of an animal and search out signs of a suitable **habitat**.
2. Assign an animal to each participant; give some animals that do inhabit the area to half of your group and other ones from different **habitats** to the rest of your group.
3. Ask each participant to make a list of things indicative of each **habitat**. For example, for a rabbit they could list grass and hole. If necessary, you can have the participants search some information about their animal's **habitat**.
4. Take your group to an outdoor setting and ask them to hunt for the items on their lists. Based on what they find, discuss whether the hunted area is a suitable **habitat** for their assigned animals.
5. Next, you can play a **habitat** tag game using this new knowledge. Write the names of different **habitats** on the cardboard and stick them to different trees all around the activity area.
6. Ask for a volunteer to be "it" for the first round. Explain that, for each round, you will assign an animal to your group; the participants can only touch the tree representing that animal's **habitat** to be safe. Give a time allotment for each round. Those who get tagged or who are not touching the correct tree are "it" for the next round.

For example:

- Round 1 ▶ Polar bear – **habitat**: arctic sea ice
- Round 2 ▶ Squirrel – **habitat**: oak tree
- Round 3 ▶ Hippopotamus – **habitat**: grassland river in Africa

Discussion

Why was this **habitat** unsuitable for some animals?
What would happen if an animal's **habitat** is destroyed?
What changes can you make in your everyday activities to prevent that?

Habitat Bingo

Level 1 2

Aim

To identify different **habitat** elements.

Materials

A copy of the **habitat** bingo, pencils, an outdoor setting.

Time

20 minutes.

How to do it

1. Explain to your group that they are playing a *Habitat Bingo!*
2. Take the participants outside and give each one a copy of the bingo sheet.
3. Ask them to cross off the boxes when they find each item. The first one to mark off a whole line (across, down, or diagonally) is the winner!

Discussion

Were you able to find other interesting things?
Can you identify different **habitats** in the activity area?
Can animals share more than one **habitat**? How?

Habitat Bingo		
An insect walking on a plant.	An animal living on a tree.	An animal feeding itself.
A food any animal would love to eat.	A spider web.	An animal enjoying in the soil.
A water source.	An animal track.	A creepy crawly hiding under a rock.

Log Surprise!

Level 1 2 3

Aim

To explore a rotten log.

Materials

An outdoor setting, a rotten log (or tree stump), 1 large stick, notebooks, pencils.

Time

20 minutes.

How to do it

1. Explain to your group that you are going to examine a rotten log. Ask them to draw or write what they see on their notebooks.
2. First, have them check the surface of the log. What do they see? They may see slime trails of snails or slugs. Also, look for mosses, lichens, or holes bored into the log.
3. Next, peel off a piece of bark. What do they see? They may see ants or beetles, or they may find the tunnels that beetles chew into the wood.
4. Use a large stick to pick apart any crumbly wood on the log. Now what do

they see? Did they see spiders, centipedes, or pill bugs running? Do they spot any insect eggs or larvae?

5. If the log is hollow, carefully poke your stick inside. What interesting materials did you find? You may find nest materials or even a snakeskin!
6. Finally, roll over the log with your foot. What was underneath? Remember to gently return the log to its original position.

Discussion

What type of animals did you find in the rotten log?

What were they doing there? (Many were finding shelter, food, or places to raise their young.)

What other interesting things did you find?

What are the benefits of leaving a rotten log on your garden?

Source: National Wildlife Federation, Kids, Your Big Backyard, Fun, Outdoors, Observing Wildlife, Tree-mendous Mystery,
www.nwf.org/Kids/Your-Big-Backyard/Fun/Outdoors/Observing-Wildlife/Tree-mendous-Mystery.aspx

A Day of My Life In...

Level 1 2 3

Aim

To learn about coral reefs.

Materials

Paper, pencils.

Time

30 minutes.

Background

Tiny **organisms** called coral polyps build coral reefs. Polyps build skeletons made of calcium around themselves. When these hard outer skeletons touch, they begin to build a structure called a coral head. The accumulation of coral heads over time becomes a coral reef. This process can take thousands of years. Some of today's coral reefs started growing millions of years ago!

Coral reefs are home to 25 percent of all marine life on the planet, and form the nurseries for about a quarter of the ocean's fish. Coral reefs have survived tens of thousands of years of natural change, but many of them may not be able to survive the destruction wrought by humankind. For many coastal areas, coral reefs also provide an important barrier against the worst ravages of storms, hurricanes, and typhoons. Coral reefs are essential not only to ocean health, but also to human health and well-being.

The main threats of these beautiful and life-sustaining **organisms** include overfishing and destructive fishing practices, careless tourism, coral mining, sedimentation and **climate change**. We have already lost 27 percent of the world's coral reefs. If present rates of destruction are allowed to continue, 60 percent of the world's coral reefs will be destroyed over the next 30 years.

Source: World Wildlife Fund, Our Earth, Oceans, Seas and Coasts, Coasts, Coral Reefs,
www.panda.org/about_our_earth/blue_planet/coasts/coral_reefs/

How to do it

1. Explain to your group that their parents are scientists and that they have been assigned to work with a research team studying coral reefs. They have just been told that all the family will be moving to Australia for a whole year and that they are leaving in two days! They have heard their parents talk about the Great Barrier Reef, the largest coral reef found on earth, located off the coast of Australia, but they are nervous and excited about the change!
2. Using a sheet of paper, tell your group to write about *A day of my life in the Great*

Barrier Reef. Ask them to think and write about things like the kind of clothes they would wear, the type of activities/sports they would do, how they would get around, etc. Tell them to be creative and to pretend they are writing in their diary or writing a letter to their best friend.

3. Have each participant read their work.

Discussion

Why are coral reefs so important for **biodiversity** preservation?
What are some threats to these **habitats**?
What do human beings need to change to stop coral reefs destruction?

Habitat Change!

Level 2 3

Aim

To discuss animal adaptation to different **habitats**

Materials

Whiteboard, whiteboard markers, books or internet for research.

Time

40 minutes.

How to do it

1. Ask your group what animals they would like to have in their region that are not currently found there (for example, pandas, dolphins, kangaroos, etc.). Make a collective list that includes various types of mammal, amphibian, fish, reptile, bird, tree, other plants, etc.
2. Begin a discussion of which ones could be expected to survive under local conditions. Ask the participants to eliminate possibilities, make a cross-referenced list of the difficulties they would face: **climate**, food sources, shelter, etc.
3. Next, have your group make another similar list to include problems that their successful adaptation would cause for other **species**. For those that remain or are 'uncertain'. Instigate research to determine more particular requirements of the **species** suggested, and for any that continue to appear feasible, suggest advantages to be gained and propose a particular location for an experimental **habitat**. If it is possible, you could even ask the opinion of an expert to comment upon the idea.
4. If the participants are ultimately unable to make suggestions of ideas they find feasible, have them invent news stories about fictional experimental importations that 'went wrong', detailing specific disruptive effects that followed the importation of a foreign **species**. Advise them to go beyond direct effects to secondary and chain-reaction effects upon other **species** and aspects of the **environment**.

Discussion

What could some negative effects of introducing new **species** to a determinate **habitat** be?
Why might different **species** need to change their **habitats** and adapt to new ones? What difficulties might they encounter?
How responsible are human beings in preventing this from happening?

Getting to the Roots!

Level 2 3

Aim

To learn about temperate forests and their root system.

Materials

3 potted plants, magnifying glass, newspaper, tweezers, gram scale, rulers, calculators, papers, notebooks, pencils.

Time

40 minutes

Background

Temperate forests grow between the tropic and the polar regions. They have four distinct seasons with a well-defined winter. Temperate forests have a moderate **climate**. These forests are home to many plant and animal **species**. Much of the food humans eat is grown in areas where temperate forests have been cleared and transformed into farms.

In temperate forests, the biomass (all life) underground in the subterranean layer can be greater than what is seen above ground! This layer holds millions of **microorganisms**, insects and fungi, but most of the biomass is plant roots. Roots come in many sizes and shapes; they carry water and minerals from the ground to the plant and anchor the plant in the soil. Roots create a web that holds soil together and helps prevent erosion from wind and water. Moreover, roots can create soil by mechanically wedging rocks apart, and dissolving them with plant chemicals.

How to do it

1. Explain to your group that you are learning about temperate forests and their fascinating root system!
2. To begin, discuss with your group about the three major plant parts (leaves and buds, stem and roots). Discuss the jobs of each part (leaves absorb energy from the sun and convert it into **nutrients**; stems support the leaves and buds and provide a conduit for **nutrients**, water and minerals; roots collect minerals and water from the soil, and hold plants in the ground).
3. Divide the participants into three teams and give the needed materials to each one.
4. Instruct students to carefully remove their plant from its pot onto the newspaper.
5. Have the participants place a sheet of paper on the scale and record its weight. (Tare weight: ____).
6. Ask them to pick up their plant, being careful not to shake off the soil and place it on the piece of paper on the scale. The soil that falls onto the newspaper must be replaced in the pot.
7. Tell the teams to place the plants back on the newspaper and to gently shake and tease as much soil as possible from the roots, then ask them to place the plant back on the scale. They must now subtract the tare weight to find out how much soil the root system was holding. (Plant & Soil: Weight #1 ____).
8. Instruct the teams to weigh the plant alone. (Plant: Weight #2 ____). They may subtract weight #2 from the weight #1 to find out how much soil was held by the roots: (Weight #3 ____). Have them calculate what percentage of the total weight was soil and what percentage was plant.
9. Next, ask the teams to make some observations:
 - Describe the roots' appearance.
 - Are they forked or branched at the tips? Do they cross over each other?
 - How are the roots different from the part of the plant that is above the ground?
 - Are all the roots the same, or are some different? Are they all the same size?
 - How would you describe the whole mass of roots?
 - How do roots help anchor the plant in the ground? Which roots do this the best?
 - What do you think the smallest roots are for?
10. Finally, have the teams do the following:
 - Measure the length of one long root.
 - Measure the lengths of the smaller roots that branch off of the long root.
 - Add their measurements and write the total.

- Try to measure the even smaller roots that branch off those and add them to the total.
- Challenge the participants to calculate the percentage of small roots in comparison with the one long root that they are attached to. (If the long root is 10 cm long and all the small roots together add up to 5 cm, then the small roots are 50 percent of the large root's length).
- Estimate the total length of all the roots on the plant all together.

Discussion

How do the roots help the plants? The forests?
Which do you think are the most amazing facts about roots?
What do you think are the main threats to temperate forests? What do you think the world would be like if they were all destroyed?

Source: Globio, Glossopedia, Learning Activity Guide, Temperate Forests,
www.globio.org/info2/LAG/GLOBIO_LAG_Temperate_Forests.pdf

Habitat Loss

Level 1 2

Aim

To understand the need for healthy **habitats** for plants and animals.

Materials

An outdoor setting, pictures of various **habitats** (optional).

Time

30 minutes.

Background

Animals and plants depend on particular **habitats** for their survival. When these natural places vanish, the **organisms** which previously used the site are displaced or destroyed as the conditions necessary for plants and animals to survive are significantly compromised or eliminated and, therefore, **biodiversity** is reduced.

Habitat loss can have natural or human causes. **Habitat** destruction through natural processes, such as volcano eruptions, fires, hurricanes, earthquakes, landslides, etc., they generally occur in isolated areas and healthy **ecosystems** are able to recover from them. Human activities, however, have significantly greater impact and are very persistent. **Habitat** destruction by human activity is mainly related to the harvesting of natural resources for industry production and **urbanization**. Clearing **habitats** for agriculture is the principal cause of **habitat** destruction. Today **habitats** are being destroyed at a very fast rate, and many songbirds, frogs, orangutans and lots of other **species** are threatened because of human activity.

How to do it

1. Take your group to an outdoor setting and remind your students what a **habitat** is. Briefly review different types of **habitats** as a group; you can use the **habitat** images to help them identify different **habitats**. Can they identify all the **habitat** elements in the activity area?
2. Next, discuss how **habitats** can be damaged, threatened or destroyed by human activity. Some ideas include, but are not limited to:
 - *Air and water pollution*
 - *Oil spills*
 - *Logging*
 - *Mining*
 - *Oil drilling*
 - **Deforestation** for timber

- Fishing
- **Urbanization**/urban sprawl
- Agriculture
- Tourism

Discussion

What could be some natural causes of **habitat** loss?
 What happens to plants and animals when their **habitat** is lost?
 How does **habitat** loss affect human beings?

Story Time!

Level 1

Aim

To learn about how human activities can affect oceans.

Materials

Internet access.

Time

30 minutes.

Background

Beneath the surface of our oceans lies an incredible world. Oceans are home to an amazing variety of creatures. Thousands of **species** of fish, turtles, birds, and other creatures live in and around the ocean. For example, the world's coral reefs cover less than one percent of our oceans, but they're home to a quarter of all marine life. We all need to protect these wonderful places!

However, people are taking far more fish out of the ocean than can be replaced by those remaining. 53 percent of the world's fisheries are fully exploited, and 32 percent are overexploited, depleted, or recovering from depletion. Moreover, as many as 90 percent of all the ocean's large fish have been fished out. Garbage and chemical pollution is another problem, many animals die each year because they eat plastic or get trapped in it.

Source: World Wildlife Fund, *Our Earth, Oceans, Seas and Coasts, Problems, Unsustainable Fishing*, www.panda.org/about_our_earth/blue_planet/problems/problems_fishing/

How to do it

1. Explain to your group that today you are going to read a story called 'Tessa and the Fishy Mystery', which is part of the Tunza Environmental Series for Children, sponsored by the United Nations Environment Programme (UNEP):

www.unep.org/pdf/Tessa_Book/TESSA_story_complete.pdf

- If it is not possible for you to download it from the internet, you could ask your group to help you write your own story about the amazing ocean life and how human beings' use and abuse of coastal areas have affected it because of overexploitation of resources and pollution, and of course don't forget to mention how important it is for people to make a compromise to lead sustainable life styles.
2. Encourage discussion.

Discussion

Can people do something to enjoy goods and services from coastal regions and at the same time protect these places?
 How important is it for people to change old habits in order to start making a difference?
 What can you do to stop ocean and water pollution?

Dying Trees

Level 1 2

Aim

To learn about acid rain and its effects.

Materials

Brown and green kite paper, scissors, cardboard, water.

Time

30 minutes.

Background

Acid rain is a term used to describe a precipitation, as rain, snow, sleet or fog, that contains harmful amounts of acid-forming chemicals (such as nitric acid and sulfuric acids) formed primarily by the pollutants that are released into the **atmosphere** when **fossil fuels** are burnt. Rain water is naturally slightly acidic but increased levels can cause damage to nature, buildings, cars, and is often indirectly damaging to humans. Acid rain is a problem that affects us all.

In the 1970s scientists discovered that some forests in Europe and North America were dying; some tests revealed that pollution from power plants, cars and trucks was to blame. The smokestacks from industries and chimneys were releasing chemicals that were rising with the smoke into the **atmosphere**, combining with other molecules and falling to the ground as precipitation which was ten times more acidic than normal, sometimes as strong as vinegar.

This acid rain was dissolving out important **nutrients** from the soil and allowing in other substances that harmed the roots. Weakened trees lost their leaves and were attacked by insects and disease; this type of pollution wiped out whole forests.

Source: United Nations Environment Programme, Tunza, A Trip With Drip,
http://unep.org/tunza/children/images/flash/a_trip_with_drip/start.swf

How to do it

1. Start by explaining what acid rain is and how it is produced. Remind them that acid rain can affect us all, damaging our car, defacing historic statues, harming trees in a once-beautiful forest, or destroying the fish population in a lake.
2. Explain to them that they are creating a forest using some cardboard and some kite paper (especially for the branches and leaves).
3. Once they are finished, have children sprinkle some 'acid rain' over their forest to imitate the effect of real acid rain.
4. Have children discuss how they can change their everyday activities in order to reduce the amount of gases that are released by the burning of **fossil fuels**.

Discussion

Why is it important to protect forests?

What can you do to prevent the pollution and help reduce the presence of acid rain?

Where is **deforestation** occurring? What can happen to the soil when trees no longer shade it, provide it with leaves and bind it together with roots?

From a Insect's Point of View

Level 1 2 3

Aim

To encourage youth to reflect about **habitat** destruction from a different point of view.

Materials

Papers, pencils, images about forest destruction (optional).

Time

1 hour.

Background

Habitat loss represents the greatest threat to **species** worldwide. The world's forests, swamps, plains, lakes, and other **habitats** continue to disappear as they are harvested for human consumption and cleared to make way for agriculture, housing, roads, pipelines and the other features of industrial development.

Habitat loss is probably the greatest threat to the variety of life on our planet today. It is identified as a main threat to 85 percent of all **species** considered to be threatened and **endangered**, that is **species** that are considered to be facing a very high risk of **extinction** in the wild.

Forests are among the most biologically rich terrestrial **ecosystems**, they contain more than 80 percent of the world's terrestrial **species**, but the survival of many of them is threatened. Forest loss and degradation is mostly caused by the expansion of agricultural land, intensive harvesting of timber, wood for fuel and other forest products, as well as overgrazing. Around half of the world's original forests have disappeared, and they are still being removed at a rate 10 times higher than any possible level of regrowth. Immediate action is required and we can all help!

Source: World Wildlife Fund, Our Earth, Species, Species Threats, Habitat Loss, www.panda.org/about_our_earth/species/problems/habitat_loss_degradation/

How to do it

1. Tell to your group that they will become newspaper reporters, but not just any type of reporters, insect reporters! Explain to them that they live in a forest and that they are writing a newspaper article about **habitat** destruction from an insect's point of view.
2. You might want to show them some photographs about forest destruction so they can get some inspiration. Give them enough time to write their article and have them read it to the rest of the group.
3. You could then send a couple of articles to your school or youth group newspaper, so everyone can learn about **habitat** destruction!

Discussion

How would you feel if your **habitat** (home) was destroyed?
Do you think your local community needs **habitat** protection programs and education? Why or why not?
How can human beings help protect forests? What can you do?

A Salted Carrot!

Level 2 3

Aim

To learn about mangroves and plant adaptation.

Materials

2 small carrots, tap water, table salt, several metric measuring cups, small metric scale, metric ruler, thin strips of paper for measuring diameter, 2 shallow dishes, spoons or stirring sticks, thin tissue or toilet paper, paper towel, pencils, masking tape for labeling the dishes.

Time

One 20 minute lesson and another 40 minute lesson.

Background

Mangroves are trees that grow in tropical and subtropical intertidal zones. These areas

are tough places for plants to grow. During low tides intertidal zones are exposed to air. During high tides they are covered by salt water. They flood frequently. The soil is poor. But mangrove trees survive and even thrive in these harsh conditions. Big groups of mangroves and other plants that live here are called mangrove swamps or forests, and sometimes simply mangal. Mangroves live in more than two-thirds of the saltwater coast areas of tropical and subtropical Africa, Asia, Australia, and North and South America.

Not many plants can survive in the mangal. Only about one hundred plant **species** are found in most mangrove swamps. Some swamps are home to only one or two **species!** The plants that do survive have adapted to deal with the special challenges. One of the biggest challenges is the salinity, or the amount of salt in the water. The water in a mangrove swamp is so salty it would kill most plants. But the roots of red mangroves contain a waxy substance that helps keep salt out. The salt that does get through this barrier is sent to old leaves that the trees then shed. White mangrove trees have glands in their leaves that let salt pass from the inside of the tree to the outside. The leaves become speckled with white salt crystals, which is how they got their name.

Just as mangroves can keep salt out, they have other adaptations to keep freshwater in. They can close up the pores in their leaves. They can also turn their leaves away from the sun to keep them from drying out. All of the plants found only in mangroves are woody and tree-like. They tend to be short with tough, evergreen leaves, another adaptation that keeps the moisture in.

Lack of oxygen is another huge challenge in mangrove forests. The soil is covered with salt water every time the tide comes in. Salt water has low oxygen content. So, mangrove trees grow fancy systems of roots that make the trees look as if they were growing on a stilts. The roots breathe through knobby holes called lenticels. They take in **carbon dioxide** directly from the air, instead of from the soil like other plants.

Source: Globio, Glossopedia, Mangroves,
www.globio.org/glossopedia/article.aspx?art_id=39

How to do it

1. Explain to your group that you are making an experiment to learn about mangrove adaptations.
2. Using masking tape, ask your group to label one dish ‘#1 Fresh Water’ and the other dish ‘#2 Salt Water’. Have them put one carrot in each dish.
3. Ask the participants to take the carrots out, one at a time, and measure their:
 - *Length* - measure in centimeters and millimeters with the ruler.
 - *Diameter* at its center point - wrap the strip of paper around the carrot, marking where the end meets the paper on the other side; measure that length with the ruler.
 - *Weight* of each carrot in grams - weigh on the scale.
4. Have your group record the data on the chart in the columns for Carrot #1 and Carrot #2. Also, ask them to make observations about the carrots and note them on the chart.

	<i>Day 1</i>	<i>Carrot 1</i>	<i>Carrot 2</i>
<i>Length</i>			
<i>Diameter</i>			
<i>Weight</i>			
<i>Texture</i>			
<i>Colour</i>			
<i>Stiffness</i>			

Other observations		
Hypothesis		
Day 2	Carrot 1	Carrot 2
Length		
Diameter		
Weight		
Texture		
Colour		
Stiffness		
Other observations		
Hypothesis		

5. Ask the participants to measure 120 milliliters of tap water and pour it into dish #1, tell them to leave the carrot in the dish.
6. Have them remove the carrot from dish #2, measure 120 milliliters of tap water and pour it into the dish.
7. Tell them to place a thin piece of tissue paper on the scale, put a small amount of salt on the paper, and have them add or remove small quantities until it weighs 15 grams. Ask them to put the salt into the second dish and stir until it is thoroughly dissolved. Finally, have them place the carrot back into dish #2. Tell them to write down what they think will happen to the two carrots (their hypothesis).
8. After a day has passed, have your group remove the carrots from the dishes and dry them with the paper towel, being careful not to mix them up.
9. Ask them to repeat the measurements for length, diameter, and weight and note the data on their chart. Tell them to repeat their observations and note them on the chart.
10. Instruct the participants to compare their carrots and the differences they see in their observations and measurements in the Results section of the chart. Make sure they include a conclusion related to the hypothesis, noting whether their guess was correct.

Results	
Do the carrots look the same?	
Has the texture changed?	
Has the colour changed?	
Are the carrots as stiff as they were before?	
Do you see any other changes? If so, what?	
Why do you think the salted carrot changed?	
Was your hypothesis correct?	
Draw pictures of your carrots:	
Carrot 1	Carrot 2

11. When students have completed their experiment, discuss osmosis and the effect it had on their carrots and on plants that live in salt water.

Information for teachers:

Mangrove trees and other plants living in mangroves have to survive in salty water that would kill most plants. Salt affects plant tissues through a process called Osmosis. Mangal plants have special adaptations to outwit osmosis and limit the amount of salt in their tissues so they don't die.

What is Osmosis?

Osmosis refers to the passage of water molecules through a membrane (semi-permeable), from an area of purer water, such as tap water (low concentration of solutes), to an area of water that has other things dissolved in it, like salt or sugar (high concentration of solutes). Think of it as “light” water and “heavy” water. If the light and heavy water were on a balance scale or a see-saw, the heavy water would sink down and the light water would roll into it until all the water was mixed together. Then the water on both sides would weigh the same. Nature is always trying to balance things, including the concentration of seawater and plant sap in relation to each other. If most trees and plants were placed in seawater, their low concentration sap would flow out through their cell membranes into the higher concentration salt water, and they would shrivel and die.

Outwitting Osmosis

1. **Stay Out!:** Some trees, like the Stilted Mangrove, exclude salt from entering with a membrane that acts like a gate. Red Mangroves have roots containing a waxy substance that keeps salt out.
2. **Pass the Salt:** Others, like White Mangroves, excrete salt through special glands in their leaves. People do the same thing when they sweat. The salty leaves are washed by rain just like how we take a bath or shower.
3. **Game of Concentration:** Some Mangroves concentrate salt by storing it in their leaves. When the leaves get old, they die and fall off, carrying away the salt.
4. **Dilution Solution:** Mangroves can also close their leaf pores (stomata) to keep water from evaporating away, helping to dilute the salt that enters through their roots. When the salt gets too concentrated, they can open the pores to release it.

Discussion

Why do we say that mangroves live in a tough **environment**? What are some of the special challenges?

How have plants adapted to live here?

Which adaptations do you think relate to your carrot experiment? How?

Why are mangroves important? How can people help save mangroves?

Source: Globio, Glossopedia, Learning Activity Guide, A Salted Carrot,
www.globio.org/info2/LAG/GLOBIO_LAG_Mangroves.pdf

Reduce Habitat Destruction

Level 2 3

Aim

To learn about **habitat** destruction and how to reduce it.

Materials

Poster boards, colour markers, colouring pencils.

Time

1 hour.

Background

Natural **habitats** are the physical, chemical and biological systems that support living things (plants, animals, fungi and microbes). In simpler words, **habitats** are the places where these **organisms** live. A **habitat** is lost and degraded when natural or human-caused activities alter these places so that fewer **species** can live there. When these natural places vanish, the **organisms** which previously used the site are displaced or destroyed as the conditions necessary for plants and animals to survive are significantly compromised or eliminated, and, therefore, **biodiversity** is reduced.

Habitat loss can have natural or human causes. **Habitat** destruction through natural

processes, such as volcano eruptions, fires, hurricanes, earthquakes, landslides, etc., generally occurs in isolated areas and healthy **ecosystems** are generally able to recover from them. Human activities, however, have significantly greater impact. **Habitat** destruction by human activity is mainly related to the harvesting of natural resources for industry production and **urbanization**. Clearing **habitats** for agriculture is the principal cause of **habitat** destruction.

Humans are also part of the cycle of life on earth, and as such we depend on the overall function of natural systems for our own survival and well-being. Properly functioning natural systems create the air we breathe, break down our wastes, provide our food, purify our drinking water and ultimately supply all the materials we require for living. Each **species** plays an important role in its **ecosystem**.

Source: Capital Regional District, Watersheds, protection, Concerns, Habitat Loss and Degradation, www.crd.bc.ca/watersheds/protection/concerns/habitat_loss.htm

How to do it

1. To start, ask your group to identify some human causes of **habitat** loss and degradation.
2. Next, ask them to think of ways how they can limit their impact on natural systems and prevent unnecessary damage to **habitats**.

Here are some examples:

- Learn more about the natural **habitats** in your area and help to educate others about their value and importance.
 - Help reduce air pollution that can damage wildlife and **habitats** by saving energy.
 - Before building on your property, learn about the natural **habitat** that may be impacted, there may be options to modify your project in order to better protect wildlife.
 - Preserve existing wetlands on your property, they provide valuable **habitat** for birds, fish, amphibians and mammals; these areas also help to filter water and protect the shoreline from erosion and wave damage.
 - Plant native **vegetation** around your home and property, it provides **habitat** for native animals and helps reduce the spread of invasive **species**.
 - When constructing on your property, make sure sediment and pollutants do not run off into nearby water bodies.
 - Help to prevent the spread of invasive **species** in natural **habitats**; invasive **species** compete with native **species** for resources and **habitat**.
 - Support and encourage the creation of protected areas in your country, let your government representatives know you are concerned about **habitat** protection.
 - Use water wisely and help to reduce water pollution that can affect nature.
 - Join a **conservation** group, there are many people working to protect **endangered** animals and **habitats**.
 - Recycle, reduce goods consumption, and be wise about garbage disposal.
 - When visiting natural **habitats**, make sure you leave everything as you found it.
 - Minimize the use of herbicides and pesticides as these contain hazardous pollutants that affect wildlife.
3. Finally, divide your group into small teams and ask them to make a mock-TV or poster advertisement to promote action. Have them show it to your school or youth group.

Discussion

What are some direct and indirect damages that might affect **habitats**?

How does **habitat** loss and degradation affect **ecosystems**?

What are some **ecosystem** goods and services people might lose because of **habitat** loss and degradation?

Seed Bombs!

Level 1 2 3

Aim

To create seed bombs to improve any place that needs some greening.

Materials

Red clay, soil, native seeds (flower, plant, fruit or vegetable), water, tablespoon, small cups.

Time

30 minutes.

How to do it

1. Explain to your group that they are making some seed bombs!
2. Give one tablespoon of seeds, three tablespoons of soil and five tablespoons of red clay to each participant.
3. Ask them to mix the seeds with the soil, add the clay and mix well until completely blended together.
4. Tell them to add some water, a bit at a time, mixing with their hands continuously. They want to get the mixture to almost bread dough consistency (but not wet and sticky).
5. Finally, tell them to form the seed balls. They can make a big ball or several small balls. The bombs are ready to deploy! They can throw, place or plant their bombs anywhere that has a small patch of unpaved ground, it can be in the backyard or indoors.

Discussion

Is there any place in your school or youth group that needs some greening?
How important is it for children and youth to enjoy some green spaces?
How do you think life would be if there were no yards and parks where you could enjoy your free time and play?

Source: Ecokids Canada, Teachers, Resources, Activities, Seed Bombs,
www.ecokids.ca/pub/teachers/resources/activities/seed_bombs.pdf

Your Own Habitat Protection Mascot

Level 1 2 3

Aim

To create your group's very own **habitat** protection mascot.

Materials

3 cardboards, colour markers, colouring pencils.

Time

1 hour.

How to do it

1. Explain to your group that they are going to create their own *Habitat Protection Mascot*. Have them begin by brainstorming some ideas about what they want their mascot to transmit.
2. Divide the participants into three teams and have each one create their mascot.
3. Ask each team to present their work.
4. Put the artworks in a place where everybody can see and have them vote to choose which one is the best. Maybe your group's creation can become your school or youth group's Habitat Protection Mascot in order to encourage action!

Discussion

How can having a mascot help attract young people and encourage them to take action?

What is the message you want to transmit through your creation?

Protected Areas Around the World

Level 2 3

Aim

To learn about protected areas around the world.

Materials

Internet access, notebooks, pencils.

Time

1 hour.

Background

A protected area is a clearly defined geographical space set aside to achieve the long term **conservation** of nature and **biodiversity**, as well as the associated **ecosystem** services and cultural values. Therefore, protected areas are a major tool for the management of **species** and **ecosystems** which provide a wide range of goods and services essential for the maintenance of a healthy planet. For example, well-planned and well-managed protected areas can help to safeguard freshwater and food supplies, reduce **poverty** as they contribute to the livelihoods and well-being of local communities, and reduce the impacts of natural disasters.

Every country in the world has designated protected areas and the purpose of them is to limit the levels of human use and occupation and restricting the exploitation of natural resources.

Source: Protected Planet Initiative, Our Work, Protected Areas, About Protected Areas,
www.unep-wcmc.org/about-protected-areas.163.html

How to do it

1. Divide the participants into groups of two or three people. Explain to them that they will be researching about protected areas around the world. To do this, they will use the *Protected Planet Initiative* from the United Nations Environment Programme and the World Conservation Monitoring Centre:

www.protectedplanet.net/

2. Have each group select any protected area from around the world; encourage them to choose areas from all continents. Ask each group to make a small presentation for the rest of the groups.

Discussion

Why are protected areas considered to be one of the most effective tools for conserving **species** and natural **habitats**?

What benefits do human beings obtain from protected areas?

Can you identify any protected area in your country? How has this contributed to stopping **habitat** destruction?

Natural Resource Awareness

Level 3

Aim

Research a natural resource and educate others about how its consumption affects your community and the world.

Materials

Notebooks, pencils, books and/or internet for research.

Time

1 hour.

How to do it

1. Divide the participants into small teams and explain to them that each one will have to choose a natural resource (such as timber, freshwater, coal, or oil) to investigate. Each group must research how the resource has been used in history and how it is presently being used; the topic to be researched is the environmental impacts of using the resource.
2. Next, each group will have to educate others about what they have learned, they could:
 - Create an educational pamphlet and place it in a central location in the school or youth group;
 - Write and record a news information podcast and play it for the school or youth group; or,
 - Write and perform a skit or short play about a situation involving a conflict resulting from the consumption of the natural resource.

Discussion

Is consumption of the resource environmentally, economically, and socially sustainable?
Does its use affect some people more than others?
What are some ways how it could be used more sustainably?

Source: Facing the Future, Service Learning, Climate Change Action Projects, Natural Resource Awareness,
www.facingthefuture.org/ServiceLearning/ClimateChangeActionProjects/NaturalResourceAwareness/tabid/332/Default.aspx

Let's Join Our Hands for Forests

Level 1 2 3

Aim

To encourage action regarding forest **conservation**.

Materials

Poster boards, colour markers, adhesive tape, your group might need additional materials if they choose to make their own activity.

Time

40 minutes. Your group might need some extra time if they choose to make their own activity.

Background

The United Nations General Assembly declared the year 2011 as the International Year of Forests, their main objective was to raise awareness of sustainable management, **conservation** and sustainable development of all types of forests. Although the International Year of Forests has passed, that doesn't mean that we should stop raising awareness about forest issues!

How to do it

1. Remind your group that many events were organized to celebrate the International Year of Forests and that now it is their turn!
2. Explain to them that they are organizing a *Let's Join Our Hands for Forests* campaign to invite everyone at their school or youth group to host an event regarding forest protection and **conservation**.
3. Have your group make some cool posters to advertise your activity. Make sure you include all the necessary information:
 - Theme of the campaign
 - Date of the event
 - Objective of the event

And you could also include some ideas and facts to encourage participation:

- Forests cover 31 percent of our total land area.
- Forests are among the most biologically rich terrestrial **ecosystems**, they care

home to 80 percent of our terrestrial **biodiversity**.

- 30 percent of forests are used for production of wood and non-wood products.
- Forests are home to 300 million people around the world.
- The livelihoods of 1.6 billion people around the world depend on forests.

Source: United Nations International Year of Forests 2011, Events,
www.un.org/en/events/iyof2011/

4. Also, ask them to include in their posters a space for the other classes or groups to write down their planned activities for the day of the event.
5. Review the ideas everyone has written down and analyze how creative and caring everyone was! Your group can also organize their own activity!

Here are some ideas:

- Tree planting.
- Park clean-up.
- Round tables regarding forest use and **conservation**.
- Invited guests.
- Role plays.
- Songs or story writing.

Be creative!

6. Place the posters and papers all around your school or youth group. Make sure everyone hears about it!

Discussion

How did your school or youth group feel about this activity?

How important do you think it is for people to motivate others to make a change and encourage action?

How do you think your campaign contributed to do this?

Let's Compare our Feet, Noses, Ears...

Level 1 2

Aim

To identify and compare one aspect of animal anatomy across various **species**.

Materials

10 photographs of different animals.

Time

30 minutes.

How to do it

1. Explain to your group that you are going to study and compare one aspect of animal anatomy as it appears among various animal **species**. For example, you could compare the feet, noses, ears, eyes, mouths, tails, fur, whiskers, or any other aspect of animal anatomy.
2. After your group has chosen the specific part of the animal they wish to compare, explain that once they begin the activity, they must note the particular differences from one **species** to the other and how these represent adaptations to the particular animal's **environment** and needs, behaviour, and integration with the rest of its anatomy.
3. Divide your group into two teams. Have the teams sit in a circle and give five images to each one. Ask them to compare the specific part of the animal they selected among the different animals they received and to write down any interesting points and conclusions.
4. Have each group present their work.

Discussion

Where you able to discover some interesting aspect of any specific animal?
Regarding the specific part of the animal you selected, which animal is more similar to human anatomy?
How do the different animal adaptations help them survive in different **habitats**?

Source: Convention on Biological Diversity, Biological Diversity for Kids, Educator's Corner, Educator's Package, kids.cbdlint/EducatorsPackage.pdf

Tree Hunt

Level 1

Aim

To reflect about the incredible forms of nature.

Materials

An open space with trees, pencils, notebooks.

Time

20 minutes.

How to do it

1. Take your group to an outdoor setting and explain to them that they will be going on a tree hunt.
2. Tell the participants to walk around and look for the following trees:
 - Trees in strange shapes.
 - Trees twisted by vines.
 - Trees lumpy with burls.
 - Trees growing in unusual places.
 - Trees that serve as a home for other plants and animals.
3. Ask the participants to use their notebooks to draw their trees, so they can show them to the rest of the group.
4. Have each participant present his/her findings and say three things they enjoyed about their tree hunt.

Discussion

Where you able to identify other special characteristics about your trees? How might they have gotten that way?
What are the benefits of enjoying time outdoors?
Why is it important to protect nature around us?

Your Own Toad House

Level 1 2

Aim

To make a toad house.

Materials

An outdoor setting, 3 or 4 plastic flowerpots, permanent marker, scissors, fist-sized rocks, damp socks or rags.

Time

20 minutes.

How to do it

1. Remind your group that toads enjoy cool and moist places where they can be safe and hide from their predators. Explain to them that they are making their own toad houses.
2. Divide your group into three or four teams and ask each one to use a marker to draw a door on the top edge of the flowerpot. Tell them to make the door about as big as a small lemon.
3. Using scissors, ask the teams to cut along the marked line.

4. Take your group outside and find a cool, shady area. Ask the teams to place their flowerpots upside down.
5. Have them put the rocks on top of the pots to keep the pots from blowing over on a windy day.
6. Finally, place a wet sock or rag inside the toad houses to keep the shelters cool and moist.

Discussion

What makes this a good house for a toad?
 Can you think of other ideas of how you can encourage toads to choose your garden as their home?
 How do you think toads benefit your garden?

Source: National Wildlife Federation, Kids, Your Big Backyard, Fun, Crafts, Toad House, www.nwf.org/Kids/Your-Big-Backyard/Fun/Crafts-and-Activities/Amphibians-and-Reptiles/Toad-House.aspx

Curly Snakes

Level 1

Aim

To learn about and have fun with snakes.

Materials

Cardboard tubes (paper towels tubes are fine), pencils, brightly coloured poster boards, scissors.

Time

30 minutes.

Background

Have you ever wondered where snakes live? Well, snakes can live almost anywhere, there are snakes all over the world; they can be found in Asia, Europe, Africa, Australia and America. Snakes have adapted to many different **environments**, they can thrive in rainforests, prairies, rivers, grasslands, caves, or even in deserts. Snakes live on the ground, in trees, and in water.

How to do it

1. Explain to your group that they are making their own snake armband!
2. Give some cardboard tubes to the participants and ask them to cut a ring about 5 cm wide. Make sure the tubes' diameter is appropriate for the participants' upper arm. Have them cover the ring with a piece of colourful poster board.
3. Ask them to draw a snake shape on a piece of poster board, cut out the shape and glue it onto the ring.
4. Tell the participants to decorate their snakes with spots or stripes cut from other cool colours of poster board. Finally, tell them to glue two eyes and a tongue on the snake's head. Now, they are ready to have some snake fun!

Discussion

Have you ever seen a real snake? How did you feel?
 Why do you think people are generally afraid of snakes?
 Why are snakes important for our **environment**?

Conservation Time!

Level 1 2 3

Aim

To learn about conservationists and **conservation** organizations.

Materials

Guest speaker, papers, pencils.

Time

A 10 minute lesson to explain the activity and to prepare some questions for the guest speaker, and another 40 minute lesson to receive him/her.

How to do it

1. Invite a representative from a **conservation** organization to your school or youth group, so he/she can talk about the initiatives and projects that are being developed to try and save **endangered** animals in your country, terrestrial and aquatic.
2. Before that day, make sure you encourage your group to think about the things they might want to know and help them prepare some questions.

Discussion

What are some of the different means that humans can use to protect biological diversity (legislation, petitions, public awareness, volunteering, etc.)?
Why do you think the work of **conservation** groups is so important?
Have you heard about other **conservation** organizations in your country?

The Life of a Sea Turtle

Level 1 2 3

Aim

To learn about a sea animal and the relation to its **environment**.

Materials

Information card provided below, papers, pencils.

Time

1 hour.

How to do it

1. Explain to your group that they are writing a short fictional story about a sea animal, a *Loggerhead Sea Turtle!*, and its interaction with the **environment**.
2. Have your group read the information card provided below and ask your group to write the story from the point of view of the sea turtle. Tell them to be creative!
3. Have each one read their story.

Discussion

What are the particularities of this **species**?
What are some threats these sea turtles might face during their life?
What are the interactions they might have with human beings?

Loggerhead Sea Turtle

The Loggerhead is a coloured sea turtle that got its name because of its oversized head that looks like a big log. These turtles live in oceans all over the world, except in the coldest seas. A loggerhead sea turtle can live to be more than 50 years old in the wild. For the first 7 to 12 years of its life, a young loggerhead lives far out at sea. As hatchlings, they find the ocean currents that will carry them away from shore. Only when they are older do the sea turtles live or linger in waters nearer shore. Adults often live in bays and estuaries.

Loggerheads have powerful jaws, which they use for crushing prey like conchs, horseshoe crabs, and other animals with hard shells. They also eat softer foods like jellyfish, fish, seaweed, and brown algae called sargassum.

Loggerheads are threatened by many things: predators (such as sharks), pollution, human development in the turtle's nesting areas and fishing nets.

A female loggerhead sea turtle may travel thousands of miles to return to the beach where she hatched as a baby to lay her own eggs as an adult. Male turtles never return to the shore unless they are sick or injured. A loggerhead female generally nests every two to three years. On average she will lay four times in one nesting season. Each time, she comes ashore and uses her front flippers to clear a spot in dry sand. Then she uses her hind flippers to dig her nesting hole. She positions herself so that her eggs fall gently into the hole as she lays them. Even in the buried nest, the loggerhead eggs may fall prey to hungry raccoons or wild pigs that dig them up. But the eggs that remain undisturbed hatch about 60 days after being laid. The hatchlings face many dangers on their way to the water, they might face raccoons once again, crabs, birds, and other predators.

By instinct, hatchlings head toward the brightest horizon, which is normally the horizon over the sea. But in places where there is human development, like stores or houses, the bright light from these areas draws the turtles away from the sea instead of toward it. Babies that head toward the artificial light usually die.

Laws prohibit people from harming loggerheads and other sea turtles. Sea turtles live in the water, but they must surface to breathe. And when they do, they can get hit by boats. They also frequently get tangled in fishing nets and drown.

Source: national Geographic Kids, Animals, Creature Features, Loggerhead Sea Turtles,
<http://kids.nationalgeographic.com/kids/animals/creaturefeature/loggerhead/>

Threatened Animals Crossword!

Level 1 2

Aim

To learn about threatened animal **species**.

Materials

A copy of the crossword provided below, notebooks, pencils.

Time

30 minutes.

Background

The International Union for Conservation of Nature (IUCN) has created a Red List of Threatened Species, which is widely recognized as the most comprehensive, objective global approach for evaluating the **conservation** status of plant and animal **species**. The different categories of threatened **species** include:

- **Extinct**: cannot be found anymore.
- **Extinct in the wild**: captive individuals survive, but there is no free-living, natural population.
- **Critically endangered**: faces an extremely high risk of **extinction** in the immediate future.
- **Endangered**: faces a very high risk of **extinction** in the near future.
- **Vulnerable**: faces a high risk of **extinction** in the medium-term.
- **Near threatened**: may be considered threatened in the near future.
- **Least concern**: no immediate threat to the survival of the **species**.

The more general term used by the IUCN for **species** at risk of **extinction** is threatened **species**, which includes the less-at-risk category of vulnerable **species** together with **endangered** and critically **endangered**.

How to do it

1. Discuss with your group threatened **species**. Have them write down their own meaning.
2. Give a copy of the crossword to each participant and ask them to find the correct words, these are all related to threatened animal **species**:

Across

1. This word describes a **species** in danger of becoming extinct.
2. This is the largest animal that has ever lived and it is **endangered**! Although often thought of as a giant fish, it's actually a mammal. It has a colour in its name.
3. This threatened animal is the largest cat in the Western Hemisphere. It's often confused with the leopard (both have spots). There is a car with the same name.
4. This word means that a **species** no longer exists.
5. This is a small **endangered** marine animal and it is the only mammal, other than primates, known to use tools, such as rocks, mainly to get food out of shells. Its name has two words.

Down

6. This **endangered** animal is the largest of the apes and lives in the tropical forests of Africa. It has darkly coloured fur.
7. The place where a plant or animal lives that provides what it needs to survive.
8. This animal is threatened because it often gets caught up in fishing nets in the ocean. Its name has two words. It moves very slowly on land.
9. This big, **endangered** animal lives in Africa and it is well known by its two horns located on its head. It is often referred to as black, but it is actually more grey-brown in appearance.
10. The diverse and amazing variety of all life on Earth.

3. Review the answers with the whole group.

Answers: 1) **Endangered**, 2) Blue Whale, 3) Jaguar, 4) Extinct, 5) Sea Otter, 6) Gorilla, 7) **Habitat**, 8) Sea Turtle, 9) Rhinoceros, 10) Biodiversity.

Discussion

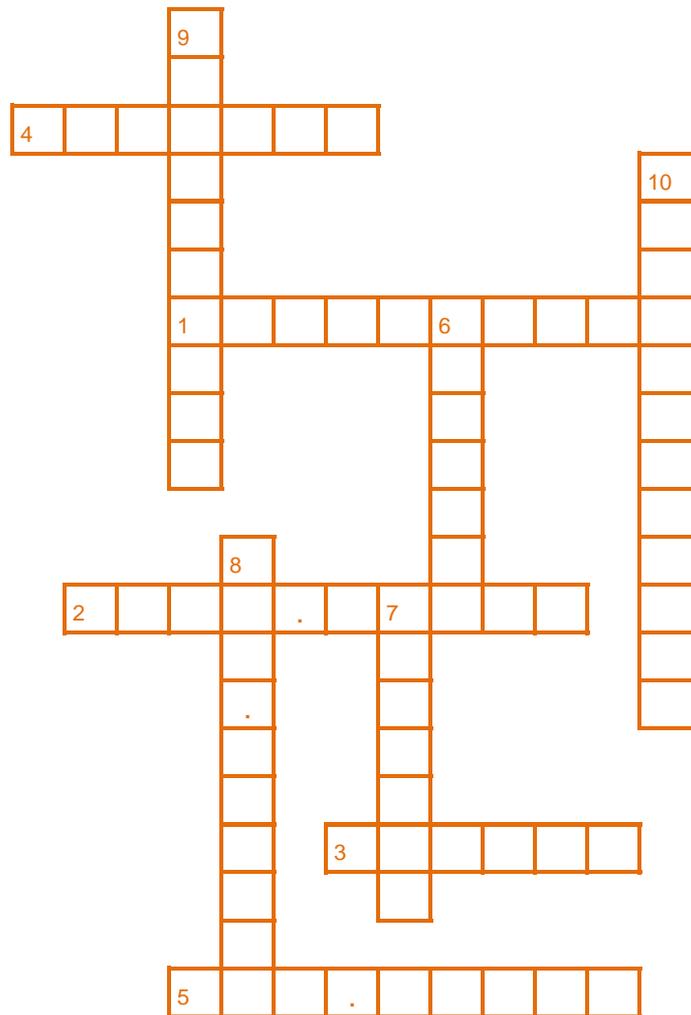
Have you heard about other threatened animal **species**?

Why is each animal and plant **species** important for our world?

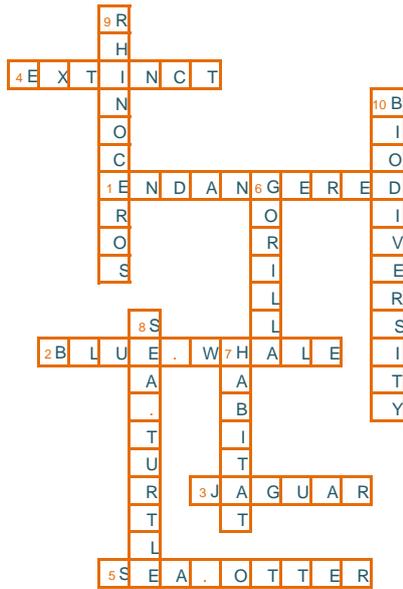
How is **biodiversity** affected when an animal becomes extinct? What can human beings do to prevent this?

Source: Kids Planet, Cool Stuff, Kids activity Book, Wild Animals That Need Our Help,
www.kidsplanet.org/coolstuff/kids_activity_book_2007.pdf, page 21.

Threatened Animals Crossword!



Solution:



Threatened Species!

Level 1 2 3

Aim

To reflect on a threatened **species** and understand what is necessary for their survival.

Materials

Whiteboard, whiteboard markers, information card provided below.

Time

40 minutes.

Background

Threatened **species** are any **species** (including animals or plants) which are vulnerable to endangerment in the near future. An **endangered species** is a population of **organisms** that are still alive, but very few of them remain. This **species** is at risk of becoming extinct or disappearing forever because it is either few in numbers, or threatened by changing environmental or predation conditions.

How to do it

1. Explain to your group that now that they know more about **biodiversity** they are going to focus on understanding the life of a specific **species** that is threatened.
2. Ask your group to sit in a circle. Have a participant read out loud the information card. Discuss why the **species** in their information card is threatened.
3. Finally, ask your group to brainstorm what the **organisms** need to survive each day and write them in the whiteboard.
4. To finish, have each participant write a concluding idea and ask each one to read it to the rest of the group.

Discussion

Why is it important to protect threatened **species** from different **ecosystems**?
What are some of the ways people can help to protect threatened **species**?
Have you heard about a extinct **species**? Why would it be good to still have it around?

Source: Earthrangers, Bring Back the Wild, Junior Lesson Plan 2, A Day in the Life...,
www.earthrangers.com/bbtw/content/documents/Junior/Grade4/Junior_LessonPlan_2.pdf

The Grizzly Bear

The Grizzly Bear is sometimes called the Silvertip bear. It is typically brown and its back is often silver-tipped and appears grizzled – hence its name. This bear is a powerful animal that lives in the uplands of western North America. It has large teeth, powerful jaws, and long claws. It weighs 100 kg to 500 kg, and males are usually twice as heavy as females. Grizzly bears can live 25 to 30 years.

The Grizzly Bear can be found in the North American continent and most live in Alaska and western Canada. This bear is a habitat generalist, this means that it occupies a variety of environments: from partly enclosed bodies of water along the coast to alpine forests in the Rocky Mountains. As a result of being able to live in a number of different environments, the Grizzly Bear's diet is diverse. It eats large and small animals (bison, elk, caribou, deer, salmon, and trout) as well as seasonal berries (blueberries and blackberries), roots, and grasses. Being a large, powerful omnivore, a fully-grown Grizzly Bear is not preyed upon by other land species. These bears have no natural enemies, but are **endangered** due to poaching and loss of habitat. When you have a home as beautiful as the Grizzly Bear's, everybody wants to live there. But more people would bring in a lot of traffic and disrupt the species there, including the Grizzly Bear.

Extinction Impact!

Level 2 3

Aim

To learn about the impact of **extinctions** in an **ecosystem**.

Materials

Notebooks, pencils.

Time

40 minutes.

Background

When there are no more animals of a particular **species** left alive on our planet, that **species** is said to be extinct. In the past, many animal **species** became extinct because of natural causes. But ever since human beings have been on Earth, and especially in the last hundred years, animal **species** have become extinct because of hunting, pollution, or **habitat** destruction. Many animals are now in danger of disappearing forever.

How to do it

1. Explain to your group that you are talking about animal **extinction** and its impact in an **ecosystem**.
2. Choose an **ecosystem** you have studied and remind the participants all about it!
3. Have your group sit in a circle and ask them to choose an animal **species** that lives in that **ecosystem**.
4. Ask them to think about the following questions:
What would happen to your **species** if humans built lots of roads in the **ecosystem** where they lived?
Expected responses:
 - Less food and shelter available;
 - Risk of getting hit by cars;
 - Weaker **ecosystem**;
 - Many **species** would leave.

What would happen to your **ecosystem** if a new predator **species** was introduced that

had no known predators?

Expected responses:

- More consumers (the prey to the new predator) would likely disappear;
- Less food for native **species**;
- Weaker **ecosystem**;
- Other predators and **species** would leave or be pushed out.

What would happen to your **ecosystem** if _(choose an animal **species**)_ were taken out of the **ecosystem**? Answers will greatly vary depending on the **species** chosen but should include some of the following information for each type of **species**:

Producers	Consumers	Decomposers
Consumers would die	Over-population of producers	Waste piles up no nutrient recycling
The ecosystem would collapse	Reduced variety of decomposers	Spread of disease Ecosystem would collapse

5. Discuss the importance of preserving our environment.

Discussion

Can you list at least two impacts that would result from your **species** becoming extinct?
Could your **ecosystem** continue to exist without your **species**? Why or why not?
How can you get involved in the preservation of your local **environment**?

Source: Earthrangers, Bring Back the Wild, Primary Lesson Plan 3, Extinction Impact in an Ecosystem,
www.earthrangers.com/bbtw/content/documents/Primary/Grade1/Primary_LessonPlan_3.pdf



Useful resources

Convention on Biological Diversity - Youth

www.cbd.int/ibd/2008/youth

Field Museum - Underground Adventure

<http://archive.fieldmuseum.org/undergroundadventure/index.shtml>

Soil-net

www.soil-net.com

Oxfam

www.oxfam.org.uk/education

Globio

www.globio.org

Friends of the Earth

www.foe.co.uk

Agriculture in the Classroom

www.agclassroom.org

Earth Matters

www.earthmatters4kids.org



Our World

Introduction

Biodiversity is all around us! Just look to your side, above your head or beneath your feet. We can find an incredible variety of plants, animals and **microorganisms** in different **ecosystems** around the world. Of course we cannot forget about genetic diversity which makes every living thing unique and allows different populations to adapt to changing **environments**. The great variety of life on Earth is a true wonder, and we depend on it for our health, livelihoods, and economic development.

Learning about **biodiversity** is important to understand how humans should live while respecting the Earth's finite resources. When we talk about **ecosystems** we are talking about our life-support systems. All living **organisms** benefit with a multitude of resources and processes that are supplied by healthy **ecosystems**, collectively, these benefits are known as **ecosystem** goods and services. Among the goods and services we obtain from nature we can mention: clean air, abundant fresh water, energy, nutritious food, fibre, medicines, pollutant filtration, waste decomposition, crop pollination, disease regulation, protection from natural disasters, cultural services, recreation opportunities... and much more.

The importance of biological diversity to human beings is hard to overstate. It is estimated that 40 percent of the global economy is based on natural products and processes. We all need food, water, energy, homes and other materials to live. All these demands are met by a few sectors like: agriculture, fisheries, forestry, industry, water and energy. The problem is that the way we meet these needs are threatening an amazing number of plants, animals and **habitats** all over the world. Our everyday decisions, like the things we buy, the food we eat or how we travel, can have negative consequences on our planet's health, and, therefore, on us.

We have a big and complex world and new **species** are discovered all the time. Unfortunately scientists believe that out of the 100 000 000 different **species** on Earth, 10 000 **species** go extinct each year, and the worst part is that a single **species** appears to be almost entirely responsible for this, ours! The main causes of **biodiversity** loss are our increasing population, increasing use of resources and, in consequence, increasing pollution. Specifically, **habitat** destruction, over-exploitation, pollution and **climate change** are the main causes of environmental decline.

Experts agree that our behaviour has changed the world more rapidly and extensively in the past 50 years than in any other period of human history. Currently, human beings are using more resources than nature can regenerate in a year. Many have affirmed that the loss of **biodiversity** is the biggest threat to world stability and security today. It can cause **ecosystems** to become stressed or degraded, and even eventually to collapse. This threatens the continued provision of **ecosystem** services, which in turn threatens **biodiversity conservation**. Moreover, the impact will be felt most directly by the world's poor as they will not have access to clean water, sufficient and adequate food, and other natural resources needed to lead a prosperous life.

Biodiversity loss is a big problem that concerns all of us. People have already borrowed too much from nature and now it is time for us to care for the planet that sustains us. Providing children and youth with useful information about the dangers faced due to irresponsible human activities and developing awareness will help them to identify what needs to be changed and what actions they can take to promote the creation of a world that is healthier and more equitable. The activities below will help young people to realize they can be responsible global citizens that play a very important role in the promotion of a green world.

Discover!

Biodiversity Fun

Level 1

Aim

To encourage **biodiversity** observation.

Materials

An outdoor setting, B-I-O-D-I-V-E-R-S-I-T-Y cardboard letters.

Time

30 minutes.

How to do it

1. Take your group to an outdoor setting and divide into six teams.
2. Assign two letters to each team and ask them to think about names of any living things that begin with the letters they are holding.
3. Ask each team to write down the names they come up with for each letter, so they can share them with the rest of the group. Let the teams continue until they run out of names/time.
4. You can make this more difficult by limiting the selection of names to your local wildlife.
5. Finally, ask the teams to join their letters and discover the hidden word, BIODIVERSITY!
6. Have your group remind you what **biodiversity** is.

Discussion

What is the role of living things and their place in our lives? How do they help us? Think about the different functions they provide. (e.g. pollinate plants, provide food (directly or indirectly), clothing materials, construction materials, medicine, control insect pests, purify air/water, etc.)

Source: Scottish Natural Heritage, Nature on Your Doorstep, Activity 1, Biodiversity Begins Here, www.snh.gov.uk/docs/A402704.pdf

This is My Habitat

Level 1 2 3

Aim

To reflect on different **habitats**.

Materials

An outdoor setting, papers, pencils.

Time

40 minutes.

How to do it

1. Remind your group about the many and beautiful **habitats** we have on our planet, have them write their own meaning.
2. Explain to your group that they are writing a story about a **habitat**. They can choose between two options:
 - They can imagine they are showing an animal friend around their own **habitat** (their home or neighborhood): a panda bear, a kangaroo or why not a blue whale! Or,
 - They can imagine they are some small creatures only an inch tall living in a spider web, a tree hollow, a pond, a nest, a pile of rocks, a hive, or hole in the ground, and that they are showing a human friend around their **habitat**.

3. Ask them to write a story or skit about taking the animal/human on a tour of their **habitat**, introducing it to their friends and family, and explaining how they move around, get food, take care of the young, and have fun.
4. Tell each participant to share their story.

Discussion

What makes each **habitat** so special?
 Why does our world need many different **habitats**?
 What do you think is the most special aspect of your **habitat**?

Creatures by the Foot

Level 1 2

Aim

To discover which creatures are living in the backyard.

Materials

Yardstick, string, scissors, garden trowel, pencil, counting creatures chart.

Time

40 minutes.

How to do it

1. Explain to your group that they are going to conduct a simple creature survey in a 1 metre square grid.
2. Cut four 1 metre pieces of string. Locate a grassy area, flowerbed, or other place with **vegetation** outside, and use the string to mark off a 1 metre square.
3. Help your group to find and count different types of insects, worms, or other creatures within the square. Be sure to look beneath the grass, on plant leaves, and under rocks. Consider using a garden trowel to dig up a bit of soil and look for worms. Some creatures you are likely to find include ants, grasshoppers, beetles, and earthworms.
4. Take the counting creatures chart with you and make a hash mark for every creature you find. The participants can draw pictures of the creatures, and write in the creatures' names.
 *You could use a field guide to help identify any unfamiliar insects.
5. After you and your group have counted the creatures in one square metre, ask the participants how many creatures they think might live in two square yards. Have the participants count the hash marks two times to come up with a rough idea. Explain that scientists guess, or estimate, the number of insects in a large area the same way they just did.

Counting Creatures Chart

Name	Number Seen	Total	Picture
Ladybug	III	3	

Note:

The bug-counting technique in this activity is not unlike a method scientists use to gauge insect populations. They just study a larger sample area. By counting insect populations in a specific-size plot and multiplying the insect totals by the number of specific-size plots a **habitat** contains, scientists can estimate insect populations for an entire forest or meadow, for example.

Discussion

How many different kinds of insects did you find? Were you able to hear some of the noises they make?

Which bugs crawl upwards? Which ones hide under cover? Were any of the bugs nibbling on plants?

Do certain bugs chase other bugs?

Why are bugs important for our gardens?

Source: National Wildlife Federation, Big Backyard, Fun, Outdoors, Observing Wildlife, Creatures by the Foot, www.nwf.org/Kids/Your-Big-Backyard/Fun/Outdoors/Observing-Wildlife/Creatures-by-the-Foot.aspx

Similarities and Differences

Level 2 3

Aim

To compare and contrast different plant and/or animal **species**.

Materials

Whiteboard, whiteboard markers.

Time

30 minutes.

How to do it

1. Explain to your group that they will use Venn diagrams to record similarities and differences between two animals or two plants.
2. The diagram consists of two overlapping ovals. Label each oval with one animal or plant's name. Then ask the participants to list traits the two animals or plants have in common in the overlapping area and differences outside it. You could even compare an animal and a human!
3. Here are some clues about the things all living beings need to survive:
 - Shelter
 - Food
 - Water
 - Air
 - Space/place to raise their young

Discussion

Why can we say that all living beings have similar characteristics?

What are these similarities?

How are humans similar to animals?

How do plants and animals contribute to our health and well-being?

What has changed?

Level 1 2 3

Aim

To discover how **biodiversity** has changed in local neighbourhoods.

Materials

Notebooks, pencils.

Time

A 30 minute lesson to explain and prepare the activity and another 40 minute lesson to review the outcomes.

How to do it

1. Explain to your group that they will transform themselves into **biodiversity** loss detectives and that they will be in charge of discovering how different aspects of **biodiversity** have changed over time.
2. Tell the participants that their homework will consist of interviewing an elder member of his/her family or community to learn about their perspective and

the changes they have seen developing over their lifetimes regarding **biodiversity** loss. For example, perhaps water used to be plentiful but now it is scarce, trees have disappeared in the neighbourhood, birds do not visit the gardens anymore, or fruits do not taste the same.

3. Support your group to develop a set of questions to pose in the interviews and help them consider all aspects of community life that could be affected by **biodiversity** loss.
4. Ask them to present their interviews in a fun way, maybe a diary entry, a letter or a short story.
5. Have each participant read and share their work.

Discussion

What do you think is the most serious change your community has experienced?
What do other people see as the key challenges to **biodiversity**?
What can you do or avoid doing to help **biodiversity** in your neighbourhood?

Biodiversity Comparison

Level 1 2 3

Aim

To compare the **biodiversity** found at a natural site to the **biodiversity** found in their school or youth group grounds.

Materials

An excursion site (suitable sites for your excursion include places such as national parks, environmental education centers, local forests, local parks, native gardens or remnant **vegetation** on farms), notebooks, pencils.

Time

2 or 3 hours depending on the location of the excursion site.

Background

Sites in your local area that still include remnants of original **vegetation** are likely to contain a greater range of **biodiversity** than your school or youth group. These sites provide an opportunity to compare human-influenced **biodiversity** to that found in a 'natural' site.

How to do it

1. Explain to your group that you are visiting a natural **ecosystem** and ask them to describe what they think this **ecosystem** will look like and what its main features are.
2. Invite an expert on the area you are visiting to speak to the participants. Let this person know that they will be interviewing him/her about what he/she does to manage **biodiversity**.
3. With the help of your expert, start your **biodiversity** survey! Ask him/her to provide an insight into how the area has been and still is used, and the changes that have occurred over the past years. While conducting the survey, ask the participants to interview the guide using the following questions:
 - What kinds of **biodiversity** do you look after?
 - Why is the **biodiversity** you look after important?
 - How do you improve **biodiversity** where you work?
 - What are some threats this **ecosystem** might face?
4. Once the excursion is done, re-examine the participants' description of the **ecosystem** and compare the differences between their descriptions and reality.

Discussion

Is the **biodiversity** found in the natural site similar or different to what we can find at school or youth group?
Did you find the same number of animals in both sites?
Which site had the greatest amount of **biodiversity**?

What would help explain these differences? - Link initial plant diversity survey to animal diversity. That is, the greater the variety of plant layers and **habitat** components, the greater the variety of animals.

What could be done to help improve **biodiversity** in your school or youth group?

Source: NSW Biodiversity Strategy, Biodiversity for Kids, Teacher's Guide, Biodiversity Comparison, www.environment.nsw.gov.au/resources/education/BiodiversityTeachersGuide.pdf, page 32.

Species are Interconnected

Level 1 2

Aim

To understand the interdependence among all living things.

Materials

An outdoor setting, ball of wool, 26 small flags made with cardboard taped on cocktail sticks.

Time

40 minutes.

How to do it

1. Explain to your group that they will be researching plant and animal **species** found in their school or youth group grounds.
2. Divide your group into five teams and assign five letters of the alphabet (of course one team will get six letters) to each team.
3. Ask the teams to find any living things in the outdoor area that begin with the letters they have. Each team must write the names of their living things on their flags, and leave the flags on the place where they found such **species**.
4. Have the teams take the others on a guided tour, where each team introduces their bit of the **biodiversity** alphabet.
5. Next, ask your group to stand in a circle. Assign any plant or animal **species** to each participant; make sure you include different types of **species**: bugs, birds, flowers, trees, etc.
6. Use the ball of wool to make connections between **species**. For example, were any bugs found on a plant (or eating it)? The plant participant must pass on the wool to the bug participant, holding on to the free end. Would a bird eat a bug? The participants must continue passing on the wool. As participants join up the wool, they can discover that **species** are closely interconnected.

Discussion

Was it hard for you to find some **species'** names for your **biodiversity** alphabet? Which letter was the hardest one?

Do you think your school or youth group needs to improve its grounds to make it better for wildlife? How can you support **biodiversity** at your school or youth group?

How would you describe the connections between all living things, including human beings?

Source: Scottish Natural Heritage, Nature on Your Doorstep, Activity 5, Species Hunt, www.snh.gov.uk/docs/A402708.pdf

Smelly Science

Level 1 2

Aim

Learn how some animal mothers and babies use their sense of smell to identify each other.

Materials

Empty film canisters (or similar containers with lids), cotton balls (one per participant), selection of fragrances: perfume, air freshener, clear liquid soap, liquid sweetener (enough for half of the participants).

Time

20 minutes.

Background

Mother animals can easily recognize their babies. These little creatures need their mother's constant care and attention; therefore, close contact is essential. The mother animal uses all five senses to recognize her babies, that is, smell, sound, touch, taste and sight. The majority of the mammals can separate their young from others by their particular smell. The special smell helps the mother to tell her baby from another animal's baby.

How to do it

1. Take half of the cotton balls and place a different scent on each ball. Then drop each ball into its own canister and seal it shut. Put this group of canisters aside.
2. Repeat this step with the remaining cotton balls to make an identical set of smells.
3. Separate the participants into two teams: *Mothers* and *Babies*.
4. Distribute one set of canisters to the mothers and one set to the babies. Make sure each participant gets a canister.
5. Explain to everyone that many animal babies have their own special smell. The special smell helps a mother to tell her baby from another animal's baby. The smell can also help her to find her baby when it is lost. Tell each mother to open her canister and sniff the special smell of her baby. Ask the mothers to find their babies by matching the scents in the canisters with those in the baby canisters.
6. After the mothers have found their babies, mix up the mother canisters and redistribute them to the mothers. Do the same for the babies' team. Now let the babies find their mothers.

Discussion

How did you keep from getting your smell mixed up with the other smells? (Possible answers: Kept smelling it; kept thinking about the smell in my head; the smell reminded me of something).

How do you think a mother animal might remember her baby's scent? (Possible answers: She smells the baby a lot so she won't forget the smell; she thinks about the smell a lot.)

Which smells make you remember a special person or occasion?

Source: National Wildlife Federation, Kids, Your Big Backyard, Fun, Games, Smelly Science, www.nwf.org/Kids/Your-Big-Backyard/Fun/Games/Smelly-Science.aspx

Identify Leaves

Level 1 2 3

Aim

To learn about the different plants and trees found in your neighborhood.

Materials

An area with trees and plants, shopping bag, sheets of white paper, black or brown crayons, adhesive tape.

Time

40 minutes.

How to do it

1. Explain to your group that you are going on a leaf lookout!
2. Take your group to an outdoor area, and ask them to help you gather some leaves from several different types of plants and trees. Tell them to put the leaves in a bag.
3. Have your group sit in a circle, pull the leaves out of the bag and take a close look at each one. Identify what is special or different. Are the edges smooth or rough, or is a leaf like a needle? See if they can match it to a tree.
4. Using some white paper and a crayon, ask the participants to make some bark rubbings of some of the trees. They must just press the paper to the bark and rub the crayon lightly over it.
5. Tell the participants to organize their leaves and their rubbings to make their own leaf book, complete with the leaves, the names of the plants and trees the leaves come from, and their bark rubbings.

Discussion

Where you able to find many different types of leaves? What does this tell you? Does each leaf have particular characteristics? Why do you think this is? How do plants and trees vary depending on the time of the year and **climate**?

Sources: National Wildlife Federation, *Get Outside, Be Out There*, Activities, Observe and Explore, Identify Leaves
www.nwf.org/Get-Outside/Be-Out-There/Activities/Observe-and-Explore/Identify-Leaves.aspx

Yummy Aquifers

Level 1 2 3

Aim

To learn about the geological formations in an **aquifer**, how pollution can get into groundwater and how pumping can cause a decline in the water table.

Materials

Blue/red food colouring (or substitute with red, grape or orange soda); vanilla ice cream; clear soda pop; small gummy bears, chocolate chips, crushed cookies, cereal, crushed ice or other material to represent sand and gravel; variety of coloured cake decoration sprinkles and sugars; drinking straws; clear plastic cups; ice cream scoop; spoons.

Time

30 minutes.

Background

When rain falls to the ground, the water does not stop moving. Some of it flows along the surface to different water bodies such as streams or lakes, some of it is used by plants, some evaporates and returns to the **atmosphere**, and some sinks into the ground.

Groundwater is water that is found underground in the cracks and spaces in soil, sand and rock. Groundwater is stored in -and moves slowly through- layers of soil, sand and rocks called **aquifers**. **Aquifers** consist of gravel, sand, sandstone, or fractured rock. These materials are permeable because they have large connected spaces that allow water to flow through. The speed at which groundwater flows depends on the size of the spaces in the soil or rock and how well the spaces are connected.

The area where water fills the **aquifer** is called the saturated zone. The top of this zone is called the water table. The water table may be located only a foot below the ground's surface or it can sit hundreds of feet down. The water table may be deep or shallow; and may rise or fall depending on many factors. Heavy rains or melting snow may cause the water table to rise, or heavy pumping of groundwater supplies may cause the water table to fall.

How to do it

1. Explain to your group that you are constructing an edible **aquifer**!
2. Ask the participants to help you build the **aquifers**:
 - Begin by filling a clear plastic cup one-third full with gummy bears, chocolate chips, or crushed ice, which will represent the gravel, sand and rocks.
 - Add enough soda to just cover the candy/ice. This is the groundwater. See how the "water" fills in the spaces around the gravel, sand, and rock.
 - Add a layer of ice cream to serve as a "confining layer" over the water-filled **aquifer**. Discuss what a confining layer is/does (a confining layer is usually made of clay or dense rock. The water is confined below this layer).
 - Then add more gravel and sand on top of the "confining layer."
 - Next, decorate with some coloured sugars and sprinkles to represent the porous, top layer of soil.
3. Next, have the participants add the food colouring to the soda. The food colouring represents contamination. Tell them to observe what happens when it is poured on the top of the "**aquifer**." Point out that the same thing happens when contaminants are spilled on the earth's surface.
4. Using a drinking straw, ask the participants to drill a well into the center of their **aquifers**. Tell them to slowly begin to pump the well by sucking on the straw. Watch the decline in the water table. Notice how the contaminants can get sucked into the well area and end up in the groundwater by leaking through the confining layer.
5. Finally, recharge the **aquifers** by adding more soda which represents a rain shower.
6. Review what you have learned as you enjoy eating your edible **aquifers**!



Discussion

Do people in your country use wells to obtain groundwater? Have you ever seen one? What are some sources of groundwater contamination? (Pesticides, fertilizers, motor oil, septic tanks, landfill leachate, chemicals from mining, industry and leaking storage tanks are some examples.)

Why is it important to avoid groundwater contamination? Can this contamination affect surface water? (Groundwater and surface water are connected; water can move from one to the other, a lake, for example, is under the direct influence of groundwater.)

Source: The Groundwater Foundation, Activities, Try This, Edible Earth Parfaits, www.groundwater.org/kc/activity5.html

Biodiversity and Food

Level 2 3

Aim

To reflect on food and its impacts on **biodiversity**.

Materials

Computer with internet access, notebooks, pencils.

Time

1 hour.

How to do it

1. Explain to your group that they are going to watch two short videos about **biodiversity** and food and how these two concepts are related.

The following videos can be found in the World Wildlife Fund (WWF) Video Gallery webpage:

Living in Harmony With Nature;

Healthy Diet for a Healthy Planet:

www.panda.org/wwf_news/multimedia/

2. Once the participants have seen the videos, start a roundtable discussion about the following topic: *Biodiversity and Food: Is it possible to find a balance?*
3. You will have the role of the facilitator to lead the discussion, to make sure the meeting is fluent and that every participant exposes his/ her point of view. Be sure everyone knows that at a round table all can talk equally. The facilitator can start the conversation by asking members to brainstorm about the issue. Usually once this gets started the group will take it over and the discussion will be successful.
*You could even invite some participants from other groups to join your discussion.
4. Make sure the groups reach some general conclusions at the end of their discussion.

Discussion

How could you explain the relation between food and **biodiversity** loss?
How can you help **biodiversity** through your food choices?
Which tasks would be harder to apply? Why?

Home-made Remedies

Level 1 2 3

Aim

To learn about how people use natural products for different household needs.

Materials

Paper, pencils.

Time

A 10 minute lesson to explain the activity and another 40 minute lesson to discuss about the outcomes of the interviews.

How to do it

1. Explain to your group how people use different natural products, such as plant parts, to make home-made remedies to heal different sicknesses or even to make beauty or cleaning products.
2. As homework ask each participant to conduct a small interview on an elder member of his or her family to find out about a home-made product that

this person used or continues to use, how he/she made it and what he/she used it for. Ask them to write down the “recipe” so they can share it with the rest of the group.

3. You could also make a couple of these home-made recipes and test them.

Discussion

Which recipe surprised you the most?

Do people continue using home-made remedies? In which places do you think people use them the most?

Why is this knowledge important for all of us? How might scientists use this knowledge?

Culture and Food

Level 1 2 3

Aim

To learn about food and cultural identity.

Materials

Notebooks, pencils.

Time

A 10 minute lesson to explain the activity and another 30 minute lesson to present the recipes.

How to do it

1. Remind your students how people from different countries have different traditions and culture, but they all use different elements from **biodiversity** to carry out their celebrations. For example, when preparing their traditional recipes.
2. Ask each participant to find a recipe of a meal that is prepared for a special date or occasion in your country. You can ask your mother or grandmother to help you.
*If your group can't find enough dishes to avoid repeating recipes, they can choose a meal that has a special significance to the participant and his/her family.
3. On a further lesson have each participant present his/her recipe and explain the relation between that food and cultural identity.
4. Maybe you could even prepare one of those recipes, so everyone can have a delicious meal.

Discussion

Where do the ingredients for your meal come from?

Why is this recipe important to your culture? Would this dish be served at a specific event? What is the significance of its ingredients?

Do any of the dishes have family stories or folklore behind them? What are they?

Our Green World is Changing Colour

Level 1 2 3

Aim

To discover different sources of pollution.

Materials

A small walk around the neighborhood, notebooks, pencils, poster board, colour markers.

Time

40 minutes.

Background

Our planet is changing because of us. One of the most serious threats to **biodiversity** is

pollution. Pollution occurs when harmful substances are released into an **environment** where they can have a negative effect on living and non-living things. Human activities can pollute both at a local or global scale and may affect air, water and soil - three precious natural resources.

Air can be polluted with smoke and gases from the burning of **fossil fuels** (from cars or factories for example).

Water can be polluted with sewage, fertilizers, rubbish, toxic chemicals from factories and oil.

Soil can be polluted with pesticides, fertilizers, waste, litter and toxic substances.

The pollutants we produce not only affect our own lives but also those of other living things, the plants and animals that we share our **environment** with. Pollution can change the growing conditions of these amazing **species**, degrade their **habitats** and put them at risk. It is our responsibility to take care of all of them. It is time for you to give a little bit of what you receive every day.

How to do it

1. Explain to your group that they are going on a *Pollution Exploration* of their school or youth group grounds or neighbourhood.

Make sure you take the necessary safety precautions!

2. Divide your group into two or three teams and tell them that their task is to discover signs of pollution. It can be sources or effects of pollution (dirty surfaces because of smoke or rubbish on the streets, for example). Ask them to write down their discoveries.
3. Once they are done, gather the entire group together to discuss their findings.
4. Finally, ask them to make a cool poster with some ideas to help prevent **biodiversity** pollution and destruction. Tell them to place the poster in a place where their entire school or youth group can see it!

Discussion

What do you believe is the main source of pollution in your school or youth group? What can you do to thwart the damaging effects of this pollution source and to prevent it?

No Running Water At Home!

Level 1 2 3

Aim

To realize how difficult life would be if you and your family did not have water access.

Materials

Notebook, pencil.

Time

One 10 minute lesson to explain the homework and another 30 minute lesson to review the outcomes.

Background

Less than 1 percent of all the water on the planet can be used by people, the rest is salt water (from the oceans) or is permanently frozen and we can't use it. We use water every day, but unfortunately water is not easily available in many parts of the world.

In some places, even if communities have water pipes and taps, water is supplied only for a few hours a day, in others places people have to collect their water supply from the village well, a community tap or hand pump. In other cases, women and children have to walk various kilometers each day to haul water. About 1.2 billion people don't have

access to clean water. As the population grows, more and more people need to use this limited resource. Therefore, learning how to care for it is very important.

How to do it

1. Explain to your group that you are giving them a homework which will help them and their families to realize how fortunate they are to have access to sufficient and clean water and how it is so important to save this precious resource.
2. Ask the participants to list as many uses for water as they can together with their families. Tell them to decide on their families' top five uses of water.
3. Tell the participants they must then talk to their families about people living in developing countries that do not have toilets, washing machines, dishwashers or any running water in their homes. Ask them to discuss with their families how they think people without access to running water use water differently from their families.
4. Next, tell the participants to pretend with their families that starting from the next day they will no longer have running water at home. Their families will only be able to get water from a well that is located two miles away from their homes. They will have to walk to and from the well to collect their water. Ask the participants to plan how their families will work together to bring the needed amount of water to their homes. Tell them to assign a role to each member of the family.

Family member: Duties:

Things to consider:

The family will need 60 litres of water each day. What container size should the family use? How much will these containers weigh? Does the family have younger siblings? Is everyone in the family capable of making the trip?

5. Make sure the participants reach some general conclusions with their families so they can share some ideas at school or youth group.

Discussion

What are the main water uses in your family? Where and when do you use water the most?

Do you think you and your family need to be more water conscious?

How would you and your family feel if you had to walk everyday to look for some water?

Who would be in charge of collecting the water?

How would this affect your current everyday activities?

Adapted from: Water Partners International, Global Water Supply, Elementary School Curriculum, "Water Has many Uses" Family Questionnaire, <http://static.water.org/pdfs/WPElemCurricFULL.pdf>

Forest Products

Level 1 2 3

Aim

To learn about forest products.

Materials

Computer with internet access, notebooks, pencils.

Time

One 40 minute lesson to start the activity and another 30 minute lesson to review the homework.

Background

In many forests around the world, logging is contributing to **habitat** destruction, water pollution, violence against the wildlife that lives there, and displacement of **indigenous peoples**, among others. Nevertheless, many consumers of forest products, and the companies that produce them, believe that the link between logging and these negative impacts can be broken, and that forests can be

managed and protected at the same time. It is time for you to start doing your part!

How to do it

1. Remind your group how important forests are for our lives, they provide us with different natural resources and, of course, they keep our planet healthy.
2. Have your group read the following article about uses of trees:

People and Trees,

A look at the many uses of trees

<http://sfr.psu.edu/youth/sftrc/lesson-plan-pdfs/people-trees>

3. Next, discuss the idea of forest stewardship (practice of sustainable forestry) and the importance of respecting our natural resources. Also, talk about the recreational opportunities in the forests and the responsibilities that are associated to them.
4. Assign a short homework for the next day. Ask the participants to inventory their lives (e.g., home, work, school, and recreation) for forest products.
5. The next day, ask them to make a big list of all the forest products they use on the whiteboard so they can see how much we depend on forests.
6. Finally, ask them to answer the following question in a small essay: How important is it to be an informed consumer and to make choices that positively affect our natural resources?
7. Have each participant read their essay.

Discussion

Which is your favourite forest product?

How deep do you think is human reliance on forest products?

Why can we say that all of us are forest stewards even if we do not own forestlands?

Non-Point Source Pollution

Level 1 2 3

Aim

To demonstrate what an average storm drain collects during a rainfall event and how the water from storm drains can impact the water quality and aquatic **environments** of local streams, rivers, and bays.

Materials

- Waterway: aquarium, rectangular box, water, watering can, spray bottle.
- Pollutant: green food colouring (pesticides/fertilizer), vegetable oil (motor oil), soil/sand/pebbles (erosion), grass clippings (or Shredded Paper), twigs, cafeteria waste and trash.

Time

1 hour.

How to do it

1. Introduce this activity with a discussion of storm drains and storm drain systems and their purposes. Discuss where the water and objects that float down into a storm drain go. Have your group list all of the things that they can think of that might enter a storm drain during a rain storm.
2. Fill the aquarium half-way with water and place it on an accessible area where it can be easily viewed by the participants. Cut a hole in the bottom of the box and place the box on top of the aquarium. The box represents the storm drain and the aquarium represents the waterway that the storm water mixes into after entering the storm drain. Leave the sides of the aquarium uncovered so that the students can view its contents.

3. Assign a group of participants to each pollutant. Discuss each pollutant, including its use or origin and how it could enter the storm drain.
4. Have each group place their pollutant into the storm drain. Use the watering can to create rain to wash the pollutant into the waterway. While washing each pollutant into the waterway, review the pollutant and its use or origin. Discuss the following questions: How does the pollutant damage the **environment**? Do the people who are responsible for the pollutant want to damage the **environment**? How can this type of pollution be stopped?
5. After adding all of the pollutants, examine the contents of the waterway. Discuss how the waterway has changed and how viewing this change makes the participants feel.

Discussion

What types of the pollution are natural?
 What types of pollution are added by people living in the local communities?
 How can we remove the pollution from the water?
 What could be done to stop pollutants from entering storm drains?

Source: United States Environmental Protection Agency, Environmental Education, Non-point Source Pollution.
http://water.epa.gov/learn/kids/drinkingwater/upload/2005_05_10_kids_activity_grades_4-8_nonpoint_pollution.pdf

A Big Environmental Goal

Level 2 3

Aim

To discuss a Millennium Development Goal.

Materials

Paper, pencil, information box provided below.

Time

1 hour.

Background

The Millennium Development Goals (MDGs) are eight international development goals that were agreed to by all the world's countries and all the world's leading development institutions. They range from eradicating extreme **poverty**, to fighting disease epidemics, providing universal primary education, and developing a global partnership for development, all by the target date of 2015. They represent an unprecedented effort to meet the needs of the world's poorest.

How to do it

1. Explain to your group that they are going to discuss the Millennium Development Goal n. 7: *Ensure Environmental Sustainability*.
2. First, have your group read the information box provided below and ask them to start a small discussion so they can prepare themselves to write a group report.
3. Next, ask the participants to write a report where they inform others about the issues of **biodiversity conservation**, and help everyone to become more conscious about the need to act together.
4. Read the report to your entire school or youth group!

Discussion

How would you define environmental **sustainability**?
 What do you think is missing in order to achieve the targets that were set?
 Why can we say it is everyone's task to "save the Earth"?

Millennium Development Goal N. 7: Ensure Environmental Sustainability

Target 7B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss.

The world has missed the 2010 target for **biodiversity conservation**, with potentially serious consequences. Though some success in **biodiversity conservation** has been achieved, and the situation may well have been worse without the 2010 target, the loss of biodiversity continues. Nearly 17 000 **species** of plants and animals are currently at risk of **extinction**, and the number of **species** threatened by **extinction** is growing by the day. **Species** in the developing regions are more threatened and deteriorating as fast as, or even faster than, **species** in the developed regions. Despite increased investment in **conservation** planning and action, the main causes of **biodiversity** loss (high rates of consumption, **habitat** loss, invasive species, pollution and **climate change**) are not being sufficiently addressed.

Biodiversity is extremely important for human well-being as it underpins a wide range of **ecosystem** services on which life depends. Billions of people, including many of the poorest rely directly on different **species** of plants and animals for their livelihoods and often for their very survival. The irreparable loss of **biodiversity** will also hamper efforts to meet other MDGs, especially those related to **poverty, hunger** and health, by increasing the vulnerability of the poor and reducing their options for development.

Key habitats for threatened **species** are not being adequately protected. Although nearly 12 percent of the planet's land area and nearly 1 percent of its sea area are currently under protection, other areas critical to the earth's **biodiversity** are not yet adequately safeguarded. In 2009, only half of the world's 821 terrestrial ecoregions (large areas with characteristic combinations of **habitats, species, soils and landforms**) had more than 10 percent of their area protected. However, under the Convention on Biological Diversity, one tenth of the areas of all these ecoregions should have been under protection by 2010.

Deforestation rates have slowed, but remain the fastest in some of the world's most biologically diverse regions. Tree-planting programmes, combined with the natural expansion of forests in some regions, have added more than 7 million hectares of new forest annually. As a result, the net loss of the forest area over the period 2000-2010 was reduced to 5.2 million hectares per year, down from 8.3 million hectares per year over the period 1990-2000. South America and Africa continue to show the largest net losses of forests.

Overexploitation of global fisheries has stabilized, but sharp challenges remain to ensure their **sustainability**. The proportion of overexploited, depleted and recovering stocks has remained relatively stable over the last 10 years, at about 28 percent. However, the proportion of underexploited and moderately exploited stocks has declined continuously, indicating that the negative impact of fisheries is increasing. Only about 20 percent of fish stocks were moderately exploited or underexploited, with the possibility of producing more.

Sources: United Nations Millennium Development Goals: The Millennium Development Goals Report 2010 and factsheet,
www.un.org/millenniumgoals/pdf/MDG%20Report%202010%20En%2015%20low%20res%2020100615%20.pdf page=57;
www.un.org/millenniumgoals/pdf/MDG_FS_7_En.pdf

Ecological footprint

Level 1 2 3

Aim

Understand the ecological footprint concept.

Materials

Computer with internet access.

Time

40 minutes.

Background

An ecological footprint measures the amount of the earth's surface (global hectares) necessary to produce all the energy and resources that each of us requires to live (food, clothing, housing, transportation) and to absorb all the (indirect and direct) wastes we produce. In other words, the ecological footprint is a measure of our resource use and waste production, which highlights where consumption is exceeding environmental limits.

How to do it

1. To begin, ask your group to come up with a working definition of consumption and waste.

What is consumption?

To consume is to expend, to use up, to purchase, to absorb or to destroy. Consumption is the act of consuming.

What is waste?

An unusable or unwanted substance or material; to use, consume or expend thoughtlessly or carelessly; to lose energy, strength or vigour; to become weak.

2. Next, explain to your group what the ecological footprint refers to and, once they have a clear concept, have them calculate their footprints. You can use the following calculators:

- <http://ecoguru.panda.org/#/home>
- www.myfootprint.org/

3. Discuss about the participants' results.

Discussion

What is the difference between consumption and waste?

What were the worst areas on your footprints?

Do you think your family needs to discover ways in which to reduce their ecological footprints together, at home?

Source: EcoKids, Earth Day Canada, Teachers, Resources, Lesson Plans, Ecological Footprints, www.ecokids.ca/pub/teachers/resources/lesson_plans/ecological_footprints/ecological_footprints.pdf

Biodiversity and Culture

Level 2 3

Aim

To reflect on **biodiversity** and culture.

Materials

Papers, pencils.

Time

1 hour.

Background

Cultures developed in part because people adapted to the **environment** where they lived. This resulted in different languages, traditions, customs, knowledge

and beliefs, which have been passed down through generations.

The **environment** influenced the development of cultures, and similarly our cultures influenced the makeup of the local **environment**. For example, food is an important part of culture. This affects the crops people grow and the food they eat, the animals they raise or hunt, and the waste products they send back into the **environment**.

Throughout history, **biodiversity** has been very important in inspiring many cultural traditions. This can be seen in the music, ceremonies, holidays, mythology and decorations used by different cultures around the world. Protecting **biodiversity** helps preserve many of these cultural traditions and protecting cultural traditions helps protect the natural **biodiversity** of the land the culture needs for survival and well-being.

Source: EcoKids, Earth Day Canada, Homework Help, Biodiversity, Human Activities, www.ecokids.ca/pub/eco_info/topics/biodiversity/human_activities.cfm

How to do it

1. Remind your group that cultural diversity is a recognition of the diversity in cultures, it means the variety of societies or cultures in the world as a whole.
2. Explain to your group that they are making a newspaper report about *Biodiversity, Culture and Cultural Diversity*.
3. Give them enough time to prepare their reports. Once finished, have each participant read their work. You can vote for the best paper and send it to the school or youth group newspaper!

Discussion

Why can we say that culture has intrinsic value for development as well as social cohesion and peace?
What do you think we can learn from other cultures?
How does **biodiversity** influence culture and traditions?

Reducing Global Consumption

Level 2 3

Aim

To understand the link between consumption patterns and diminishing **biodiversity**.

Materials

Poster boards, colour markers.

Time

1 hour.

How to do it

1. Start by asking your group to think about the following concepts: limited resources, consumption, ecological footprint, **biodiversity** and **sustainability**. How are all these concepts linked?
2. Remind the participants how our consumption patterns produce a great amount of waste. This waste might go into a landfill, it might be incinerated or it might simply be dumped outdoors and left to decay. Whatever happens to this waste, it is causing a problem for the **environment**. Tell your group to think about ways that we can reduce the amount of waste we produce. This can be done by following the six R's approach:

Six Rs for Biodiversity

Rethink

Reflect on whether your lifestyle is harming the planet and if you can

	make some changes to prevent this, for example, turn on the lights only if necessary.
<i>Refuse</i>	Don't accept, use or buy a material if you don't think you need it, for example, unnecessary packaging, leaflets, promotional material, plastic bags, etc.
<i>Repair</i>	Try to fix broken stuff or things that don't function properly, for example, clothes, jewellery, electrical equipment, etc.
<i>Reuse</i>	Take an existing product and use it (or its parts) for another purpose, for example, use a jelly jar to store your mom's homemade sauce, buy second hand items or donate some things.
<i>Recycle</i>	A product that has become waste can be reprocessed and transformed into a new product. Therefore, buy products that can be recycled and recycle them. For example, recycling one metric ton of paper saves 17 trees; and it takes 40-95 percent less energy to produce goods with recycled aluminum, glass, plastic or paper than it does to manufacture them with raw materials.
<i>Reduce</i>	Minimize the amount of resources you use, for example, choose products that have less packaging, buy only what you need, save energy and use water wisely.

3. Discuss whether or not there is an order of importance. Reducing and reusing gets to the root of the problem with consumption. Ultimately, recycling is still consuming, where as reducing entails the least amount of consumption and reusing reduces consumption.
4. Divide your group into small teams and ask each one to prepare a cool poster about the 6 Rs approach so they can share it with other groups.
5. Have the teams visit other classrooms or groups to talk about reducing consumption and how it is linked to **biodiversity conservation**.
6. Ask each team to share their experience.

Discussion

Can you explain the impacts of over-consumption on the **environment**?
 How do these impacts lead to environmental degradation, and how does degradation negatively affect **biodiversity**?
 Why should society reduce consumption?

Living Planet Index

Level 2 3

Aim

To learn about the Living Planet Index.

Materials

Computer with internet access.

Time

30 minutes.

Background

The Living Planet Index (LPI) reflects changes in the health of the planet's **ecosystems** by tracking the population trends of over 2 500 vertebrate **species**. The LPI calculates the average annual rate of change for **species** populations.

How to do it

1. Explain to your group that they are learning about the *Living Planet Index*. To do so, you will need to access the World Wildlife Foundation (WWF) Interactive Living Planet Index:
wwwf.panda.org/about_our_earth/all_publications/living_planet_report/living_planet_report_graphics/lpi_interactive/
2. First, make sure they understand its meaning and talk about the LPI for the year 2007, the latest date for which sufficient data is available.
3. Divide your group into six teams and assign a region to each group (Temperate: terrestrial, freshwater, marine, and tropical: terrestrial, freshwater, marine) so they can analyze how the annual rate of change has varied from 1970 to 2007.
4. Have each team take some notes and present them to the other teams.
 - *The teams can also choose any of the animals' information boxes to discover how these **species** have been positively or negatively affected.

Discussion

What can you do to help the world's animals?
Why is it important to do so? Whose responsibility is it?
How does the loss of life in our world negatively affect **biodiversity** and, of course, us?

Bio-curiousities

Level 1 2 3

Aim

To learn some curious facts about animals.

Materials

The bio-curiousities written on separate pieces of paper.

Time

40 minutes.

How to do it

1. Explain to your group that studying nature has revealed some fascinating information about the features and behaviour of plants and animals, helping us to understand how they function.
2. Divide your group into six teams and assign one of the following animals to each group. Tell them to discuss their animal's curious fact.

- *Can crocodilians run?*

Some crocodilians, such as the Australian Freshwater Crocodile, gallop when they need to move quickly on land, which allows them to jump over rocks and logs. When crocodiles gallop, their front limbs go out and forward while the back limbs push the body forward. The tail tends to move up and down rather than from side to side. The maximum speed that crocodiles can reach when galloping is about 18 km/h, but they become exhausted before they have covered 100 m.

Note:

The term 'crocodilians' refers to members of three families: the Family Crocodylidae (crocodiles), the Family Alligatoridae (alligators and caimans) and the Family Gavialidae (gharials). The term "crocodiles" refers only to crocodiles.

- *Are black rhinos really black?*

No! Black rhinos are not black at all. The **species** probably derives its name as

a distinction from the white rhino (which is not white at all either) or from the dark-coloured local soil that often covers its skin after wallowing in mud.

- *Do elephants ever forget?*

Elephants have a remarkable memory. In the wild, they appear to remember for years the relationships with dozens, perhaps hundreds of other elephants, some of whom they may see only occasionally. They also have an impressive memory for places to drink and to find food. This information gets passed on from generation to generation.

- *Why are there no polar bears in Antarctica?*

Polar bears evolved relatively recently (about 200 000 years to possibly as long as 500 000 years ago) from grizzly bears somewhere off eastern Russia or the Alaskan Panhandle. They depend on sea ice for their primary **habitat** and to find their food (mainly ringed seals and bearded seals). As the world's oceans have never been frozen from the north to the south, polar bears simply didn't have the possibility to reach the Antarctic, although it would have been a perfect home for them.

- *How do sea snakes shed their skin and why do they do it?*

Sea snakes shed their skin every two to six weeks, which is more frequently than land snakes. To shed its skin, the snake rubs its lips against coral or another hard substrate to loosen it. It then catches the skin against something to anchor it and crawls forward leaving the skin turned inside out behind it. Skin shedding allows sea snakes to rid themselves of marine **organisms** such as algae or barnacles. If they didn't shed their skin, the **organisms** would interfere with the snakes' ability to swim and could cause disease.

- *Why do hyenas 'laugh'?*

Spotted hyenas often make a sound which is very similar to high-pitched, hysterical human giggling. However, when a hyena giggles, it actually means it is quite nervous about something, and not that it thinks something is amusing. A spotted hyena most often giggles in response to aggression directed at it by another individual, or when the 'laughing' animal has some food that another hyena wants. Thus the human analogy to a hyena giggling might be a worried person saying 'Please leave me alone!'.

Source: IUCN, Biodiversity, About Biodiversity, Biocuriosities,
www.iucn.org/what/tpas/biodiversity/about/biocuriosities/

3. Ask the teams to present their curious fact in a fun way; a role play is a good idea.

Discussion

Have you heard about any other curious facts about a plant or animal?

Why can we say that nature is an infinite source of precious knowledge, inspiration and amusement?

Do you think there is still a lot to learn about nature?

Be creative!

Outdoor Senses!

Level 1 2 3

Aim

To use your senses to experience **biodiversity**.

Materials

An outdoor setting, a box or bag for collecting, a tray (or any flat surface), 8 labels (spicy, green, woody, earthy, sweet, fruity, metallic, and yuck!) for the sense of smell, 10 labels (soggy, silky, tickly, rough, furry, flexible, gritty, sticky, smooth, prickly) for the sense of touch, a fruit to share for the sense of taste.

Time

40 minutes.

How to do it

1. Explain to your group that they are exploring the wonderful outdoors using their five senses, sight, touch, hearing, taste and smell!
2. Take your group outside and ask them to sit in a circle. Have them close their eyes and listen carefully around them. Once they open their eyes, ask them to try and find the things they heard.
3. Remind the participants how many different foods **biodiversity** gives us and have them tell you what their favourite natural food is while sharing some delicious fruit.
4. Next, tell them to roam around the activity area using their "sniffers" to collect objects with different smells. Ask them to take a sample of each object. Tell the participants to let their noses be their guides, here are some ideas: assorted flowers, grass, herbs, bark, pine needles, dirt, leaves, compost, seeds, and even an old, damp newspaper would work!

*Make sure you take the necessary safety precautions and do not take more than you need of any of the **vegetation**!*

5. Arrange the aromas. Place the 'sense of smell' labels around your tray or table. Ask your group to smell each object and put it into the category that best describes its fragrance. If you need to, crush the object to boost its odour. When the participants are done sorting, try to find some candidates for the categories that might not have any items in them.
6. Finally, place the 'sense of touch' labels around your tray or table. Ask your group to hold each object and put it into the category that best describes how it feels. When the participants are done sorting, try to find some candidates for the categories that might not have any items in them.

Discussion

How did you decide which items belonged in each category? Which were the hardest to label? Why? Do you wish you had a whole different category? If so, what would it be?

Do any of these items bring back memories to you?

How do your five senses help you appreciate **biodiversity** as an integral part of your life?

Adapted from: National Wildlife Federation, Kids, Your Big Backyard, Fun, Outdoors, Outdoor Fun, The Nose Knows
www.nwf.org/Kids/Your-Big-Backyard/Fun/Outdoors/Outdoor-Fun/The-Nose-Knows.aspx

Biodiversity Music!

Level 1 2 3

Aim

To learn about the variety of natural sounds that can be heard outdoors.

Materials

An outdoor setting, notebook, pencils.

Time

40 minutes.

How to do it

1. Start by telling your group how **biodiversity** adds to the beauty of sound in our lives and explain to them that each participant will create their own sound map.
2. Take your group to an outdoor setting where they can hear some sounds of nature and tell them that each one must find a special listening spot and register the type and duration of the sounds they hear over a short period of time.
3. Gather everyone so each one can share their sound maps.
4. Have your group stand in a circle and ask each one to make one of the sounds he/she registered. Tell one participant to begin and then build on this by asking the rest of the group to add layers of additional sounds - at the end you'll have a **biodiversity** orchestra! If the registered sounds repeat you can ask them to imitate different bird calls.

Discussion

What was a common sound heard by almost everyone?
How do you think the sounds you heard will vary in a far away country?
How do the sounds of nature help people? For example when going camping or hiking?

We Prefer Diversity

Level 1 2 3

Aim

To realize that in many aspects of life people prefer diversity.

Materials

Two transparent, big jars with a lid, assorted candies (enough to fill both jars), two labels with the numbers: 1 and 2, poster board, colour markers, paper, adhesive tape.

Time

One 30 minute lesson to explain and prepare the activity and another 15 minute lesson to review the outcomes.

How to do it

1. Ask your group to think about what diversity is and how different people prefer different food, clothes, sports, movies, etc.
2. Explain to them that you are going to make a small experiment to demonstrate that we all prefer diversity!
3. Have the participants help you fill up both jars with some candies; one jar should contain only one type of candy and the other should contain many different types of candies. Assign a number to each jar - 1 for the jar containing only one type of candies and 2 for the jar containing assorted candies.
4. Explain to your group that, during your break, you are going to put the jars in a place where everyone from your school or youth group can see them, so they can all vote for the jar of candies they prefer.
5. Ask your group to help you make a nice poster to publicize your activity. Make sure they clearly explain that they should vote for the jar of candies they prefer. Also, place a couple of papers next to the jars asking the following

question:

Which jar of candies do you prefer?		
Jar # 1	Jar #2	Grade/Group

6. Review the outcomes of your small survey. You can then share all the candies with other groups or classes.

Discussion

Why do you think people prefer diversity?

What would it be like if we only had one type of fruit or vegetable, for example?

How could this affect our health?

What would happen if we only had one type of **habitat**? Would **biodiversity** as we know it exist?

Your Inner Animal

Level 1 2 3

Aim

To reflect on how humans have some characteristics similar to those of different animals.

Materials

Computer with internet access.

Time

30 minutes.

How to do it

1. Explain to your group that they are going to have some fun with the World Wildlife Fund (WWF) *Find Your Inner Animal* game:

www.worldwildlife.org/inner-animal/inner-animal.html

2. Have each participant complete the small test and see which 'animals' you have in your class or youth group!
3. Discuss your results.

Discussion

Which is your inner animal? Do you really think you share some characteristics with it?

Which animal characteristics would you like to have?

Make Your Own Perfume

Level 1 2 3

Aim

To learn how perfume is made using different natural products.

Materials

Small jar with lid for each perfume flavour (a baby food jar works fine), rubbing alcohol, enough fragrant plant parts to fill the jar (rose petals, sagebrush leaves, violets, cloves, cinnamon, lavender, etc), knife, strainer.

Time

One 30 minute lesson to begin the activity, one 10 minute lesson to finish preparation and one 40 minute lesson to review the outcomes. (Wait time – 3

weeks).

How to do it

1. Explain to your group that many plants have strong fragrances and that cosmetic companies use these to make perfume. Tell them that this time they will be in charge of making some delicious perfumes!
2. To start, ask your group to chop the plant parts into small pieces and place them in the jars.

Make sure you take the necessary safety precautions!

3. Tell them to fill the jars with alcohol and put the lid on. You will have to wait for two weeks as the alcohol needs to dissolve the aromatic oils of the plants.
4. Two weeks later, ask the participants to strain the fragrances and, if they are strong enough, they can close the jars and have them age for another week.
*If not, they must add more chopped plants and repeat.
5. After one week, your perfumes are ready! Which one is your favourite?

Discussion

Are plants more fragrant at a certain time of the year? Why do you think this is so? (To attract pollinators).

What other products (beauty, medicine, cleaning, etc.) are made using plant parts?

What special properties do these different products have?

What other uses do humans have for plants (recreation, decoration, design inspiration, etc.)?

Source: Environmental Learning Programs, Celebrate Wildflowers, Activity 6, Making Perfume, www.fs.fed.us/wildflowers/kids/activities/documents/perfume.pdf

Welcome to ...

Level 1 2 3

Aim

To think about **habitats** and wildlife in an imaginative way.

Materials

Notebook, pencils.

Time

40 minutes.

How to do it

1. To begin, ask your group to close their eyes and remember how many wonderful **habitats** we have on our planet, and how each place is full of an amazing variety of plants and animals.
2. Explain to them that they will transform themselves into tourist guides and that they are planning a short journey for their friends to a very special place, a recently discovered and magical island!
3. Encourage your group to be creative! Ask the participants to describe what the **climate** and landscape are like, which plants and animals they might see, what is special about the local culture, what clothing and gear they will need, and how they will get there. Have the participants write an itinerary and a packing list.
4. Ask each participant to present their work.

Discussion

Which of the places described by your classmates would you enjoy visiting? Why?

Do you think there might be a place similar to the one you imagined?

Do you believe we still have lots of incredible animals and plants to discover?

Fly Away Butterfly

Level 1

Aim

To make a fun windssock to hang out and play with on a windy day.

Materials

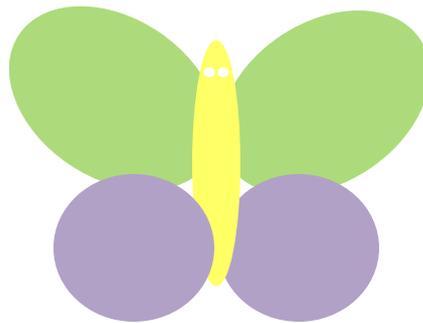
Yellow, blue and light blue craft foam or card board, scissors, glue, adhesive tape, ribbon, string or elastic cord, hole punch.

Time

30 minutes.

How to do it

1. Explain to your group that you are making a fun butterfly windssock to play with on a windy day.
2. For the upper wings, cut two 20 cm ovals and for the lower wings cut two 25 cm circles using the yellow and light blue craft foams, respectively.
3. For the body cut a 30 cm long, thin oval.
4. Glue each part of the butterfly in its place.
5. Cut the ribbon into strips about 50 cm long and use the adhesive tape to stick them at the back, bottom end of the butterfly.
6. To hang your windssock, punch two evenly spaced holes at the head of the butterfly and thread and knot a piece of string or elastic cord. Have fun!



Discussion

How do you think butterflies feel when they are flying?
Do you think the wind can affect them? How?
How would you describe your flying experience if you could fly? Have you ever experienced any activity that made you feel like you could fly?

Nature Letters

Level 1 2 3

Aim

To explore the forms found in nature.

Materials

An outdoor setting.

Time

30 minutes.

How to do it

1. Remind your group that there are many cool shapes and forms hidden in nature. Explain to them that they will be checking out for nature's alphabet! Letter shapes can be hiding on the ground, in the trees, in branches and leaves, in sunlight and shadow, on the water, and in the sky!
2. Take your group outside and encourage them to look at nature a little differently, letter shapes will pop out at them from everywhere.
3. Ask them to start looking for the letters in their first names. Now why not try

the whole alphabet!

4. Tell them to try different views. They can lie on their backs and look up at the sky or get down low on their hands and knees. They can also try to stand on their heads to see an upside-down scene. Over, under, all around! Letters can be hidden anywhere. Have them look at big and small shapes.
5. As they discover each letter, ask them to sketch them so they can take them home!

Discussion

Were you able to find other cool shapes apart from letters?
How important do you think nature is regarding works of art?
Can you remember some artists whose works were inspired by **biodiversity**?

Save Water!

Level 1 2 3

Aim

To realize how simple it is to practice water **conservation**.

Materials

An outdoor setting, 4 large buckets, water, 2 measuring cups, 2 meter sticks, 2 containers (for tickets), water spending tickets, paper, markers, adhesive tape.

Time

30 minutes.

How to do it

1. Take your group to an outdoor setting and explain to them they are playing a water **conservation** game.
2. Label two buckets with *Colossal Water Consumers* and the two others with *Smart Water Spenders*. Out of each pair, designate one bucket as "Clean Water Supply" and the other as "Water Spent".
3. Fill one of each pair of buckets with 6 litre of water and place them at one end of the activity area. Put the water spending tickets in the containers, and place them next to their respective teams.
4. Divide your group into two teams, and give each team a measuring cup; indicate to them that they will be participating in a relay race that will show both efficient and non-efficient uses of water.
5. Explain the instructions: one team member from each team must move up to the ticket basket, take a ticket, and follow the instructions. Each team member will go to his/her respective bucket, Colossal Water Consumers or Smart Water Spenders, and with his/her measuring cup, withdraw the amount of water indicated on his/her ticket from the Clean Water Supply bucket, and pour it into the Water Spent bucket. They must return to tag the next member in their team, pass on the measuring cup and have a seat for the game to continue. The team to go through all their water uses (tickets) wins.
6. Compare the amount of water spent and conserved in the Water Conservers and the Water Wasters buckets by having participants either measure water height (using the meter sticks) or water volume. Students can create a chart or graph to visually compare the various types of water use between the Colossal Consumers and the Smart Spenders using the information on the water tickets.

Discussion

What were the differences between the two teams?
Which activities spend more water?
Can you think of any other ideas that might help you to conserve water?

Source: H₂O!, Activities, Bringing Water Home, Saving Water: What a Difference it Makes!, www.watercan.com/h2oh/3-3.shtml

Water Spending Tickets

<i>Colossal Water Consumers</i>	<i>Smart Water Savers</i>
We flush different items down the toilet such as bugs or toilet paper. 250 mL	We never flush extra items down the toilet. We also have installed a low flush toilet. 125 mL
We take long showers, and leave the water running before showering. 500 mL	We take very quick showers. 125 mL
We leave the water running while brushing our teeth. 250 mL	We shut the tap off while brushing our teeth, and use a glass of water for rinsing. 125 mL
We water our grass everyday in the summer, and often leave the hose running. 300 mL	Our grass does not need watering everyday in the summer, and we use a sprinkler on a timer. We also have plants that require little water, and use collected rain water to water our plants. 100 mL
We take long hot baths and fill the tub up to the top. 350 mL	We usually take short showers, and do not completely fill the tub if we need to take a bath. 125 mL
We drink cold water from the tap and let the water run while doing so. 250 mL	We keep cold water available in the fridge to drink and avoid running the tap constantly. 125 mL
We wash even small loads in the washing machine, and do not adjust the water levels. 500 mL	We use the washing machine mainly for full loads and/or adjust the water levels. 250 mL
We ignore dripping faucets. 500 mL	We close dripping faucets properly and fix leaking ones immediately. 0 mL

Colossal Water Consumers	Smart Water Savers
We wash our hands while letting the tap run. 250 mL	We close the tap while soaping our hands, and do not let the tap run. 125 mL
We wash even small amounts of dishes using the dishwasher. 500 mL	We only use the dishwasher when there is a full load of dishes to wash, and we have a water-saving dishwasher. 250 mL
We wash our car using a hose and liquid soap. 500 mL	We wash the car with a sponge and a bucket of water. 200 mL
We have showerheads which leak, and which allow water to flow from the tub faucet as well. 500 mL	We use low flow showerheads that save water when showering. 125 mL
We leave the faucet running when washing our dishes. 325 mL	We fill the sink when washing our dishes. 250 mL

Your Own Rainstick!

Level 1 2 3

Aim

To make a fun rainstick.

Materials

Cardboard tubes (from rolls of paper towels or wrapping paper), colour markers, water colours, paper, tape, beads and feathers, glue, uncooked beans, rice.

Time

1 hour.

Background

It is believed that the rainstick was invented in South America and it was played in the belief that it could bring about rainstorms. Currently the rainstick is used as a musical instrument that sounds like rain when you turn them from one end to the other. Traditionally, rainsticks are made from the wood skeleton of a cactus.

How to do it

1. Explain to your group that you are making some rainsticks to call the rain!
2. Have each participant cover one end of the tube with a double layer of paper to make it more resistant and tape it shut.
3. Tell them to pour a handful of rice and beans into the tube.
4. Ask them to cover the other end of the tube as they did before.
5. Have everyone decorate their rainsticks using water colours, markers, beads, and

feathers.

6. Go outside, shake your rainstick up and down and make a rain dance with your group!

Discussion

Does your rainstick imitate the sound of rain? Did your rain dance attract the rain? Have you ever seen this musical instrument? Or have you heard how it sounds? Do you know about other musical instruments that imitate a sound of nature?

Let's Get Dirty and Smelly

Level 1 2

Aim

To learn that playing in mud is good and fun.

Materials

An outdoor setting, some old clothes and shoes to get dirty, papers, magnifying glass, shallow plastic containers (to make mud pies).

Time

40 minutes.

How to do it

1. Explain to your group that you are having a fun and muddy day and that they must prepare themselves to get dirty and smelly! It is a good idea to experience this activity after a rainy day.
2. Take your group to an outdoor setting and find some mud patches (or make them) and have them enjoy different activities:

Be an artist

- Give the participants a stick and a muddy surface to draw on. Mistakes are no problem; mud is a very forgiving medium. Just smooth the mud over and start again.
- Mud prints are fun, too. Your group's muddy hands and/or feet can stamp cool patterns onto a sheet of paper. If you prefer to keep it simple, the sidewalk is another canvas.
- And then there's sculpture. Mud balls can become out-of-season snowmen or abstract sculptures. If your group's creation isn't sticking together, just add more water.

Be a builder

- Your group can make buildings of all shapes and sizes if they use sticks to create a frame and pack mud on to it. Houses perhaps, a castle with a moat or a stable.
- If they also like the idea of large-scale public works, have them make a river by digging a trench in the mud or dirt. Then, tell them to add water as needed. Most importantly, they must build a dam to protect the town!

Be a biologist

- Take a walk through your activity area so your group can learn which animals go under cover during rain and which come out in this type of **weather**. You might not have pigs nearby, but some dogs will happily wallow in a mud puddle if they have a chance. You may also see birds swooping down to take a bath.
- This is also a fine time to study worms that surface to breathe when their burrows fill with water. Supply a magnifying glass so your group can get an even closer look. Then, enlist the participants in a Worm Rescue Squad. Ask them to move any worms they find on the sidewalk back to the dirt so they don't dry out.

- Now, help them build a worm hotel.

Be a baker

- If you're going to play in the mud, why not make some mud pies? Use some shallow plastic containers to start cooking. Once the pies are "baked," it's time to make them beautiful! Encourage your group to scour the yard for pebbles, petals, and leaves that will make perfect decorations on top.
3. Make sure everyone washes their hands and changes clothes before going home!

Discussion

How does playing outdoors help you grow strong and healthy?
Why do you think some animals enjoy playing in the mud so much?
How does spending time outside help you learn about, appreciate and respect nature?

Adopt a Tree!

Level 1 2 3

Aim

To discover different kinds of trees through the senses.

Materials

A wooded area, blindfolds, paper, crayons.

Time

40 minutes.

How to do it

1. Take your group to a wooded area and ask them to pair up at a starting point. One partner in each pair should be blindfolded.
2. Explain to your group that the blindfolded players must be led by their partners to a tree, where they must "get to know" the tree by touching it, smelling it, measuring it with their arms, noticing what the bark feels like, how the tree trunk is shaped, etc.
3. The blindfolded players must then be lead back to the starting point where the blindfolds must be removed and the players must identify which tree is theirs. Several different trees may have to be felt before the right one is found. The partners must then switch roles and play the activity again using a different tree.
4. Next, give the participants a large piece of paper to fold into quarters. Have them choose their favorite tree, grab a crayon and brush up on their artistic abilities:
 - In the first quarter they must draw their favorite tree's shape.
 - In the second quarter they must do a bark rubbing of the tree's trunk.
 - In the third quarter they must draw a picture of one of your tree's leaves.
 - In the fourth quarter they must sketch the tree's fruit or cone, if present, or write a poem about their special tree!
5. Have the participants present their work and share their findings with each other to discover similarities and differences among the trees.
6. For elder participants you can turn this sensory activity into a more interpretive one. Ask them to look at their surroundings for evidence of birds or other animals; can they see any sky when they stand underneath their tree; how much shade does the tree throw; how tall is the tree; what type of soil is the tree growing in; if they were an animal, what would they look for in a tree? Tell them to collect some leaves, twigs, bark, flowers and seeds so

they can try to identify different kinds of trees by using their parts.

Discussion

Which are the trees that are most commonly found in your area?
Does it have any special meaning for your community?
How important is it to maintain wooded areas in your community?

Source: EcoKids Canada, Teachers, Resources, Activities, Adopt a Tree,
www.ecokids.ca/pub/teachers/resources/activities/adopt_a_tree.pdf

Our Furry Friends

Level 1 2 3

Aim

To learn about genetic diversity.

Materials

Photographs of different dog breeds (optional).

Time

30 minutes.

Background

Genetic diversity is what makes every **organism** unique. **Genes** are the units of heredity found in all cells and they contain special codes or instructions that give **organisms** different characteristics. Genetic diversity occurs within a **species** and even within a variety of a given **species**.

Genetic diversity serves as a way for populations to adapt to changing **environments**. With more variation, it is more likely that some individuals in a population will possess characteristics that make them more suitable for a specific **environment** and, therefore, they might have some special abilities that make them better at certain things. For example, when talking about dogs, some might be better at hunting, swimming, jumping, etc.

How to do it

1. Remind your group that dogs are some of the most popular pets on the world, and that there are many different breeds of dogs, each one with different characteristics, personalities and abilities.
2. Ask the participants whether they have dogs at home or know someone who does. Have each participant say what kind (breed) of dog it is, to describe it, and perhaps speculate about how large it might grow, what it needs and how long might it live.
3. Now, ask your group to think about the special abilities these dogs have. What practical things do they do or could do for their owners?
4. Finally, help your group to compare the variation in types of dogs with differences among types of horses, cats, cattle, etc.

Discussion

Why do you think there are so many different types of dogs?
Which is your favorite dog breed? Why?
Long ago, do you think dogs were more different from each other than they are today, or were they more the same as each other? Why do you think so?

Source: Convention on Biological Diversity, Biological Diversity for Kids, Educator's Corner, Educators' Package,
<http://kids.cbd.int/EducatorsPackage.pdf>

Biodiversity Superhero

Level 2 3

Aim

To create a **biodiversity** superhero for your school or youth group.

Materials

Poster boards, colour markers, adhesive tape.

Time

Two 1 hour lessons (1 hour to organize the activity and 1 hour to review the results).

How to do it

1. Explain to your group that you are organizing a drawing competition to find your school or youth group's *Biodiversity Superhero!*
2. Divide the participants into small groups and have each one make a poster to publicize your event. Don't forget to include all the necessary information:
 - Theme
 - Participants' age range
 - Size of the drawing paper
 - Drawing materials accepted
 - Deadline

And of course don't forget to say that the new superhero will be used in all the publications, documents and activities your school or youth group might organize in favour of environmental protection!

3. Place the posters all around your school or youth group. Make sure everyone hears about it!
4. Tell your group that they will be in charge of selecting the winner and awarding him/her with a cool certificate (or maybe you could even give him/her a prize of your choice).
5. You can also make an award ceremony with the entire school or youth group to congratulate everyone for participating and encourage them to continue caring for **biodiversity**.
6. Now that you have your superhero, you can talk to your school or youth group's director to encourage him/her to organize an activity where your superhero can invite everyone to make a change!

Discussion

How important do you think it is to develop awareness about **biodiversity conservation** starting at a young age?

How might your superhero encourage children and youth to act?

Dirt Shirts!

Level 1 2 3

Aim

To learn how dirt can also serve as a medium for art.

Materials

An outdoor area, bowl, spoon, water, newspaper, permanent marker, white T-shirt or any clothes item the participants might want to decorate, dirt.

Time

1 hour.

How to do it

1. Explain to your group that for the Senufo people of Africa's Ivory Coast, mud is the stuff of art. They use mud to paint intricate designs on cloth, which they wear or sell. Tell them that now they are going to become mud artists!
2. Take your group to an outdoor area as they will be working with mud.
3. If they are painting a shirt or a tote bag, have them put several layers of newspaper inside it to keep the mud from soaking through to the back of the shirt or bag.

4. Ask the participants to add a few handfuls of dirt to the bowl and pick out any rocks, leaves, twigs, or other debris.
5. Have them add water and stir to make mud the consistency of tempera paint. If the mud isn't dark enough, you can add a bit of black or brown water-based paint to it.
6. Tell the participants they can use their fingers or sticks to apply the paint. They can also coat items such as leaves, grass, or hands with mud and use them to make prints on the shirt.
7. Encourage your group to think about a cool slogan related to the **environment**, "I Dig the Earth!" is an example. Have them write the slogan in mud or use a permanent marker.
8. Let the painting dry. Have the participants shake off any caked-on mud before proudly wearing the dirt shirt. The design will fade in the wash, but they can always be reapplied!

Discussion

In what other ways is dirt used around the world?
 How important is soil in our lives?
 In what ways can you help protect soil?

Sources: National Wildlife Federation, News and Magazines, National Wildlife, Outdoors, Archives 2011, Earth Day Dirt Fun, www.nwf.org/News-and-Magazines/National-Wildlife/Outdoors/Archives/2011/Earth-Day-Dirt-Fun.aspx

Wild Party

Level 1 2

Aim

To learn how different animals move or 'dance'.

Materials

An open area (a big classroom or meeting room is fine), tape recorder, music, leaves, thread, scissors, adhesive tape, cardboard, colour makers, computer with internet access (optional).

Time

A 30 minute lesson to explain and prepare the activity and another 1 hour lesson to enjoy the party.

How to do it

1. Start by asking your group if they like to dance and if they think animals like to dance; many animals seem to when they leap, strut, flap, or flutter, for instance. Explain to them that it may just be funny moves they make; or it may be a form of communication.
2. Tell your group that you are having a Wild Party where everyone will represent an animal and will have to dance or move like it. Ask each participant to choose the animal he/she wants to represent and to practice its moves.
3. Invite other groups or classes to enjoy the party. Ask your group to make some cool invitations and send them out. Make sure you include all the necessary information, and of course, tell them to prepare their wild moves!
4. The day of the event, have your group make some nice garlands using leaves and other natural objects, so they can hang them all around.
5. Enjoy your party! Have each participant say which animal he/she has chosen and show everyone how to rock it.
6. You can show the participants a very cool video about a cockatoo named *Snowball* who loves dancing to music:

www.birdloversonly.org/snowball2.html

Discussion

Why do you think people dance (exercise, expression, fun, etc.)?

What types of dances do you know?
What role do you think dance plays on our cultural traditions?

Adapted from: national Wildlife Federation, Kids, Ranger Rick, Animals, Mixture of Species, Dancing Animals,
www.nwf.org/Kids/Ranger-Rick/Animals/Mixture-of-Species/Dancing-Animals.aspx

Nature Artist

Level 1 2 3

Aim

To use leaves to create works of art.

Materials

An outdoor space, newly fallen leaves of different colours, shapes, and sizes, construction paper, newspapers, heavy books, such as telephone books, water-based glue, scissors.

Time

One 40 minute lesson to collect the leaves and another 1 hour lesson to make your nature works of art.

How to do it

1. Remind your group how nature is found in many works of art. Tell them that this time they will use leaves to make some nice figures of plants, animals or sceneries.
2. Take your group to an outdoor setting and ask them to gather some leaves and put them between layers of newspapers. Pile heavy books on top.
3. In a week, the leaves will be flat and dry. Instruct the participants to begin arranging the leaves on construction paper. Tell them to think about different animals or plants and try to create their shapes. Tear or cut off leaf pieces to make eyes or other small features.



4. Once the participants are happy with their leafy creation, tell them glue the leaves to the paper.
5. Have each one share their work of art!

Discussion

Which different figures were you able to recreate with your leafy art?
How important is nature when talking about art?
What recreational benefits does nature give us?

Source: National Wildlife Federation, Get Outside, Be Out There, Activities, Cook and Craft, Make a Leafy Creature,
www.nwf.org/Get-Outside/Be-Out-There/Activities/Cook-and-Craft/Make-a-Leafy-Creature.aspx

Your Own Community

Level 2 3

Aim

To reflect about land use and its effect on the **environment**.

Materials

White poster board (one for each group), scissors, glue, construction paper, cotton balls, yarn, colour markers.

Time

1 hour.

How to do it

1. Remind your group how humans have an effect on our surrounding **environment** no matter what they do. The way we use land directly impacts wildlife, plant life, and air and water quality.
2. Tell them to imagine that they are city planners. Their job is to design a city/community that will serve the needs of their population, but that will also impact the **environment** as little as possible.
3. Divide your group into teams of about four or five. Provide each team with a white sheet of poster board and markers. You may also provide pieces of construction paper, cotton balls, yarn or anything else that the participants can paste onto their board for added effect.
4. Have your group discuss the following key words and issues before the activity:
 - **Urbanization** or urban sprawl and its effects on wildlife and the **environment**
 - Economic growth
 - **Conservation** and preservation
 - Renewable and non-renewable resources
 - Agriculture
 - Greenbelts
 - Sustainable development
 - Organic farming vs. traditional farming
 - Ecological footprint
5. Tell the teams to start constructing! Listed below are features that the communities should include and questions the teams should think about as they are designing it.

Make sure to include:

 - Residential areas where people can live (houses and apartment buildings);
 - Business/entertainment areas where people work and spend leisure time (offices, stores, theatres, galleries);
 - Industrial areas (factories and large warehouse businesses);
 - Agricultural areas (farm land for crops and livestock); and,
 - Greenbelts (parks, **conservation** areas, wetlands, forest/tree lots).

Don't forget to include:

 - Schools;
 - Hospitals;
 - Community centers;
 - Roads, sidewalks; and,
 - Landfills, garbage/waste disposal sites.

You may also want to include:

 - Airport;
 - Other recreation areas (golf courses, amusement parks); and,
 - Community gardens.

Questions to think about as you are building your community:

 - What land areas serve a dual purpose? For example, are there places for humans to live/work/play in that also serve as wildlife **habitat**?

- Is most of the food for your community being produced locally or is most of it being transported from somewhere else?
- Is public transportation available in your community? If so, what kinds?
- Last but not least, come up with a name for your community/city. Be creative!

6. After the teams have finished designing their communities, ask them to present their work and its features as the group goes on a “Communities Tour”.

Discussion

Think back to what the land might have looked like before you built your community. What plants and animals were displaced? What changed about the geography and topography of the area? Were rivers dammed or redirected? Were wetlands filled in and built over? Were trees cut down?

Cities grow and change over time. What do you think your city will look like 10 or 20 years from now? How will urban sprawl affect the natural greenbelt and agricultural areas in your community? How will you make room for growth with minimum environmental impact?

Source: Ecokids Canada, Teachers, Resources, Activities, Build a Community, www.ecokids.ca/pub/teachers/resources/activities/Build_a_Community.pdf

I Am Part of Biodiversity Too!

Level 1 2 3

Aim

To become aware of the fact that human beings are also part of **biodiversity** and to value others as equal and different.

Materials

Papers, pencils, photographs of children and youth from other countries, whiteboard, whiteboard markers, world map.

Time

40 minutes.

How to do it

1. Remind your group that we have many different cultures in the world, and explain to them that you are reflecting about how people are also part of our amazing **biodiversity**.
2. Start by showing your group some photographs of children and youth from other countries. Can they guess where they are from? What made them think that?
3. Ask the participants to locate where each of the photographs was taken on a world map. Tell them to describe any connections they may have with the countries. For instance, they may have visited one of the countries, or have family or friends living there. Ask your group if anyone knows anything about any of the countries, such as a famous building or city, the capital city, someone famous living there, or a language spoken there.
4. Now have them think how their preferences and their characters might be influenced by the plants, animals and **habitats** they are used to enjoying. How might the **environment** in which they live and grow help shape their way of being?
5. Next, create a word bank by brainstorming different characteristics children and youth might have: funny, helpful, intelligent, talkative, stubborn, and so on.
6. Assign to each participant the name of another partner and ask him/her to

choose words which he/she thinks describes his/her friend and to write them as a recipe. Encourage the participants to see their partners positively, like the example below.

For Example:

Mary

Ingredients:

2 cups of laughter

1 cup of joy

1 cup of energy

A sprinkle of tears

A pinch of stubbornness

A dash of playfulness

Method:

Stand under the stars and growing moon for several nights. Bring into a warm and secure place, nurture with love and care, and watch it grow into Mary.

7. You can finally make a class or youth group book of recipes.

Discussion

Why can we say that we are all different, but equal?

How do human beings contribute to the wonders of **biodiversity**?

Do you think having different cultures makes our world richer?

Adapted from: Oxfam Education, Resources, Global Citizenship, Lesson 3, A Recipe for Myself,
www.oxfam.org.uk/education/resources/global_citizenship/key_stage_one/files/lesson3_a_recipe_for_myself.pdf

Awesome Nature Snakes and Ladders

Level 2 3

Aim

To learn about some of the benefits people get from nature.

Materials

40x40 cm piece of cardboard, colour markers, markers and dice.

Time

40 minutes.

How to do it

1. Explain to your group that they are going to play an *Awesome Nature Snakes and Ladders* game where they will be able to discuss about the benefits all living beings obtain from nature, especially humans, and to identify ideas how they can contribute to the protection of our amazing **environment**.
2. Take a 40 x 40 cm piece of cardboard and divide it into a 10 x 10 grid of squares. Number the squares from the bottom left square (as 1) and going backwards and forwards up the board to the top left square.
3. Draw seven ladders and seven snakes which connect different squares to each other. On some other squares, write the following instructions:
 - In Kenya, solar lanterns bring light into homes in the evening and enable children to read and do their homework. Move forward 3 spaces.
 - In Bangladesh, frequent floods have eroded the lands, washed away houses and left people without food and jobs. Go back 2 spaces
 - In Peru, alpacas not only provide milk, which can be made into cheese and yogurts, but also their fleeces can be made into blankets and clothing, providing warmth and a way of earning some money too. Move forward 2

spaces.

- In Kenya, persistent droughts have led to people, animals and plants not having enough water to grow and survive. Go back 3 spaces.
- In Sudan, special ploughs and harnesses for donkeys take the strain of the hard work in cultivating the dry land, and enable families to grow crops more easily. Move forward 1 space.

Ask your group to help you make it look colourful and fun!

4. Explain the game. You will need one marker for each player and a dice. The participants must roll the dice and move the marker that number of spaces. If they land on a ladder, they can climb up it if they give a reason how **biodiversity** contributes to human health and well being. If they land on a snake, they must slide down it unless they can give a reason how they can contribute to preserve **biodiversity** through their everyday choices. The first participant to reach the space 100 is the winner! Have fun!

Discussion

What consequences does **biodiversity** loss bring to people's well-being?

How does **biodiversity** give people options for overcoming **poverty**?

Have you heard about any initiative that is being applied in your community to protect nature and its living creatures?

Adapted from: Practical Action, Snakes and Ladders,

<http://cdn1.practicalaction.org/s/n/4d8a552d-51f8-45ee-85d3-30a72e33baf9.pdf>

Reach out!

Biodiversity Day

Level 1 2 3

Aim

To encourage people to celebrate **biodiversity**.

Materials

Poster boards, colour markers, adhesive tape.

Time

A 1 hour lesson to plan the activity and another 1 hour lesson to develop it and review the outcomes.

Background

The United Nations proclaimed May 22 The International Day for Biological Diversity (IDB) to increase understanding and awareness of **biodiversity** issues. Everyone can help commemorate this important date, so communicating and involving other members of the community is an important component for achieving this goal.

How to do it

1. Explain to your group that you are having your own *International Day for Biological Diversity Celebration* and that you are going to invite everyone from your school or youth group, people from the community and the local media. The more people involved, including all genders and ages, the greater the project's impact will be.
2. Tell your group that you will be making a fairly easy and fun activity that everyone will enjoy and that will also leave a lasting impression. You will all dress in green and will become statues! So everyone can stop for a moment and think about the need to care for **biodiversity**.
3. Ask your group to help you choose a place for the event, may be your school or youth group backyard or a local park. Tell them to make some really cool posters to publicize your event and invite everyone to participate. Don't forget to include all the necessary information:
 - Date – May 22
 - Reason
 - Activity – green statues!
 - Who can participate – everyone!
 - Time
 - Place

Make sure you take the necessary safety precautions!

4. Put your posters all around your school or youth group, in your local supermarket, library, community center, etc. Don't forget to contact your local newspapers, magazines and TV stations!
5. After the activity discuss about your fun experience.

Discussion

Where you able to attract many people?
What was the general impression? Did they enjoy it?
What is the message you were able to transmit?

Adapted from: United Nations Environment program, WED Pak, A Guide to Celebration World Environment Day, www.unep.org/wed/infomaterials/downloads/WED_PACK.pdf; page 19.

Habitat Mural

Level 1 2

Aim

To encourage **habitat** protection through a **habitat** mural.

Materials

2 or 3 poster boards, coloured cardboard, colour markers, colouring pencils, adhesive tape, books and/or internet for research.

Time

1 hour.

How to do it

1. Explain to your group that they are creating a *Habitat Mural*, with the objective of teaching others about a local **habitat** and encouraging its protection.
2. As a group, choose and research the physical features and **species** that live in a local **habitat**.
3. Ask each participant to draw and paint the shape of a plant, animal, or object to add to the mural. Have them use the coloured cardboards to make their drawings. Tell them to cut out their shapes and then write some interesting facts about them on the back.
4. Form your mural by gluing together two or three poster boards. Have your group tape the elements to the mural in such a way that viewers can flip up each shape and read more about it.
5. Finally, stick your **habitat** mural in a place where your entire school or youth group can see it. Don't forget to include a message regarding the importance of protecting this **habitat**!

Discussion

Why do different **habitats** have, or need to have, different characteristics?
How do plant and animal **species** interact within their **habitats**?
Why is it important to learn about your local **habitats**?

Source: National Wildlife Federation, Ranger Rick Activities, Habitat Mural,
www.nwf.net/~media/PDFs/Kids/Ranger%20Rick/Educators/RC_Activities.aspx

The Animals Are Talking

Level 1 2 3

Aim

To reflect about **habitat** destruction.

Materials

Paper, pencils.

Time

1 hour.

How to do it

1. Remind your group that man-made **habitat** loss, polluted **ecosystems** and over population are causing illness, disease and death not only to plants and animals, but to mankind itself.
2. Explain to your group that they will be creating a song about **habitat** destruction.
3. Tell them to be creative and to write a song that will not only help people to realize how humans are affecting our world, but also to be conscious about the need to start making a change.
4. Once finished, you could ask a music teacher to help you with the song.
5. Sing it for your entire school or youth group! You could even send it to your local radio station.

Discussion

What are some of the benefits coral reefs provide to nature? And to human beings?

Why is it important to protect every **habitat** in our world?

How can music help express your feelings and ideas?

Bio-benefits

Level 1 2 3

Aim

To reflect about all the benefits we obtain from **biodiversity**.

Materials

Cardboard, colour markers, notebooks.

Time

One 40 minute lesson to develop the activity and another 20 minute lesson to review the homework.

How to do it

1. Start by asking your group to reflect about the following question: Can you imagine a world without **biodiversity**?
2. Tell them to make a drawing of how the world would be without it. Could it even exist?
3. Have each participant share their drawing.
4. Now ask your group to think about all the wonderful things **biodiversity** provides us with and that are necessary for our lives. Have your group write them down in their notebooks.

Here are some ideas:

- *A livable planet:* **biodiversity** keeps in balance all the wonderful **ecosystems** where millions of plants and animals can thrive.
- *Air to breathe:* plants and trees absorb CO₂ and help us maintain a clean and healthy air.
- *Clean water:* forests and wetlands around the world filter water again and again, recycling the water we use every day.
- *Food and healthy crops:* bacteria in soil provide **nutrients** that help crops grow. Moreover, bats, bees and other insect pollinate food crops, and birds, insects and other predators control pests.
- *Medicine:* many ingredients that help us maintain a good health come from plants and animals all around the world.
- *Cultural traditions:* **biodiversity** has inspired cultural traditions around the world. Archeologists study many different objects to learn about how people in the past may have interacted with the natural world.
- *Music:* many musical instruments are made with natural objects, such a bamboo. Music also imitates the sounds of nature.
- *Ceremonies:* many people around the world, especially indigenous people, use natural products and objects in their traditional ceremonies.
- *Decoration:* many products found in nature have inspired designers to create many beautiful objects that make our houses more beautiful.
- *Natural beauty and holidays:* the great outdoors provides people with many different beautiful places to have fun and relax.
- *Bright ideas:* many great inventions have come from the natural world; inventors obtained their design ideas by observing how animals and plants behave.
- *Transportation:* inventors obtained their ideas for transportation by observing that animals are shaped in special ways to allow them to fly or move under water, for example.

- *New materials:* scientists study different natural products to manufacture new objects that work like natural ones. **Biodiversity** is very wise!
- *Clothes and more:* many things come from raw materials provided by the earth's **biodiversity**.

5. As homework, ask the participants to share with their families the list of bio-benefits. Tell them to make sure their families make a commitment to care for and respect **biodiversity**!
6. In the next class, ask them to share their experiences.

Discussion

Was your family aware of all the benefits **biodiversity** gives to us? Why or why not?

What changes do you think your family needs to make in order to fight against **biodiversity** loss?

Can you name an invention that was inspired in nature?

Adapted from: American Museum of Natural History, Ology, Biodiversity,
www.amnh.org/ology/biodiversity#

Lower Your Emissions!

Level 1 2 3

Aim

To show children and youth they can make a change by saving energy.

Materials

Paper, pencils, electricity bills.

Time

Two 30 minute lessons.

Background

Energy is what makes things happen. We need it to turn the lights on, to cook a pizza and to listen to music. We need energy for almost everything we do and every day we need lots of it.

Renewable and non-renewable energy sources can be used to produce electricity. We get most of our electricity from non renewable sources and there is a bad consequence of doing so. The problem is that the use of **fossil fuels** contributes to greenhouse gas emissions into the Earth's air and this can lead to global warming and **climate change**. Using electricity is not wrong; you just have to be smart about it. Energy has a cost, so the less you use, the more you save and the less impact you have on the **environment**!

How to do it

1. Before the first lesson, tell your group to ask their parents for the total number of kilowatt-hours listed on their families' last month's electric bill.
2. Sum up the total kilowatt-hours of your entire group and explain to them that they will have the challenge to lower that value.
3. Tell your group that they are going to make a list of energy saving tips and share it with their families. Suggest that they hang the tip list in an area where all of their family members can see it. Explain to your group that they will compare the total kilowatt-hours of next month's bills to the number of kilowatt-hours they used on the first bills.

Here are some ideas:

- Turn the lights off after leaving a room.
- Open the curtains instead of turning on the lights.
- Use energy efficient light bulbs.
- Ask for air conditioning to be turned down and open the windows to let some air

- in.
 - When possible, wear an extra sweater instead of turning on the heating.
 - After your cell phone is done charging unplug the charger from the wall. The charger wastes energy when nothing is plugged in to it.
 - Whenever you can, take the stairs, not the lift, it will help you keep fit.
 - A TV set on standby can still use a quarter of the energy it uses when it is on, it is better if you unplug it.
 - Turn off your stereo when you are not listening to it.
 - Don't leave your computer on if you are not using it, let it sleep and turn off the monitor to save energy.
 - If your family is buying new household appliances, make sure they are energy efficient ones.
4. One month later, ask the participants to record the total number of kilowatt-hours listed on their families' electric bill and compare their results!
 5. Sum up the new total of kilowatt-hours of your entire group, how did they do?

Discussion

What was the easiest thing to do to save energy?

Was your family supportive? Do you think you can continue applying these tips in your everyday activities?

Who in your group managed to reduce the highest number of kilowatt-hours?

And the Award Goes To...

Level 1 2 3

Aim

To encourage teachers and leaders to keep up the good work.

Materials

Coloured cardboard, colour markers, your school or youth group auditorium.

Time

1 hour to plan the activity and another hour to make the award ceremony.

How to do it

1. Explain to your group that they are having their own *Green Award Ceremony* where they will award their teachers or leaders who have demonstrated some special abilities or characteristics regarding environmental respect and protection.

Here are some ideas:

- *Saving water and using it wisely*
- *Respecting and caring for animals*
- *Saving energy and always turning off lights*
- *Saving paper*
- *Recycling wastes*
- *Using reusable objects when possible*
- *Caring for plants and trees*
- *Eating nutritious food*
- *Avoiding food with too much packaging*
- *Helping others to learn about the **environment***

2. Have the participants make some cool diplomas for their teachers or leaders. And, of course, ask them to make nice invitations so all their school or youth group can come to the ceremony. Make sure they include all the necessary information:
 - Theme

- Date
- Time
- Audience – everyone!
- Place

3. Give your group some time to organize their ceremony and the different points of the program: opening words, awarding of diplomas, closing. One of the participants will also have to act as the host.
4. The day of the event you could also invite some family members, community members, or the local media.
5. Discuss your nice experience.

Discussion

How can this activity encourage your teachers or leaders to keep up the good work?
If your friends were to give you a ‘green award’, what do you think it would be for?

Your Eco-code

Level 1 2 3

Aim

To create your school or youth group’s environmental values.

Materials

A meeting room, papers, pencils, poster boards, colour markers, adhesive tape.

Time

1 hour.

How to do it

1. Explain to your group that you are creating your school or youth group’s Eco-code. The Eco-code is a mission statement that should demonstrate, in a clear and imaginative way, your school or youth group’s commitment to improving its environmental performance. It should be memorable and familiar.
2. Tell your group that to elaborate your Eco-code you are inviting some friends from other groups and classes; this is important as it will give everyone a greater sense of responsibility toward the values the Eco-code represents.
3. Gather everyone in a meeting room and ask them to think about their school or youth group’s aims and targets regarding **biodiversity** protection and **conservation**.

Here is an example:

P.A.P.E.R

Paper will not be wasted;

All pages in copy will be filled;

Photocopies will be 2-sided;

Every box, paper and cardboard will be reused, recycled and therefore reduced;

Reduction of paper is our aim.

4. Ask the participants to make some cool posters containing the Eco-code. They must be prominently displayed throughout the school or youth group. For instance, post it on your notice board, in every classroom or meeting room, in communal areas, and in the staff room. The Eco-code should also be presented to the local community at your different events.

Discussion

Is there any aspect in which your school or youth group needs to improve?

How do you think your Eco-code will help overcome this?
How important is it that everyone develops a sense of responsibility toward applying your Eco-code?

Source: National Wildlife Federation, Global Warming, School Solutions, Eco-Schools USA, Become an Eco-School, Eco-Code, www.nwf.org/Global-Warming/School-Solutions/Eco-Schools-USA/Become-an-Eco-School/Steps/Eco-Code.aspx

Stop Habitat Destruction!

Level 2 3

Aim

To learn about **habitats** and how to protect them.

Materials

Coloured cardboard, colouring pencils, colour markers.

Time

40 minutes.

Background

Our planet has millions of different **species** of plants and animals living in unique **habitats** all around the world. A suitable **habitat** is a critical necessity for all living **organisms**. A **habitat** is comprised of the physical and environmental features where a particular type of **organism** can find food, water and shelter. **Species** adapt to and depend upon particular **habitats**. Unfortunately, these places where animals and plants live and grow are being destroyed; many animals and plants may not be able to cope with these changes and may not survive.

How to do it

1. Remind your group how learning about the need of **habitats** and how to preserve them represents a responsibility we all share.
2. Explain to your group that they are going to make some cool leaflets about natural **habitats** (including some interesting facts) and how to help stop **habitat** damage.

Here are some ideas:

Facts

- Our world is home to nearly 10 000 000 incredible **species** of plants and animals.
- As the world population grows, more and more houses, offices, shops and roads must be built, and this means a greater need for water and energy.
- Oceans, seas, rivers and lakes are being over-fished and polluted by rubbish, chemicals and sewage.
- One out of every five living **species** could disappear in the next 30 years.
- Meadows, grasslands and hedgerows are being ploughed up for crops and polluted with chemicals that poison animals and plants.
- **Habitat** loss and degradation represent the biggest single source of pressure on **biodiversity** worldwide, and one of the main causes is the conversion of wild lands to agriculture, which accounts for 30 percent of land globally.
- When fuel is burnt to provide electricity it releases **greenhouse gases** into the air and causes **climate change**; alterations in temperature is making **species** and **habitats** disappear as they cannot adapt to such rapid changes.
- More than half of the world's forests have been completely destroyed, mostly during the last century.

Source: Friends of the Earth, Resources, Factsheets, Mad About Natural Habitats, www.foe.co.uk/resource/factsheets/habitats_mad_about.pdf

Advice

- Visit your wildlife areas so you can realize why they are so important and, thus, need to be preserved.
- If you have a garden, grow different plants that attract wildlife, you will help them

- find food and shelter.
 - Make your own compost from leftover food instead of sending it to landfills.
 - Shop wisely; ask your family to buy organic food when possible.
 - Dress up with 'green style'; buy clothes that were made with organic materials.
 - Buy products from companies that care for and respect the **environment**.
 - Buy recycled and second hand whenever possible, this stops consuming more natural resources.
 - Recycle and use less of... everything! If we do this, there would be less pollution and fewer raw materials would be mined.
 - Raise your voice! Tell your government representatives that you want laws to protect all our amazing **habitats** and wildlife from being damaged.
3. Divide your group into small teams and ask each one to elaborate the leaflet, it is a good idea to fold it in three (Z fold) to make it look nice.
 4. Once they are done, have them deliver their leaflets to other classes or youth groups!

Discussion

Whose responsibility is it to protect **habitats** and their living creatures?
 How can you do that through your everyday choices?
 What do you think is the biggest negative impact your school or youth group is causing to **biodiversity**? What can you do about it?

Endangered Species Parade

Level 1 2 3

Aim

To remind everyone about **endangered species**.

Materials

Poster boards, colour markers, books or internet (to look for **endangered species** in your country), adhesive tape.

Time

1 hour.

Background

An **endangered species** (including animals or plants) is a population of **organisms** that are still alive, but very few of them remain. This **species** is at risk of becoming extinct or disappearing forever because it is either few in numbers, or threatened by changing environmental or predation conditions.

How to do it

1. Explain to your group that this activity has the objective of helping others to see and learn about **endangered species** in your country.
2. Divide the participants into small teams and have each one choose an **endangered species**, plant or animal.
3. Ask each team to investigate about their **species** and to make a cool poster containing a drawing and some information about it.
4. Have each group present their **endangered species**.
5. Display the team's works in a place where other groups and classes can see them.

Discussion

Why is it important to learn about the **endangered species** in your country?
 Why did these **species** become **endangered**?
 Is your community already making a change? If not, what can you do about it?

Respect Animals

Level 1

Aim

To reflect about the need to respect animals.

Materials

Cardboards, colouring pencils, colour markers, ice-cream sticks, glue, scissors.

Time

A 40 minute lesson to make the masks, and another 20 minute lesson to review the outcomes of the activity.

How to do it

1. Remind your group that animals are very important for our world. Have them think about the many benefits we receive from them.
2. Next, explain to your group that they are making some cool animal masks so they can wear them the next morning to school or youth group. Tell them they will be doing this to remind everyone about the need to respect and protect animals.

To make the masks:

- Have the participants draw their favourite animal on a piece of cardboard, big enough to cover all his/her face. Cut the mask and make some holes for the eyes. Glue an ice-cream stick at the bottom of the mask so the children can hold it.
3. Tell the participants that the morning of the activity they must talk to at least one person to tell them about the benefits we receive from animals and to encourage them to care for them.
 4. Discuss their experiences.

Discussion

What are animals rights?

Do you have an animal at home? What are its needs?

How can you help take care of the animals that visit your garden?

Amazing Rainforest

Level 2 3

Aim

To learn about rainforests and understand that our choices can affect them.

Materials

Green and brown poster boards, markers, adhesive tape, scissors.

Time

40 minutes.

Background

Tropical rainforests are warm, humid, wet forests. In most tropical rainforests, it rains every day. Tropical rainforests grow in a narrow zone near the equator. They are found in South and Central America, Africa, Asia, and Australia. The largest rainforest in the world is the Amazon rainforest in South America. Rainforests contain over half of the planet's wildlife and represent home for many people. Rainforests are precious and amazing, but we are losing them fast. Everyone must start making a change now!

How to do it

1. Explain to your group that they are producing a *Fact and Solution Rainforest Tree*.
2. Ask each participant to draw around their left hand on a piece of brown poster board and tell them to write a fact about the rainforest on it.

Here are some ideas:

- Tropical rainforests have the greatest **biodiversity** of any other **ecosystem** on earth, they contain over half of all wild plants and animals on the planet.

- It is estimated that 31 million hectares of tropical rainforest are destroyed each year. That is an area larger than Poland.
- People have lived in the rainforests for thousands of years, and many different tribes still live there, but they have learnt how to take all that they need without destroying the **environment**.
- Tropical rainforests once covered 14 percent of the earth's land surface, but now they only cover 6 percent.
- Rainforests have 170 000 of the world's 400 000 known plant **species**.
- Tropical rainforests are quickly disappearing as a result of logging and clearing for timber, livestock grazing, plantations, and the harvest of other natural resources.
- Many of our favourite foods first came from the rainforests and about one-quarter of all the medicines we use come from rainforest plants.
- Destroying rainforests harms wildlife. The orangutan, spider monkey and the scarlet macaw are now all **endangered** creatures.

3. Then, have the participants draw around their right hand on a piece of green poster board and ask them to write a solution to help prevent rainforest destruction on it.

Here are some ideas:

- Learn about rainforests and how amazing they are so you can be conscious about the need to protect them.
- Recycling and reusing items as many times as you can will help protect the **environment**. This is because companies will not need to collect as much of the world's precious wood, metals and other materials to make new things.
- Support the creation of protected areas and rehabilitation centers in tropical rainforests, many plants and animals do not survive when they are destroyed.
- Use less paper at home and at school or youth group and try to choose recycled paper. Write on both sides of the paper.
- Ask your family to recycle unwanted wood. If your local council does not run a recycling scheme, ask one to be set up!
- Shop wisely, when buying something new, especially wooden products, choose recycled or buy second hand. Avoid buying throw-away paper products such as paper cups, plates, etc.
- Save energy at home and at school or youth group, greenhouse gas emissions from the burning of **fossil fuels** are contributing to **climate change** and all our **environment** is being affected.
- Buy wooden goods only if they have the Forest Stewardship Council (FSC) logo, it will tell you that the wood used is from a well-managed forest.

4. Next, tell them to help you put all the 'fact hands' together to form the trunk of the tree and all the 'solution hands' together to form the branches of the tree.

5. Finally, tell the participants to invite other groups to learn from their rainforest tree! Or you could even put it in a place where all your school or youth group can see it.

Discussion

What do you think the world would be like if rainforests were all destroyed?
 How does a tropical rainforest compare to another forest you have been to?
 Would you like to live in a rainforest or in a different **environment**? Why?
 How can you help people understand the value of tropical rainforests?

Facts Source: Friends of the Earth, Resources, Factsheets, Mad About Rainforests,
www.foe.co.uk/resource/factsheets/rainforest_mad_about.pdf
 Globio, Glossopedia, Tropical Rainforest,
www.globio.org/glossopedia/article.aspx?art_id=6&art_nm=Tropical+Rainforest#

Greener Fashion!

Level 2 3

Aim

To think about how the fashion industry can affect our natural world.

Materials

School or youth group auditorium or theatre, cardboards, colour markers, the participants might need other materials for their role play.

Time

A 1 hour lesson to prepare the activity and another 1 hour lesson to present it.

Background

What is Fashion? For centuries individuals or societies have used clothes, accessories, jewellery and other body adornment as a form of non-verbal communication to indicate occupation, gender, geographic origin, group affiliation, personal style, etc. What we wear, how and when we wear it, provides others with shorthand to subtly read the surface of a certain person. Fashion is a language of signs and symbols, it is an international language, a sort of common art, through which a culture examines its notions of beauty and goodness.

Fashion, by definition, changes constantly. The changes may occur more rapidly than in most other fields of human activity (language, thought, etc). For some, modern fast-paced changes in fashion embody many of the negative aspects of western societies: it results in waste of resources and encourages people to buy things they do not really need. Others, especially young people, enjoy the diversity that changing fashion can apparently provide, seeing the constant change as a way to satisfy their desire to experience 'new' and 'interesting' things.

But, fashion has some hidden costs, in terms of social and environmental impacts: sweatshops, use of pesticides for fibre production, wild animal trade, etc. The textile and clothing industry is a diverse one, in the raw materials it uses and in the techniques it employs. Spinning, weaving and industrial manufacture undermine air quality. Dyeing and printing use vast amounts of water and chemicals, releasing volatile agents into the **atmosphere** that are particularly harmful to our health. In this context, being informed consumers is very important to make responsible choices!

How to do it

1. Explain to your group that they are making a role play about fashion and its effects on the **environment** for your whole school or youth group. Make sure you especially invite the little ones, so they can have a good green start.
2. Start by discussing how young people can help protect nature by thinking before buying and making wise choices. Remind them they decide how to spend their money, so they can use their purchase power to send a clear, strong message to stylists, manufacturers, and retailers.

Here are some ideas that might be useful for their role play:

- Think before you buy. Think about what you really need and want: do not purchase your clothes and accessories just because 'everybody else has it', or are pushed by an aggressive marketing campaign.
- Buy fewer and more durable clothes, it may cost a little bit more, but you will see the difference. In the long term, you will be saving money.
- Mend clothes when possible, do not just throw them away.
- Check the labels, if they don't give you enough clear information, don't be afraid to ask. Most of the clothes in our wardrobes contain polyester, elastane or lycra. These are cheap and easy-care fibers whose manufacture creates pollution and they are hard to recycle.
- Prefer eco-friendly fabrics which are made with materials that are claimed to cause less harm to the **environment**, like organic cotton and wool produced

- without synthetic chemicals and pesticides, or hardy, fast-growing plants like bamboo and hemp that are produced with relatively little pesticides and fertilizers.
- Choose goods made/distributed by manufacturers and retailers with clear environmental and ethical policies and related codes of conduct.
- Prefer eco-labeled and ethical-labeled products and services.
- Choose products containing significant percentages of recycled materials or which are easily disposable or recyclable.
- Donate your unwanted clothes. You can even exchange them with your friends.
- Keep your favourite brands under continuous scrutiny; contact your local consumer group to find out more about them. Join web campaigns to improve manufacturing employment practices.
- Buy directly from the producer, if you have access to the Internet, shop 'virtually' whenever possible and cut down the distribution chain. By doing so you will contribute to reducing transport-linked pollution while benefiting local small producers.

3. Give your group enough time to prepare themselves. Ask your group to help you make some nice invitation letters and send them out. Make sure you include all the necessary information:
 - Topic
 - Date
 - Time
 - Audience – everyone!
 - Place

Discussion

How do you choose what to wear?
 How healthy are your clothes?
 What is your favorite shirt made of? Where does it come from?
 How important do you think it is for people to be informed consumers?

Source: United Nations Environment Programme, Youth Xchange, Towards Sustainable Lifestyles, The Guide, Training Kit on responsible Consumption, Looking Cool and Fair, www.unep.org/pdf/DTIE_PDFS/DTIX0655xPA-YXCguide08EN.pdf, page 57.

At the Beach!

Level 1 2 3

Aim

To learn about ways to protect beaches.

Materials

A day at the beach!

Time

2 hours.

How to do it

1. If you are lucky to live close to the sea, explain to your group that you are spending some time at the beach in order to explore it and determine if there are things that need to be changed.
2. Ask your group to walk around and observe how the beach is conserved and how people behave. Are they acting responsibly?
3. Have your group sit in a circle and encourage discussion. Why do beaches and shorelines need to be protected?
4. Next, ask your group to think of simple ideas to protect beaches and oceans.

Here are some ideas:

- Take your trash with you and put it in the right place.
- Never throw trash into the water, many animals die every year for this

reason.

- Use the walkways at the beach instead of trampling on the dunes, these areas are very delicate and are easily harmed.
 - If your beach needs a major clean up, volunteer to help get rid of the trash!
 - At home, avoid using chemicals on your garden, these can run off into different water bodies and make their way into seas, polluting the water and harming the wildlife.
 - If you bring your pets to the beach, make sure you keep it clean.
 - Don't take any animals or plants with you, they are happy where they live!
5. Finally, have your group invite some people they see around so they can share with them their ideas to preserve the local beaches.

Discussion

What is the main issue affecting the beaches in your country?
Do you think your community is beach-conscious? Why or why not?
How did the people react when you told them how important it is to protect the beaches and oceans? Were they willing to follow your advice?

Green Advertisements!

Level 1 2 3

Aim

To give others a nice message about **biodiversity**.

Materials

Video camera (a digital camera, a mobile phone with a camera or voice recorder could work if you do not have access to a video camera); the groups might need some additional materials for their videos/recordings.

Time

A 40 minute lesson to organize the activity, and another 1 hour lesson to make the videos/recordings.

How to do it

1. Explain to your group that they are going to make some cool advertisements about **biodiversity**.
2. Divide your group into small teams and tell them that they must make a fun video/recording about the following topic:

You depend on biodiversity, and biodiversity depends on you!

They can also include ideas about how to protect our amazing biological diversity. Tell them to be creative!

3. In the first lesson give the teams some time to organize their ideas and think about any extra materials they might need.
4. In the next lesson, help them make their videos/recordings.
5. Finally, share the videos/recordings with other classes or groups.

Discussion

What does it mean when we say that people are the keepers of the Earth?
How do advertisements help get messages across and influence people's points of view?

Biodiversity Pledge!

Level 1 2 3

Aim

To commit to care about our great **biodiversity**.

Materials

Papers, pencils.

Time

A 40 minute lesson to organize the activity, and another 30 minute lesson to review the outcomes.

How to do it

1. Explain to your group that they are going to have their families, their school or youth group friends, and members of their community sign a *Biodiversity Pledge*.
2. To start with, ask your group to write a fun and appealing pledge.
Here is an idea:

Biodiversity Pledge

I pledge to:

- Save energy and use it wisely.
- Use less water and value it as a precious resource.
- Shop smart and buy only what I really need.
- Help reduce pollution by being wise about waste and toxic materials.
- Surround myself in green, care for and enjoy the great outdoors.

I promise to:

- Explore the wonders of nature around me.
- Learn about the importance of every living thing.
- Live every day as Earth's best friend.
- Encourage and help others to do the same.

Name

Signature

.....
.....
.....

.....
.....
.....

3. Give some copies of the pledge to each participant. As homework, ask them to have everyone sign their pledge.
4. Discuss your experience.

Discussion

How did people feel about your initiative?
How do you feel knowing that you are making a difference?
How important is it to inform and involve others in different activities that might help them become aware of the need to respect **biodiversity**?

Eco-Traveler Code

Level 1 2 3

Aim

To reflect on how transport and traveling affects nature.

Materials

Cardboard, colour markers.

Time

1 hour.

Background

Almost all of us like to travel and take the opportunity to visit a new and fun place. There is nothing like seeing for yourself all the wonderful places we hear about almost every day! As every eco-aware person on the planet knows, however, it all comes at a cost, and that means more than simply the price of a airline ticket, or the entrance fee to visitor attractions. Fortunately, it certainly doesn't have to be all bad news; with a bit of care, it is perfectly possible to still enjoy your trip, without quite literally costing the earth.

How to do it

1. Explain to your group that they are making an *Eco Traveler Code*, which they will then share with other classes or youth groups so they can make sure that when they travel they enjoy their trip and respect the planet at the same time. This is a great activity you can make before a holiday!
2. Have your group think about some ideas for their code.

Here is some useful information:

Travelling

- Always try to use the most environmentally friendly form of transport you can for each part of your journey; don't forget that how you get to the airport and the way you choose to explore your destination has an effect on the overall environmental cost of your trip too.
- If you chose to travel by car, share it with your friends or family.
- Try going by train instead of using an airplane, trains are much less polluting. If air travel is unavoidable, try to choose airlines with higher occupancy rates and more efficient aircraft.
- Choose "green" hotels, tour operators and suppliers that support sustainable development, do not impact negatively on the **environment**, and provide financial support to local communities. They should be able to advise you about the important things you need to know – and what to avoid – for your chosen destination.
- Once you return home, you might like to consider a carbon offset – either as part of an official scheme, or something less formal such as planting an extra tree in your back garden.

Packing and Luggage

- If you don't really need it, leave it behind. Added weight means more fuel has to be burnt, and that means more emissions!
- Take as little packaging away with you as you can; it reduces weight and minimizes the need to dispose of your rubbish where you are going.
- Bring as much of your waste back with you as you can, especially if you have gone somewhere where local facilities to recycle don't exist.

Wildlife and the Environment

- Always aim to leave anywhere you visit just as you found it – no litter, no damage, no mess.
- Enjoy what you see, but always leave animals, plants and the places as undisturbed as you can.

- Remember the old saying “leave nothing but footprints, take nothing but photographs.”

Local Impact

- Find out about the people, their culture and traditions before you go to make sure you don't cause offence; they will respect and appreciate you for it.
- Try to use services and companies which benefit the local economy and people where you can.
- Don't overburden local resources; things like water, food and energy may not be as plentiful as back home, and facilities for recycling and waste disposal less freely available.
- Avoid damaging recreational activities, such as sports which have a significant harmful impact on the **environment**.

Photos and Souvenirs

- Ask before you take photographs – not everyone welcomes having their picture taken.
- Try to buy local, ethically produced souvenirs which will benefit the people who actually made them.
- Watch what you buy for a souvenir! Be careful about anything made from materials that were once living – shells, bones, coral, flowers or wood, they could be illegal. Make sure you don't buy anything **endangered**.

3. Divide your group into couples and ask each one to use a piece of cardboard to write down the Eco Traveler Code. Tell them to make it look fun and attractive.
4. Share your code with other classes or groups!

Discussion

How difficult do you think it is to think “eco” before acting?
And how important is it?

Source: Eco friendly Kids, Eco Travellers Code,
www.ecofriendlykids.co.uk/eco-travellers-code.html

No More Toxics!

Level 1 2 3

Aim

To learn about toxics and ways to prevent them from affecting nature.

Materials

Poster boards, colour markers, adhesive tape.

Time

1 hour.

Background

Bug spray, powerful cleaners, fertilizers for lawns, crops, and golf courses. These and other chemicals can help make our lives easier, but they can also cause unintended problems. Toxic issues affect us all in some way. Because of that, it is important to know that there are many ways that each of us can help in solving the problem. Actions we can take may range from simple consumer choices to a more active role in community decision making, to more responsible activities at the workplace.

How to do it

1. Explain to your group that chemicals bring significant benefits to society - through their use in healthcare for example - unfortunately some chemicals are damaging to wildlife and people. Toxic chemicals have made their way into every ocean and continent on Earth and contaminated whales, panthers, seals, and almost every living

thing, some very seriously.

2. Ask your group to think about ways how they can help to eliminate or reduce toxics.

Here are some ideas:

- Ask your school or youth group to use and recycle white paper. Coloured paper requires more bleach in the recycling process to remove the inks and dyes.
- When practical, use latex or water-based paint instead of oil-based paint. Oil-based paints and their solvents can be toxic, and the by-products of manufacturing these paints are dangerous pollutants.
- Instead of using toxic chemical pesticides on your garden, use organic ones such as a soapy spray. Once pest populations are reduced, introduce predatory insects like ladybugs and praying mantises that eat the plant-eating pests. Chemical pesticides can endanger wildlife and beneficial insects, contaminate groundwater, and destroy soil **microorganisms** essential for healthy and productive plant growth.
- Choose household cleaning products with ingredients that break down naturally in the **environment** and don't end up in the sea and contaminate water supplies. Use the least toxic cleaners you can find, or make your own for easy cleaning jobs. For example, mix together vinegar and salt for use as a surface cleaner.
- Avoid the use of toxic drain cleaners. Prevent clogged drains by straining food particles and hair, collecting grease in separate containers, and pouring boiling water or baking soda and vinegar down the drain. To open clogged drains, use a plunger instead of toxic chemical products.
- Use a non-chlorine bleach whenever possible. Chlorine is a powerful chemical that can kill fish and other aquatic life if it ends up in streams, rivers, or lakes.
- Help cut down on the use of toxic chemicals around your home by using natural lawn care methods. If homeowners reduced their use of pesticides by ten percent, we would remove five million pounds of toxic chemicals from the **environment** every year. Try weeding by hand, using ladybugs and other natural pest controls, and planting native **species** adapted to the conditions in your area to keep your yard healthy and toxics-free.
- Help improve your pet's (and the planet's) health by cutting down on flea powders and other toxic chemicals to control fleas. Use pesticides only during the height of flea season, wash your pet with soap and water, and use a flea comb regularly.
- Avoid using toxic chemicals on your carpet. To deodorize dry carpets, sprinkle liberally with baking soda. Wait at least 15 minutes and vacuum. Repeat as needed.
- Ask the managers of the stores you frequent to offer effective alternatives to cleaning products that contain hazardous chemicals. Many types of nontoxic, environmentally friendly cleaning products are available.
- Find a hazardous waste disposal site near you, chemicals must be disposed of properly when no longer needed. Never dispose of them down the drain.
- Identify the toxic chemicals in your home. Common household items such as paints, cleaners, oils, batteries, and pesticides often contain hazardous chemicals. Read the labels to find out if a product is toxic; look for warnings like danger, caution, toxic, corrosive, flammable, or poison. These products are considered household hazardous waste and should be disposed of properly.
- Organize a group of students to conduct an inventory of the toxic chemicals in your school. Talk with your teachers or leaders, principal, cleaning staff, and groundskeepers to find out what kinds of cleaners, paints, and pesticides are being used around the school. Then, look for ways they can be reduced, you can even present a toxics reduction plan to your principal.
- Dispose of your rechargeable batteries properly. While rechargeable batteries help reduce the amount of waste in landfills, they do contain toxic chemicals.
- Use and store hazardous chemicals carefully. Never store hazardous products in food containers; instead, keep them in their original containers with their original

labels. Seal containers tightly to prevent volatile chemicals from evaporating into the air.

- Help protect agricultural workers, yourself, and the **environment** by buying organically grown produce. Organic fruits and vegetables are grown without applying toxic pesticides and chemical fertilizers, and, therefore, are friendlier to farmers, consumers, and **biodiversity**.
- Whenever possible, buy organic cotton. Cotton is the most pesticide-intensive crop in the world, accounting for 25 percent of the pesticides used in the world.

3. Tell your group to make a cool poster with these ideas and put it in a place where everyone can see it!

Discussion

Who can be affected by toxic chemicals in our **environment**?

How can understanding the full impact of toxic chemicals help us make better decisions about the role they should play in our lives and communities?

Who is responsible for acting?

Source: World Wildlife Foundation, Biodiversity 911, Toxics,
www.biodiversity911.org/toxics/pdfs/toxics_actions.pdf

Humankind or nature?

Level 1 2 3

Aim

To learn that humankind must find a balance between its needs and nature preservation.

Materials

Notebooks, pencils, guest speaker.

Time

A 10 minute lesson to explain the activity and to prepare some questions for the farmer's visit, and another 40 minute lesson to receive him/her.

How to do it

1. Explain to your group that you are inviting an expert – a person who works in the environmental or **conservation** area - to come to your school or youth group to answer the following questions:

Can humankind be given priority over nature? Who decides this?

2. Before that day, make sure you encourage your group to think about the things they might want to know and help them prepare some questions. Don't forget to invite other groups and classes.
3. Discuss about the new knowledge you acquired.

Discussion

Do you believe humankind has acted careless and disrespectful regarding natural resource use?

Are we still on time to revert the problems we have already caused to our world?

What can you make to respect nature with your everyday actions?

Take action!

The Green Hour

Level 1 2 3

Aim

To encourage children and youth to spend more time outside.

Materials

An outdoor space.

Time

A 20 minute lesson to explain the homework and another 30 minute lesson to discuss the participants' experiences.

How to do it

1. Remind your group how important it is for children and youth to spend some time having fun with nature. Discuss with them how children who regularly spend unstructured time outside:
 - Play more creatively;
 - Have lower stress levels;
 - Have more active imaginations;
 - Become fitter and leaner;
 - Develop stronger immune systems;
 - Have greater respect for themselves, for others, and for the **environment**.
2. Explain to them that as homework they will have to spend an hour playing, exploring or exercising outside! Make sure they realize that they will be also helping the planet as they will not be inside using energy: watching TV, surfing on the internet or playing video games.
3. In the next lesson, have each participant share their experience.

Discussion

How did you feel spending some cool time outdoors?

What activities did you do?

How do activities like this one help you stay happy and healthy?

Adapted from: national Wildlife Federation, Global Warming School Solutions, Eco-Schools USA, Pathways Green Hour, www.nwf.org/Global-Warming/School-Solutions/Eco-Schools-USA/Become-an-Eco-School/Pathways/Green-Hour.aspx

Biodiversity Audit

Level 1 2 3

Aim

To discover your school or youth group's level of **biodiversity**.

Materials

School or youth group's garden, copy of the Biodiversity Audit, pencil.

Time

50 minutes.

How to do it

1. Explain to you group that they are making a *Biodiversity Audit* on their school or youth group's garden.
2. Take your group outside and ask them to complete Biodiversity Audit Scorecard.
3. Help them calculate their school or youth group's **biodiversity** rating.
4. Next, based on your results, decide what you can do to improve **biodiversity** on your school or youth group's grounds, maybe you can start by talking to

- your principal or director about it.
5. Encourage discussion.

Discussion

What do you think about your school or youth group's **biodiversity** rate?
 Why is **biodiversity** important for your school or youth group?
 How can you take care of your school or youth group's gardens or backyard?

SCHOOL BIODIVERSITY AUDIT SCORECARD

What is your school's level of biodiversity?

Biodiversity category	What to look for	Points	Your score
Trees	Fewer than 10 large trees (over 6m)	1	
	More than 11 large trees	2	
	Most trees Australian natives	3	
	Most trees locally native trees	4	
	Most trees locally native and older than 20 years	5	
Shrubs	A few	1	
	Lots	2	
	Most shrubs Australian natives	3	
	Most shrubs locally native	4	
Ground cover	Large lawn area	1	
	Small lawn area	2	
	Mulched flower garden beds	3	
	Native grasses or low spreading plants	4	
Beetle and bug habitat	More than 10 dead branches or logs	4	
	More than 10 large rocks	4	
	Large areas of leaf litter	4	
Bird habitat	More than 20 locally native trees and shrubs	4	
	10-20 locally native trees and shrubs	3	
	Freshwater ponds or dams	4	
Native animal habitat	Areas of native bush with understorey	4	
	More than 20 locally native trees and shrubs	3	
	More than 5 dead trees with hollows	3	
	10-20 locally native trees and shrubs	2	
Frog habitat	Native wetland area	3	
	Large dams or ponds	2	
TOTAL SCORE			

How does your school rate?

50+	Excellent. Look after what you've got.
34-50	Very good. There's room for improvement. Try planting more locally native trees, shrubs and grasses
10-24	Good. Try to look at ways you can improve habitat for native animals, birds and insects.
Under 10	Talk to other students, staff and the schools' grounds staff about how to improve biodiversity within the school environment .

Source: Up 2 Me For Kids, Teachers, School, School Biodiversity Audit Scorecard,
<http://up2meforkids.com.au/extras/downloads/223.School%20biodiversity%20audit%20scorecard.pdf>

No Cars Allowed Today!

Level 1 2 3

Aim

To encourage others to be conscious of car pollution.

Materials

Poster board, markers, paper, pencils.

Time

Two 1 hour lessons (1 hour to organize the activity and 1 hour to review the results).

Background

Our quality of life depends on the quality of our **environment**, but we have put too much pressure on it. One of the main causes is car pollution; no other machine has had a greater impact on our **environment** than this one. The millions of cars in which we travel around every day are a big cause of air pollution.

The exhausts of cars emit many different chemicals, such as carbon monoxide, **carbon dioxide**, nitrogen oxides, hydrocarbons and dirty particles that pollute our air. These gases degrade the health of the city and its people. Dirty air can give us headaches, irritate our nose, throat and lungs and make breathing problems worse.

It is not bad to use a car, but why not avoid it when you can! Cars add far more carbon per person to the air than public transport. So, it is time to start making wiser choices.

How to do it

1. Explain to your group that you are organizing a car free day, when no one can come to school or youth group by car. Give a name to your campaign, for example: *No Cars Allowed Today!*
2. Get students and teachers to pledge to walk, to bicycle, to take the bus or the train that day! You can have everyone sign a pledge to ensure their participation.
Here is an example:

No Cars Allowed Today! Campaign

I pledge not to drive my car today and to give my world a breath of hope!

Day of the event:

Name	Age	Signature

We count on YOU!

3. Have your group make some posters to publicize your event. Make sure you include all the necessary information:
 - Day of the event;
 - Objective;

And you could also include some ideas to encourage participation:

- Riding a bicycle is not only green, but healthy too.
- Using public transport means fewer cars on the road and less pollution.
- Smokes from cars can seriously damage your health.
- Traffic fumes contain some of the most harmful substances known to humans.

4. Place the posters all around your school or youth group. Make sure everyone hears about it! You could also stick the pledge papers under the poster, so everyone can sign.

Discussion

How many people did you get to sing your pledge?

How did you feel the day of the event?

Do you think you can convince your family and friends to do the same? Why is this important?

Corporate Responsibility

Level 2 3

Aim

To reflect about the role companies have in environmental protection.

Materials

Papers, pencils.

Time

40 minutes.

Background

Companies also have a role to play in **biodiversity** protection. Corporate Social Responsibility (CSR) has become a slogan entering the global debate. As companies have started to become more powerful worldwide, it is generally recognized that they must embrace responsibility for their actions and encourage a positive impact through their activities on the **environment**, consumers, employees and the community.

How to do it

1. Remind your group how companies have a social responsibility; discuss how they must assume the environmental impacts of their production and undertake different activities to protect the natural world.
2. Explain to your group that they are writing to a local business to ask it to sponsor an event. Ask your group to think about any creative activity they might want to develop in favour of their local **biodiversity**:
 - A new vegetable garden for their school or youth group;
 - An awareness walk to encourage recycling;
 - A lake clean-up;
 - And many more!
3. Have your group brainstorm some ideas they might want to include. Have them choose what a good opening, body and closing would be.
4. Write the letter with the help of your entire group and make sure you all sign it.

Discussion

Have you heard about other initiatives local companies have taken in favour of the **environment**?

What do you believe is the role companies have in your community?

Why is it important that every company integrates corporate citizenship values into their business models?

Save Energy Day

Level 1 2 3

Aim

To encourage everyone to reduce energy use.

Materials

Poster boards, colour markers, papers, adhesive tape.

Time

A 1 hour lesson to prepare the activity and another 30 minute lesson to review the outcomes.

How to do it

1. Remind your group about how we can all help reduce air pollution when we save energy.
2. Explain to them that they are going to be organizing a *Save Energy Day* when they will encourage everyone to reduce their energy use by undertaking any of the following ideas:
 - Bad hair day! Ask everyone at your school or youth group not to use the hair drier, hair straighteners or curling irons for one day.
 - Zzz day! Ask everyone at your school or youth group to sleep one hour earlier.
 - Dry in the sun day! Ask everyone at your school or youth group to tell their family to dry their clothes outside instead of using the clothes dryer.
3. Ask your group to make some cool posters to publicize their event. Make sure they include all the necessary information:
 - Theme
 - Date
 - Objective
 - Activity
 - Who can participate – everyone!

Also, leave some space in a corner of your posters so everyone can write their name and a small explanation about their experience.

<i>Save Energy Day!</i>	
<i>Name</i>	<i>Experience</i>
.....
.....
.....

4. Put the posters all around your school or youth group so everyone hears about it!
5. Review the outcomes of your activity.

Discussion

Where you able to encourage many people to participate? How were their experiences?
 How do you think people felt while making this fun activity?
 How did you feel knowing you are helping to make a change?

A Walk for Nature!

Level 1 2 3

Aim

To encourage others to protect plants and animals.

Materials

Small potted plants, pets (dogs are better at walking).

Time

A 40 minute lesson to organize the activity and another 1 hour lesson to develop it.

How to do it

1. Explain to your group that you are organizing a *Walk for Nature!* event. Tell them that one morning they are all going for a walk around the neighbourhood to encourage people to care for and respect plants and animals.
 2. Explain to them that the day of the event everyone must carry a small potted plant or they can also take their pet, a dog is a great companion for a walk.
 3. Invite family members and other classes and groups to join your walk. Send out some cool invitations made by your group. Make sure you include all the necessary information:
 - Theme
 - Date
 - Objective
 - Activity
 - Who can participate – everyone!
 - Place
 - Time
- Be sure to take all the necessary safety precautions!*
4. Discuss the outcomes of the activity.

Discussion

How did people feel about the activity?
Why is it so important to respect and preserve plants and animals?
What do you think is your role in encouraging awareness?

Waste Detectives!

Level 1 2 3

Aim

To encourage others to reduce waste.

Materials

Children and youth at lunch time.

Time

A 50 minute lesson to prepare the activity and another 30 minute lesson to review the outcomes.

Background

Every day millions of people around the world buy all kinds of food that come with a packaging. The packaging is the container or group of materials used to wrap a product. Packaging is good as it helps protect and prevent a product from decay, but this can become a problem because it produces a lot of waste.

Waste is a serious issue. Waste disposing can be difficult and costly and most of it ends up in holes in the ground (landfill sites) or is burnt in incinerators. Every day we produce tonnes and tonnes of waste and landfill sites are already becoming full. There are concerns about the impact on people's health and pollution caused by landfill sites and incinerators.

How to do it

1. Remind your group how much waste people produce every day and how this affects our planet.
2. Explain to them that they are going to become *Waste Detectives* for one day, and that they will be in charge of discovering some children and youth that are using disposable bags or wrappers to carry their lunches to school or youth group.
3. Choose a day so the participants, during their lunch time, can look for at least two people using aluminum, plastic or paper bags and wrappers to carry their food. The

participants must talk to them about the benefits of using reusable bags, lunchboxes or containers in order to avoid creating more waste. They can also talk to them about ways to help the planet through their food choices.

Here are some ideas:

- Buy local food with no packaging.
- When possible choose sustainably produced foods.
- Cut down on meat and dairy products, they have a bigger environmental impact than vegetable crops.
- In the supermarket choose food with less packaging.
- Buy only what you will eat, we waste a lot of food.
- Purchase foods in-season to avoid food miles.
- Grow your own food.
- Compost your organic waste.
- Cook more at home and eat less junk food.
- Buy in bulk to avoid packaging.
- Use reusable bags when you go to the supermarket.

4. Have each participant share his/her experience.

Discussion

How did the people you talked to feel?

How much waste do you produce?

What resources and **biodiversity** go into the products and packaging that you throw out?

What **species** and ecosystems do the wastes affect?

Park Clean-Up!

Level 1 2 3

Aim

To encourage everyone to keep a clean neighborhood.

Materials

Poster boards, colour markers, adhesive tape (to publicize the event). You might need different materials for the park clean-up: rubber gloves, plastic bags, shovels, car or truck to take away all the garbage, photo camera (optional).

Time

A 1 hour lesson to organize the activity, and a whole morning to develop the activity.

How to do it

1. Explain to your class that you are organizing a *Park Clean-up* and that you are going to invite everyone at your school or youth group and neighbourhood to help; the more the better!
2. Divide the participants into small groups and have each one make a poster to publicize your event. Don't forget to include all the necessary information:
 - Theme
 - Date, place and time
 - Needed materials
 - Safety issues

Place the posters all around your school or youth group, in your local library, community centre or supermarket. Make sure everyone hears about it!

For the park clean-up:

1. Make sure you have any required permits to access your adopted park before the day of your event.
2. Arrange in advance for the ultimate destination of all the debris collected and

means to get it there.

3. The day of the event, make sure everyone knows where the garbage will be placed, and of course how it will be recycled.
4. List the tasks to be accomplished, hold meetings and assign tasks to different people. The idea is to clean up all the garbage and weeds around the park (or a part of it if it is too big).
5. Make a map of where people will be working and keep track of everyone.
6. Make sure everyone is aware of the safety issues: wear rubber gloves, don't pick up anything hazardous, work in pairs, call if you need help, etc.
7. When you are finished, record the amount and type of debris collected. Take pictures!
8. Provide information to the local media, you can even invite them to cover your event.

Make sure to take the necessary safety precautions!

Discussion

Where there a lot of people willing to help? Why do you think this is?

How did you feel knowing that you were doing something to improve your **environment**?

How do you think the park clean-up will help the **environment** and the life that it supports?

Trees for Life

Level 1 2 3

Aim

To remind everyone about the importance of trees.

Materials

A native tree, shovel, rake (optional), big garden, brown poster board, scissors, adhesive tape.

Time

A 30 minute lesson to explain the activity and another 20 minute lesson to discuss the participant's experiences. The participants will need some extra time with their families to develop this activity.

How to do it

1. Remind your group how trees can be a wonderful addition to your garden, they provide wildlife **habitat**, create shady areas and, of course, they help keep our planet healthy.
2. Explain to them that each one will be planting a tree with their families (they might want to plant a flower if they do not have access to a big garden). Tell them to take into account the following ideas:
 - Dig a shallow hole. Make it a diameter that is at least three times the diameter of the root ball. The hole should be no deeper than the height of the root ball, otherwise the tree roots will not be able to get enough oxygen and will have difficulty developing. Be sure to slope the sides and scrape them with a rake to allow for better root penetration.
 - Plant the tree. Place the tree in the hole, making sure to lift it by the root ball and not by the trunk. Before refilling the hole with dirt, have someone view the tree in its hole from all sides to confirm that the tree is straight. Begin filling the hole with the original soil that was removed until it is about one-third full, and then gently pack the soil around the base of the root ball. Continue filling the hole by adding a few inches of soil at a time followed by water to eliminate drying air pockets until the hole is filled and the tree is firmly planted.
 - Follow up care. Remove all tags and labels to prevent girdling of branches

or trunks. New trees need to be routinely watered for at least two years after planting. Watering sessions should be determined by the natural rainfall level to avoid over watering, which can be just as damaging as not watering enough. Trees should be watered very deeply in the root zone area.

3. After the participants plant their tree, ask them to make a nice drawing of it and to cut it out.
4. In the next lesson, ask your group to help you make the trunk and the branches of a tree and to put their drawings as the tree's leaves. Stick the tree in a wall where they can see it every day and remember the importance of trees and forests.
5. Discuss about their experiences.

Discussion

How did you feel sharing this experience with your family?
Can you name some of the benefits we receive from trees and plants?
How do you feel when you know you are contributing to protect the planet?

Adapted from: National Wildlife Federation, *Get Outside, Outdoor Activities, Garden for Wildlife, Gardening Tips, Planting Trees*, www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife/Gardening-Tips/Planting-Trees.aspx

Biodiversity and Climate Change

Level 2 3

Aim

To learn about the link between **biodiversity** and **climate change**.

Materials

Papers, pencils.

Time

1 hour.

Background

Experts believe that **climate change** is likely to become one of the most significant drivers of **biodiversity** loss by the end of the century. They now agree that by burning **fossil fuels** to provide energy we are releasing alarming concentrations of **greenhouse gases** into the **atmosphere**, causing the planet to warm up and **weather** patterns to change.

Through sudden changes to **habitats** and **ecosystems**, **climate change** could lead to the **extinction** of many **species** of terrestrial and aquatic **species** of plants and animals. **Biodiversity** can support efforts to reduce the negative effects of **climate change**. Conserved or restored **habitats** can remove **carbon dioxide** from the **atmosphere**, thus helping to address **climate change** by storing carbon (for example, reducing emissions from **deforestation** and forest degradation). Moreover, conserving intact **ecosystems**, such as mangroves, for example, can help reduce the disastrous impacts of **climate change** such as flooding and storm surges.

Source: Convention on Biological Diversity, *Climate Change and Biodiversity*, www.cbd.int/climate/

How to do it

1. Remind your group that it is currently recognized that **climate change** and **biodiversity** are interconnected. **Biodiversity** is affected by **climate change**, with negative consequences for human well-being, but **biodiversity**, through the **ecosystem** services it supports, also makes an important contribution to both **climate change** mitigation and adaptation.
2. Explain to your group that they will become teachers for a day. That's right! They will have to teach younger classes or groups about **biodiversity** and **climate change**. Tell

them that they will also have to share ideas about what they and their families can do to join the fight against global warming. The participants can work in pairs.

Here are some ideas:

- Reduce paper use, paper production is linked to rainforest destruction.
- Recycle your waste, landfill sites are already becoming full and they are negatively impacting people and nature.
- Save energy, turn off the lights, TV and computer when you are done using them.
- Shop locally grown food to avoid food miles.
- Shop smart, buy in bulk to reduce the amount of waste produced by packaging.
- Try car pooling or using public transport, car exhausts are a big cause of air pollution.
- If you are going somewhere near, think about walking or riding your bike.
- Make sure your family uses the washing machine only when you have a full load. It is better to use cold water as heating water uses a lot of energy.
- Dry your clothes outside, clothes dryers use a lot of energy.
- Plant some trees, they take in CO₂ from the air and help reduce global warming.
- Shop less. Cut down on how much stuff you buy, it takes a lot of energy to make, package, and ship things to a store.
- Tell everyone about **climate change** and the need to reduce global warming.

3. Ask each pair to share their experiences.

Discussion

How did the children you were teaching to react about the things you were telling to them?

How did you feel during the activity?

Why is it important to encourage children to learn about **climate change**?

Cool in Green Day!

Level 1 2 3

Aim

To encourage everyone at school or youth group to think green.

Materials

Poster boards, colour markers.

Time

A 40 minute lesson to explain the activity and prepare the posters and another 30 minute lesson to discuss its outcomes.

How to do it

1. Tell your group that they are organizing a *Cool in Green Day* to remind everyone about the importance of **biodiversity**! Explain to them that the day of the event everyone at your school or youth group will have to dress in green, that's right, the colour that symbolizes nature and the natural world!
2. Ask your group to make some cool posters to advertise their activity, invite everyone to participate! Make sure you include all the necessary information:
 - Theme
 - Date
 - Objective
 - Activity
 - Who can participate – everyone!
3. Also, have your group prepare a message about the importance of **biodiversity** so they can read it on the day of the event. It is a good idea to read it through the microphone or during lunch time, when all the school or

youth group is gathered.

- 4. Discuss about the outcomes of the activity.

Discussion

What were some comments you received about the activity? What does **biodiversity** mean to you? And what do you think it means to your school or youth group as a whole?

Share & Exchange Program

Level 1 2 3

Aim

To encourage people to exchange things instead of buying new ones.

Materials

A board to post things on, a sign-up sheet.

Time

30 minutes.

How to do it

- 1. Tell to your group that you are going to start a *Share & Exchange Program* at your school or youth group. Explain that the program has the objective of asking people to write down all the things they would like to give, loan, and/or trade. People who need or want those things can contact the giver directly. It is probably best for you to start off the list to get people’s ideas going!
2. Ask your group to make some sign-up sheets and to put them on the school or youth group’s board so everyone can see it!

Share & Exchange Program

Table with 6 columns: Name, What, Gift, Loan, Trade, Class/Group. Rows include Ben Carver (Guitar lessons), Mary Johnson (Vegan baking knowledge), and Mark Brown (Biodiversity book).

- 3. Send a participant to every class and/or youth group so he/she can explain the program and encourage everyone to participate.
4. Keep an eye on the paper list that is posted, and post a second page when the first one gets filled.
5. Celebrate because you have helped connect people in your school or youth group, shared materials and skills, decreased unnecessary consumption, created alternatives to monetary exchanges, and diverted things away from the landfill!

Discussion

Why is it important to encourage everyone to help prevent overuse of natural resources by changing their consumption patterns? How can small actions make a change?

Source: The Otesha project 2005, The Otesha Book, The "Share Your Wares" Program, www.otesha.ca/files/the_otesha_book.pdf, page 76.

Greening Our School Day

Level 1 2 3

Aim

To encourage young people to reuse school supplies.

Materials

Poster boards, colour markers, plastic bags.

Time

A 40 minute lesson to explain the activity and prepare the posters and another 1 hour lesson to carry out the activity.

How to do it

1. Remind your group how at the end of the year there are a lot of unused or partially used school supplies that are thrown away. Explain to them that, in order to help reduce the amount of rubbish your school or youth group produces, you are organizing a *Greening Our School Day* when everyone will clean up their lockers in search of school supplies.
5. Ask your group to make some cool posters to advertise their activity, invite everyone to participate! Make sure you include all the necessary information:
 - Theme
 - Date
 - Objective
 - Activity
 - Who can participate – everyone!
 - Time
2. Arrange two or three drop-off points in your school or youth group where children and youth can leave their unused materials. Remember to announce where these places are going to be. It might also be a good idea to have some people of your group walk around collecting the unused materials.
3. You can contact an organization to donate the supplies you collected or you can save them for next year's back-to-school season.
4. Make sure you calculate how many supplies were collected and share it with your school or youth group to encourage them to continue participating the next years.

Discussion

How many different supplies were you able to collect?
Do you think your school or youth group partners enjoyed your activity?
How can you make your back-to-school purchases more planet-friendly?
How can small actions make a big difference?

Source: Alliance for Climate Education (ACE), Act Now, Toolkit, Facilities, Locker,
www.acespace.org/act-now/toolkit/facilities/locker

The Wonders of Nature

Level 1 2 3

Aim

To learn about the many amazing natural wonders our world has.

Materials

Computer and internet access, poster boards, colour markers, adhesive tape.

Time

A 1 hour lesson to organize and prepare the activity and another 1 hour lesson to present it.

Background

The Official New 7 Wonders of Nature campaign started in 2007 and its objective is to

create a list of seven natural wonders chosen by people through a global poll. Our planet is home to an amazing amount of breathtaking natural wonders which really show all of us the incredible beauty and variety of our planet. It is extremely important to learn about all these places so we can start taking care of them.

Source: World of New 7 Wonders, New 7 Wonders of Nature,
<http://world.n7w.com/n7w-of-nature-pages/the-official-new7wonders-of-nature/>

How to do it

1. Remind your group about the many beautiful places our nature allows us to enjoy: mountains, rivers, caves, beaches, volcanoes and waterfalls, among many, many others.
2. Explain to them that they are going to learn about the wonders of nature. Divide your group into small teams and ask each one to choose any of the incredible natural wonders our world has, the *New 7 Wonders of Nature* web page can help them:

<http://www.new7wonders.com/>

3. Each team will have to make a presentation about their natural wonder; they can make some cool posters or, if possible, they could use a computer program to make their presentations.
4. Don't forget to invite other groups or classes to learn about these unique places!

Discussion

What makes each of these places so special?

Whose responsibility is it to preserve them?

Have you ever visited a place you would qualify as a wonder of nature? How was this experience?

Biodiversity Relay Race

Level 1 2 3

Aim

To show everyone that caring for the planet is at the same time a shared and fun responsibility.

Materials

An open space (like a park or backyard); additional materials will be needed according to the planned activities: water, buckets, litter (cans, bottles, papers, etc.), bags, garbage cans (or boxes would work fine), seeds, shovels, flower pots, lunch bag (with food inside), reusable containers for food, balloons, stuffed animals.

Time

A 1 hour lesson to organize the activity and 1-2 hours to develop it.

How to do it

1. Remind your group how individual actions, when multiplied, can make an exponential difference to the planet!
2. Explain to them that you are having your own *Biodiversity Relay Race*, where different teams will compete to see which one is the greenest!
3. Ask your group to plan some fun activities for this exciting day. Explain that the teams will participate in a relay race where each member of the team will perform a certain action.

Here is an example:

1. Pick-up litter from the ground (cans, papers, plastic bottles, etc.)
2. Separate the litter items so they can be recycled and put them into the right garbage cans
3. Carry a bucket of water without spilling it
4. Water some plants with the water you receive
5. Plant some seeds in a flower pot

6. Open a lunch bag containing too many food wrappers (plastic bags, papers bags, aluminum foil, napkins, etc) and change everything into reusable containers
7. Switch to efficient light bulbs (change some yellow balloons for some white ones)
8. Take an animal back to its **habitat** (a stuffed animal works fine)
9. Finally, run to the finish line!

Encourage your group to be creative and to think about many cool and fun activities.

4. Make sure you take the necessary safety precautions the day of the event. The team that performs all the activities in the right way and in the shortest time is the winner. You can invite other groups or classes to participate. Have fun!

Discussion

How did you feel during the **biodiversity** relay race?

How do activities like this one help you enjoy nature and learn how to protect it?



Useful resources

WWF Biodiversity 911

www.biodiversity911.org

National Wildlife Federation – Kids

www.nwf.org/en/Kids.aspx

Arkive

www.arkive.org

Natural History Museum

www.nhm.ac.uk/kids-only

United Nations Cyber School Bus

www.un.org/cyberschoolbus

Practical Action

practicalaction.org

Eco kids Canada

www.ecokids.ca

Eco Friendly Kids

www.ecofriendlykids.co.uk

Wildlife Watch

www.wildlifewatch.org.uk

Glossary

<i>Aquifer</i>	An underground layer of rock or soil that stored water.
<i>Atmosphere</i>	the atmosphere is a layer of gases around the Earth and it is held in place by gravity. The gases in the atmosphere include oxygen (which humans and animals need to breathe) and carbon dioxide (which plants need to respire, like breathing).
<i>Biodiversity</i>	the variety of all the different kinds of plant and animal life on earth, and the relationship between them.
<i>Canopy</i>	the top layer of a forest, including treetops and the plant species that reach above the canopy.
<i>Carbon Dioxide (CO₂)</i>	a gas made up of carbon and oxygen, which makes up less than one percent of the air. CO ₂ is produced by animals and used by plants and trees. It can also be produced by human processes such as burning fossil fuels . CO ₂ is a greenhouse gas and can speed up climate change .
<i>Climate</i>	the average weather conditions for a particular place and time period. This is not the same as weather ; weather may change from day to day, but climate changes over hundreds or thousands of years.
<i>Climate change</i>	a significant change from an established climatic condition to another. This may present harmful effects for all living beings as many animals and plants need one kind of climate to survive.
<i>Conservation</i>	maintaining the health of the natural world (including land, water, biodiversity , and energy) by changing human needs or habits.
<i>Deforestation</i>	when people remove trees from forests and use the land for other purposes.
<i>Developed country</i>	a socially and economically well-off country, with high levels of industry, technology, infrastructure and so on.
<i>Developing country</i>	a poor country that is trying to become more economically advanced. Developing countries tend to rely heavily on subsistence farming or fishing (where farmers or fishers grow, raise or catch enough food only to feed their families, and rarely produce enough to sell on to earn a living).
<i>Ecosystem</i>	a community of living organisms (plants and animals) and non-living things (water, air, soil, rocks etc.) interacting in a certain area. Ecosystems don't have a defined size, depending on the interactions you are interested in, an ecosystem can be as

small as a puddle or as big as an entire river or lake. Ultimately, the whole world is one big, very complex ecosystem.

Endangered

the state of being threatened with **extinction**.

Environment

the air, water, soil, minerals, living things, and all other things that act upon a creature or a community. The circumstances that surround each one of us.

Extinction

the state where an animal or plant **species** no longer exists on Earth.

Food security

when all people can always have access to sufficient, safe and nutritious food to lead an active and healthy life.

Fossil fuels

a general term used to refer to coal, natural gas and oil (petroleum), which are substances that were formed during millions of years from plant or animal remains.

Gene

a chemical structure inside a cell that determines certain characteristics of an **organism**, and which is passed down from parent to offspring.

Greenhouse effect

a careful balance of **greenhouse gases** keeps the Earth warm enough for humans, animals and plants to survive. But, when people burn too many **fossil fuels** such as coal, oil or gas this balance cannot be kept. When humans add more **greenhouse gases** to the **atmosphere** there is a general warming effect on the Earth's surface because these gases act like a blanket that trap heat and prevent it from escaping to outer space.

Greenhouse gases

the gases that occur naturally on the Earth's **atmosphere** that absorb and trap heat to keep our world warm. Some examples are water vapor, **carbon dioxide**, methane, nitrous oxide and others. Some human actions also produce these gases, such as the burning of **fossil fuels**.

Habitat

the local environment within an **ecosystem** where an **organism** usually lives.

Healthy diet

eating a good variety of foods and in the adequate amounts to receive the **nutrients** you need for a healthy growth and development.

Hunger

an uneasy situation that occurs when people do not have enough food to meet their nutritional needs.

Indigenous peoples

the people who were the original or oldest known inhabitants of a particular area. Also known as native peoples, first peoples or aboriginals. These communities often have a strong cultural, and sometime spiritual connection, to the forests in which they live.

<i>Microorganism</i>	a creature too small to be seen by the human eye alone, but can be seen through a microscope. In ecosystems , they help in recycling nutrients.
<i>Nutrient</i>	the part of a food that is stored and used by the body to build and repair, give heat and energy and protection from diseases.
<i>Organism</i>	a living creature, like a plant, animal or microorganism .
<i>Poverty</i>	not having enough money or resources for basic needs: clothing, shelter and food.
<i>Renewable energy</i>	energy powered by renewable resources which can be replaced or replenished, either by natural processes or human action. Wind, water and solar energy are examples of renewable forms of energy.
<i>Species</i>	a group of similar organisms which are able to breed together and produce healthy offspring that are able to produce young themselves.
<i>Sustainability</i>	the state in which we humans use the natural environment to meet our needs without damaging it so that it can no longer be productive (i.e. can no longer support plant, animal or human life). Making sure that our actions are sustainable means that future generations will be able to live well, too.
<i>Urbanization</i>	the process by which people move from the countryside to go and live in towns and cities, often in search of better jobs and living conditions.
<i>Vegetation</i>	the plants and trees in an area.
<i>Watershed</i>	an area of land that catches rain and snow, and drains into a larger body of water such as a marsh, stream, river, lake, ocean or groundwater. A watershed (sometimes called a drainage basin) can be as small as a few hectares or as large as thousands of square kilometers.
<i>Weather</i>	describes what the day looks like outdoors in a specific place at a specific time. Weather can change a lot in a very short time; it refers to what happens from minute to minute. For example, it may rain during the morning, but you may have a sunny afternoon.



Resources and additional information

Join us!

Additional resources and information will be developed by FAO, WAGGGS, YUNGA and other partners for you to use when helping children and young people learn about the different issues that affect our world. If you would like to be automatically informed of the new materials that become available please write to us at:

children-youth@fao.org

and we will register you to the free YUNGA newsletter.

Share with us!

It would be great to receive your comments and information about your own experiences, activities and stories. You can write to us to:

children-youth@fao.org

Take the challenge!

Children and youth need to understand the environmental and social realities of our time and of their future. We need to support them to become empowered and responsible citizens of the world, able to adapt and to respond to future challenges.

The *Biodiversity Challenge Badge* is a tool to allow teachers and youth leaders to guide young people in learning about biological diversity and developing action-oriented projects. Age-appropriate activities introduce biodiversity concepts and stimulate exploration through action-based learning. They encourage participants to get to know the natural world in their community, to find out why certain species and habitats are struggling to survive, and to understand the links between biodiversity and the well-being of people around the world.

The badge activities help young people gain knowledge, skills and values to protect, preserve and improve biodiversity. The badge will also help them realize they can make a difference and that they are capable of finding innovative and lasting solutions to our world's challenges. Encourage your group to take the challenge!

www.fao.org/climatechange/youth/68784/en/

Other useful resources

Links to other useful resources and activity materials which can be used by you and your group to learn about and understand biodiversity are listed below:

[FAO Children and Youth Climate Change Portal](#) contains a great variety of information, activities, publications, competitions, projects and videos for children and youth to learn and explore about our

world's biological diversity. It also gives details about national and international news and events so young people can be informed about the various ways how they can be actively involved in the creation of a better world. It also includes links to FAO and other UN agencies youth sites:

www.fao.org/climatechange/youth and www.fao.org/kids

Youth and United Nations Global Alliance (YUNGA) was created to empower children and youth to have a greater role in society, raise awareness and be the active agents of change. YUNGA is developing different initiatives, resources and opportunities for children and youth to translate their knowledge into advocacy and action. YUNGA also acts as a gateway to allow young people to be involved in UN related activities such as the Millennium Development Goals (MDGs) and initiatives related to food security, climate change and biodiversity.

www.yunga.org

WAGGGS Web Site contains great resources and news on climate change and other environmental issues like, for example, the “Together We Can Change Our World” badge curriculum about the Millennium Development Goals.

www.waggsworld.org

The Green Wave is a global biodiversity campaign to educate children and youth about biodiversity. Its aim is to encourage them to unite efforts for a healthy and biodiverse future. Moreover, each year, The Green Wave will contribute to worldwide celebrations of the International Day for Biological Diversity (IDB).

<http://greenwave.cbd.int/en/home>

Diversity for Life is a campaign designed to inspire people to use agricultural biodiversity to improve their nutrition, their livelihoods, and the health of the planet. The campaign will undertake and support projects and activities all around the world. The key target audiences are policymakers, schools and the media. Current activities with schools include the Oral History Project and Teaching the Teachers.

www.diversityforlife.org/schools/

Organizing events and activities

Interested in making a difference through your own initiatives but not sure where to begin? Here are some ideas to get you started!

Find out!

You can find out more about the biodiversity in your country by getting in touch with the people that work on these issues. Encourage them to share their knowledge and information on their projects with you. Find out what they are doing and try to join their activities. For example:

- Representatives of UN agencies: FAO, UNDP, UNESCO, UNICEF, WFP, WHO, UNEP
- Ministry of Agriculture
- Ministry of the Environment
- Ministry of Education
- Ministry of Health
- Non-governmental Organizations and International Non-governmental Organizations
- Universities and other schools
- Community groups
- Faith-based groups

Think!

You can organize many lively activities: competitions, fairs, sports, conferences, debates, round-tables, workshops, concerts, drama, painting, photography, posters, collages, songs, poems, essays, slogans, letters, and many more!

Raise your voice!

Invite families and the community to contribute to and participate in your activities. Encourage the media to help you publicize your event and promote public awareness. Contact local news reporters to write stories about your activities and local and community radio stations to broadcast information and messages.

Sponsor and partners

This resource and activity guide has been developed with the kind financial support of the Swedish International Development Agency (Sida).

www.sida.se

The Biodiversity Resource and Activity Guide was developed by:

Food and Agriculture Organization of the United Nations (FAO)

FAO leads international efforts to defeat hunger. Serving both developed and developing countries, FAO acts as a neutral forum where all nations meet as equals to negotiate agreements and debate policy. FAO is also a source of knowledge and information, helping countries to modernize and improve agriculture, forestry and fisheries practices and ensure good nutrition for all.

www.fao.org/climatechange/youth

World Association of Girl Guides and Girl Scouts (WAGGGS)

WAGGGS is a worldwide movement providing non-formal education where girls and young women develop leadership and life skills through self-development, challenge and adventure. Girl Guides and Girl Scouts learn by doing. The Association brings together Girl Guiding and Girl Scouting Associations from 145 countries reaching 10 million members around the globe.

www.wagggsworld.org

Youth and United Nations Global Alliance (YUNGA)

YUNGA was created to allow children and young people to be involved and make a difference. Numerous partners, including UN agencies and civil society organizations collaborate in developing initiatives, resources and opportunities for children and young people. YUNGA also acts as a gateway to allow children and youth to be involved in UN related activities such as the Millennium Development Goals (MDGs), food security, climate change and biodiversity.

www.yunga.org



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