# **Connecting With Nature:**

# An educational guide for grades one to three



Connecting With Nature: An educational guide for grades one to three

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# Introduction

Two common requests we get at the David Suzuki Foundation are for Dr. Suzuki to speak to schools and for ideas on how young people can help protect nature. Because scientists haven't yet figured out how to clone enough David Suzukis to meet all the speaking requests, we crafted this resource to help educators connect their students to nature, help them understand how their actions can affect it, and empower them to bring about positive change.

There are many reasons why we should be connecting our students to nature outside every day. The eminent biologist E.O. Wilson argued that *biophilia*, our need to affiliate with other species, is built into our genes. You can see biophilia in children—they have an innate curiosity about the natural world around them.

As well, studies have shown that spending time in nature helps with recall and memory, problem solving, and creativity. Children (and adults) who spend more time outside are physically healthier and less stressed.

And finally, if we want to protect the natural world on which our survival depends, we must learn that we are a part of it, and we must encourage our children to appreciate its wonders. As you work through the lesson plans with your students, share your own personal experiences connecting with nature. Because scientists haven't yet figured out how to clone enough David Suzukis to meet all the speaking requests, we crafted this resource to help educators connect their students to nature, help them understand how their actions can affect it, and empower them to bring about positive change.

The David Suzuki Foundation is a science-based organization committed to helping Canadians act on the understanding that we are all interconnected and interdependent with nature — and each other. Helping young people develop a love of nature is key to achieving that vision.

# How to use this guide

In the pages that follow, you will find:

- An introductory lesson, which gets students outside exploring their schoolyard
- Six cross-curricular lessons, each comprising indoor and outdoor components, reflection questions, taking-it-further suggestions, and community connections
- A concluding lesson, though which students will internalize their explorations and interconnections with nature

We strongly encourage you to start with the introductory lesson, as it sets the tone for all those to come. Even if you can't complete all the lessons, be sure to wrap up with the conclusion lesson. We also encourage you to explore the Taking it Further suggestions

 they offer great opportunities for student empowerment and sharing with family and friends.

In designing the lessons, we preferred activities that are fun, hands-on, and thought provoking. We encourage you to combine the information in this guide with other resources that you find relevant to the needs of your students. To reduce the footprint of this resource and your classroom, please use projectors and This educational guide is aligned with *Acting Today, Shaping Tomorrow,* the Ontario Ministry of Education's policy framework for environmental education.

Smartboards when possible to share background information.

This educational guide is aligned with *Acting Today, Shaping Tomorrow,* the Ontario Ministry of Education's policy framework for environmental education.



# **Key concepts**

#### **Connect with nature**

Young people will feel compelled to protect what they understand and feel connected to. Because we learn best by experiencing and doing, spending time outside is the best way to nurture a relationship with nature in youth.

#### Everything in nature is connected

As biological creatures, humans depend on clean air, clean water, clean soil, and clean energy, as well as a variety of plants and animals (biodiversity) for our well-being and survival. We are linked to nature by what we buy, how we get around, what we eat, and where we live.

#### Nature is valuable

Although most Canadians recognize the importance of the environment to their wellbeing, the services that nature provides are often not accounted for. For example, trees clean our air and wetlands filter our water. Green urban spaces absorb carbon, cool our cities, and protect us from storms. It would be expensive to develop facilities to replace these ecosystem services.

#### Live within the limits of nature

Everything we do has an impact on nature. Air, water, and land are finite resources, and we cannot expand the planet to accommodate our growing population. We must live within the limits of nature or face consequences like climate change and resource scarcities.

#### Change is all about personal decisions and collective action

We all play a part in making change. Our everyday actions and choices can have a profound impact on nature. It is also important to take collective action when tackling our most pressing environmental challenges. Joining together to achieve a common goal can be a powerful force for change.

#### Taking it home

To help your students apply what they learn in these lessons to their everyday lives outside the classroom, encourage them to continue discussions at home. The Taking it Further suggestions offer ways for students to review what they've learned and share their knowledge with their community and family.

#### Some other ideas:

- Encourage students to repeat experiments or activities at home with their families.
- Ask students to discuss one of the reflection questions at home.
- Invite families to participate in some activities and presentations, encouraging even greater collective action.



#### **ABOUT DAVID SUZUKI**

David Takayoshi Suzuki was born in Vancouver, BC, on March 24, 1936. His grandparents had come to Canada from Japan in the early 1900s, making him a third-generation Canadian.

But the fact that David was born in Canada meant sadly little when Canada went to war

against Japan in 1941. The Canadian government insisted that people of Japanese descent — even those born in Canada — be shipped off to internment camps, ghost towns in the Rockies, and plantations. David and his family were sent to a camp in interior BC.



After the war, the Japanese were freed, and the Suzukis moved east to Ontario. In Leamington, they

were the only non-white family in the neighbourhood. Life was lonely for David, and he began spending hours exploring the swamp near his home. He now recalls this swamp as his inspiration to protect nature.

After high school, David studied zoology and genetics in university. He earned his PhD and became a professor at the University of British Columbia, where he ended up teaching for 40 years. His teaching skills transferred well to TV and radio, and he hosted his first TV show for kids (called *Suzuki on Science*) in 1970. In 1979, he began hosting a popular CBC science show called *The Nature of Things*, which he still hosts today.

Then, in 1989, David had a new idea. His radio series, *It's a Matter of Survival*, had called people's attention to the serious state of the planet, and thousands of listeners were writing to him, asking what they could do to help the environment. So David and his wife, Tara Cullis, a professor at Harvard University, created the David Suzuki Foundation, an organization dedicated to finding solutions for environmental problems.

The foundation began by focusing on projects in other countries, such as protecting indigenous people in Colombia and salmon in Japan. When environmentalists from all over the world gathered in Brazil for the Rio Earth Summit in 1992, David, Tara, and other Foundation members created the Declaration of Interdependence, to remind everyone that we are one with the Earth.

Now his seventies, David still volunteers for the foundation he created in Vancouver. When he's not in the office, he's usually sharing his knowledge through speaking presentations, recording episodes of *The Nature of Things*, and spending precious time with his children and grandchildren.



# Lessons described

#### LESSON 1: AIR

Subject areas			
Grade 1	Grade 2	Grade 3	
<ul> <li>Science and technology</li> <li>Understanding life systems</li> <li>Social sciences</li> <li>Heritage and identity: our changing roles and responsibilities</li> </ul>	<ul> <li>Science and technology</li> <li>Understanding life Systems</li> <li>Understanding earth and space systems - air and water in the environment</li> </ul>	<ul> <li>Science and technology</li> <li>Understanding life systems</li> <li>Understanding matter and energy - forces causing movement</li> </ul>	
<ul> <li>People and environments: the local community</li> </ul>	<ul><li>Social sciences</li><li>People and environments: global communities</li></ul>	<ul> <li>Language arts</li> <li>Oral communication, reading, writing, media literacy</li> </ul>	
<ul> <li>Oral communication, reading, writing, media literacy</li> <li>Mathematics</li> <li>Geometry and spatial sense/</li> </ul>	<ul> <li>Mathematics</li> <li>Geometry and spatial sense/ data management and probability/patterning</li> </ul>	<ul> <li>Mathematics</li> <li>Geometry and spatial sense/ data management and probability/patterning</li> </ul>	
data management and probability/patterning The arts • Environmental education	<ul><li>The arts</li><li>Environmental education and the arts (visual arts)</li></ul>	<ul><li>The arts</li><li>Environmental education and the arts (visual arts)</li></ul>	
LESSON 2: ANIMALS			
<ul><li>Science and technology</li><li>Understanding life systems: needs and characteristics of living things</li></ul>	<ul><li>Science and technology</li><li>Understanding life systems: growth and</li></ul>	<ul><li>Science and technology</li><li>Understanding life systems: growth and changes in plants</li></ul>	
<ul> <li>Social sciences</li> <li>Heritage and identity: our changing roles and responsibilities</li> <li>People and environments:</li> </ul>	<ul> <li>changes in animals</li> <li>Social sciences</li> <li>People and environments: global communities</li> </ul>	<ul> <li>Social sciences</li> <li>People and environments: living and working in Ontario</li> </ul>	
the local community Language arts Oral communication reading	<ul> <li>Language arts</li> <li>Oral communication, reading, writing media literacy</li> </ul>	<ul> <li>Oral communication, reading, writing, media literacy</li> </ul>	
writing, media literacy Mathematics	Mathematics • Geometry and spatial	<ul><li>Mathematics</li><li>Data management and probability/patterning</li></ul>	
<ul> <li>Data management and probability/patterning</li> </ul>	sense/ data management and probability/patterning	<ul> <li>The arts</li> <li>Environmental education</li> <li>and the arts (visual arts)</li> </ul>	
<ul><li>Environmental education</li></ul>	<ul> <li>Environmental education</li> </ul>	and the arts (VISUAL afts)	

 Environmental education and the arts (visual arts)

#### **LESSON 3: PLANTS**

patterning The arts

music, visual arts)

Environmental education

and the arts (dance, drama,

#### Subject areas Grade 1 Grade 2 Grade 3 Science and technology Social sciences Science and technology • Understanding life systems: needs • People and environments: • Understanding life systems: and characteristics of living things global communities growth and changes in plants Social sciences Language arts Social sciences Heritage and identity: our changing Oral communication, reading, People and environments: roles and responsibilities writing, media literacy living and working in Ontario People and environments: Mathematics Language arts the local community Geometry and spatial Oral communication, reading, Language arts sense/ data management writing, media literacy Oral communication, reading, and probability/patterning Mathematics writing, media literacy The arts Measurement/geometry Mathematics Environmental education and spatial sense/ and the arts (visual arts) Measurement/geometry and data management and spatial sense/data management probability/patterning and probability/patterning The arts Environmental education The arts Environmental education and the arts (visual arts) and the arts (visual arts) **LESSON 4: SOIL** Science and technology Science and technology Science and technology • Understanding life systems: needs Understanding life systems: Understanding earth and characteristics of living things growth and change in animals and space systems: soils in the environment Social sciences Social sciences Heritage and identity: our changing • People and environments: Social sciences roles and responsibilities global communities People and environments: • People and environments: living and working in Ontario Language arts the Local community • Oral communication, reading, Language arts Language arts writing, media literacy Oral communication, reading, writing, media literacy Mathematics writing, media literacy Geometry and spatial Mathematics Mathematics · Geometry and spatial sense/ data management Geometry and spatial sense/ data sense/ data management and probability/patterning management and probability/ and probability/ The arts

 Environmental education and the arts (visual arts)

- Oral communication, reading,
- patterning The arts
- Environmental education and the arts (dance, drama, music, visual arts)

#### **LESSON 5: SUN**

#### Subject areas Grade 1 Grade 2 Grade 3 Science and technology Science and technology Science and technology Understanding matter and Understanding matter Understanding matter energy: energy in our lives and energy: properties of solids and liquids and energy Social sciences • Heritage and identity: our changing Social sciences Social sciences roles and responsibilities • People and environments: • People and environments: global communities the local community Language arts Language arts Language arts Oral communication, reading, Oral communication, reading, writing, media literacy writing, media literacy writing, media literacy Mathematics Mathematics Mathematics Geometry and spatial sense/ Measurement/geometry Measurement/geometry and data management and and spatial sense/ spatial sense/data management probability/patterning data management and and probability/patterning probability/patterning The arts The arts Environmental education The arts Environmental education and the arts (visual arts) Environmental education and the arts (dance, drama, music, visual arts) music, visual arts) **LESSON 6: WATER** Science and technology Science and technology Science and technology Understanding life • Understanding life systems: needs Understanding life systems: growth and and characteristics of living things systems: growths and changes in animals changes in plants Social sciences Understanding matter

- Heritage and identity: our changing roles and responsibilities
- People and environments: the local community

#### Language arts

 Oral communication, reading, writing, media literacy

#### The arts

 Environmental education and the arts (dance, drama, music, visual arts)

#### space systems: air and Water in the environment

#### Social sciences

and energy

 People and Environments: **Global Communities** 

• Understanding earth and

#### Language arts

 Oral communication, reading, writing, media literacy

#### Mathematics

 Geometry and spatial sense/ data management and probability/patterning

#### The arts

 Environmental education and the arts (visual arts)

- Understanding life systems
- People and environments: living and working in Ontario
- Oral communication, reading,

and the arts (dance, drama,

#### Social sciences

• People and environments: living and working in Ontario

#### Language arts

 Oral communication, reading, writing, media literacy

#### The arts

 Environmental education and the arts (dance, drama, music, visual arts)

# **LESSON 1**

#### INTRODUCTORY LESSON

# Exploring your schoolyard

### **Guiding question**

What parts of nature are present in our schoolyard?

### What's the point?

In this introductory lesson, students explore their schoolyard and get to know nature within it. They create an art project based on what they have found and experienced.





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## Part A: Classroom

#### What you do

Together as a class, establish and discuss rules for outdoor learning. Revisit and follow these rules for all other lessons. Write the rules out and post them on the wall.

Here's an example:

- 1. Stay together.
- 2. Stand inside boundaries.
- 3. Stay away from danger.
- 4. Work as a team on a task.
- 5. No picking, pulling, or pocketing.
- 6. Listen for a signal.
- 7. Dress for the weather.

## **Part B: Outdoors**

#### What you do



Take students outdoors and have them find natural materials for their creative art piece. Encourage them to use found materials on the ground rather than pulling live materials from trees or flowers. Sharing resources will also help reduce the impact on nature.

If possible, make multiple trips outside and focus on a different part of nature each time. For example, on leaves, on flowers, on stones, on birds, and so on. Multiple trips allow for practice time to reinforce outdoor learning routines and observation skills.



PHOTOS COURTESY MAUREEN CROSBIE, FLICKR CREATIVE COMMONS. "THE CHILDREN WERE INSPIRED TO MAKE THESE TEMPORARY PIECES OF ART AFTER LOOKING AT THE WORK OF ANDY GOLDSWORTHY."

#### **Reflection questions**

- Can you describe the parts of nature you found in your schoolyard? Create a web that illustrates this.
- 2. What do you think would happen to your schoolyard if one of the many parts of nature you found was missing?
- 3. Can you think of another instance when you should consider all the parts of nature?
- 4. How is your art project similar to or different from those of your classmates?

#### Taking it further

- Put your students' creations on display as a nature art exhibit. Invite family and community members.
- Create community announcements and posters identifying and explaining the many parts of nature necessary for a healthy neighbourhood.
- Incorporate a nature fair within a school fun fair night. Invite your neighbours.



# **LESSON 2**

#### WHAT YOU NEED FOR PART A:

- What you need
- Plastic bottle
- Deflated balloon
- Empty cup
- Newspaper
- Tub filled with water

#### WHAT YOU NEED FOR PART B:

- Object that requires ain to function (windmill, pinwheel, etc.)
- Chart paper

#### WHAT YOU NEED FOR PART C:

- Stopwatch
- Chart paper
- Art supplies (optional)

#### WHAT YOU NEED FOR PART D:

- Wire clothes hangers
- Clear plastic tape
- Magnifying glass



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#### LESSON 2



### **Guiding question**

How is air important in nature?

#### What's the point?

In this lesson, students explore the properties of air and understand its importance to the survival of all living things. They learn how humans can affect air quality and identify ways they can help protect the air.

#### Hook

Show students a paper or plastic bag. Blow into the bag. Ask the students how we know there is air in the bag. Can we see it?



## Part A: Classroom

#### What you do

- Begin to fill in a KWL chart about air (see handouts on pages 43 and 44). Have students come up with their own questions about air. Discuss briefly how we can prove that air exists. Then perform one or both of the following experiments to explore this question.
- For the first experiment, place a deflated balloon in a plastic bottle. Ask: Will I be able to blow up the balloon? Record their predictions. Then blow into the balloon. (Obviously, it won't inflate!) Record the results and ask students why they think it didn't work.
- 3. For the second experiment, show students an empty cup. Ask: Does this cup have air in it? Does it take up space? Push a piece of crushed newspaper into the bottom of the cup. Flip the cup over and push it to the bottom of a tub of water. Record student predictions of what will happen. Tip the cup so that a few bubbles float to the surface. Pull the cup out of the water and record observations.
- 4. Use the experiments and reflection questions below to add to the KWL chart.

- 1. Does air take up space?
- 2. How do we know it is there?
- 3. Why is air important?



# Part B: Classroom and Outdoors

#### What you do

- As a class, construct an object that requires air to function. The object might be a windmill, a pinwheel, a kite, a parachute, and so on. (You'll find many online instructions for making devices.)
- 2. Take students outside to use their devices.
- 3. Back in the classroom, have each group record its activity on chart paper and share observations with the rest of the class.
- 4. Discuss the reflection questions below and add new ideas to the KWL chart.

- 1. How did your device use air?
- 2. How does a windy day affect the device?
- 3. How does wind help us? How can it hurt us?



# Part C: Outdoors and Classroom

#### What you do

- Take students outside again. Using a stopwatch, have them count how many breaths they take in a given time period. Then have them run around the schoolyard for a few minutes and stop to count breaths again. Discuss why they are breathing hard.
- 2. Use this discussion as a jumping-off point to explore how other animals and plants use air. When you return to the classroom, add student observations and questions to the KWL chart (see page 43).
- 3. Work in groups or as a class to record their experiences and observations on chart paper, a mural, or a poster.

- 1. Why is air important to you?
- 2. Why is air important to other animals and to plants?



# Part D: Classroom and Outdoors

#### What you do

- 1. Begin by asking students to name things that are carried in the air. Record their responses on the chart.
- Gather some wire clothes hangers and clear plastic sealing tape. Attach tape across each clothes hanger to create a large, flat, sticky surface. Do not touch the sticky surface. Put the hangers in various locations around your school, inside and out.
- 3. Collect them after a few days and place them on a white surface. Examine the tape with a magnifying glass and record observations.

#### **Reflection questions**

- 1. How did the location change the amount of material that was collected?
- 2. Why do you think the air was dirtier in some places and cleaner in others?
- 3. What pollutants do you think were in the air that made it dirtier?
- 4. How does dirty air affect plants and animals? Humans?
- 5. How do we hurt or pollute the air?
- 6. How can we protect the air?

#### **Taking it further**

- Have the class design a clean air action project (for example, a Walk to School campaign or a Plant in Every Classroom campaign) for the school and the community.
- Have individuals or groups of students research the causes and effects of windstorms.
- Read Dr. Franklyn M. Branley's *Air Is All Around You* (HarperCollins).
- Conduct further air experiments using an appropriate-level book such as Larry White's Air: Simple Experiments for Young Scientists (Milbrook Press).



# **LESSON 3**

#### WHAT YOU NEED FOR PART A:

• Field guide for local nature

#### WHAT YOU NEED FOR PART B:

- Chart paper and pencils for recording
- Cameras (optional)

#### WHAT YOU NEED FOR PART C:

- Ladybug Garden
   by Celia Godkin
- List of animals counted in Part B
- Art supplies

#### **LESSON 3**

# Animals

### **Guiding question**

How are animals important in nature?

#### What's the point?

In this lesson, students conduct a species count to learn about the animals that live in their neighbourhood and to understand the diversity of nature. They explore the concept of biodiversity and why it's important in their community.

#### Hook

Read Kim Michelle Toft's *The World That We Want* (Charlesbridge Publishing). Note the different animal species in the pictures and



discuss what the animals need to survive. Ask students how habitats shown in the book are different from their schoolyard. (This activity can be done with any appropriatelevel book that contains pictures of many different species in their habitats.)





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## Part A: Classroom

#### What you do

- 1. Refer back to the introductory outdoor activity. Have students recall which animals they saw.
- Introduce the idea of a species count to monitor the living things around us. You can find many examples online, such as the Christmas Bird Count and global BioBlitz initiatives.
- Explain that the students will be going outside to count animals in their schoolyard every day for one week. Brainstorm some possible animals that they might find.
   Older students can explore the differences between general groupings like "birds" and species like the American robin and Canada goose.
- 4. Each day, read from one field guide that introduces some species names. Field guide examples include:
  - Peterson Field Guides for Young Naturalists Backyard Birds, Butterflies, Caterpillars (Houghton Mifflin)
  - Robert Bateman's *Backyard Birds: An Introduction* (Scholastic Canada/Madison Press)
  - Angela Royston's Insects and Crawly Creatures (Scholastic Eye-Openers Series)
  - Pamela Hickman's The Kids Canadian Bug Book (Kids Can Press)



# Part B: Outdoors

#### What you do

- Divide the schoolyard into sections and divide students into the same number of groups. Give each group a recording chart and, if possible, a camera to take pictures of the species. (Photographs will help with identification later.)
- 2. Explain that they will record the names of as many animals as they can find and how many they see. They should be specific as possible.
- 3. Afterward, discuss what the students found. Use field guides from the library to help identify each species as accurately as possible. Results can be recorded on a class chart.

Sample chart:

ZONE	DAY 1	DAY 2	DAY 3
1	3 Black-capped Chickadees 1 Grey Squirrel 23 Ants		

- 1. What species did you see? Why?
- 2. What species didn't you see? Why not?
- 3. How might humans affect the animals we saw?
- 4. How did working outside help us learn about the animals in our community?



## Part C: Classroom

#### What you do

- 1. Read Celia Godkin's *Ladybug Garden* (Fitzhenry and Whiteside) and discuss the role of each animal in the book.
- 2. Look at the animals you counted in Part B. Brainstorm possible roles for each one.
- 3. Create a graphic representation of the schoolyard habitat indicating connections between the species observed. The representation could be a class mural, a group poster, or an individual picture. It could also be accompanied by an oral or written explanation appropriate to the level of the class.

#### **Reflection questions**

- 1. Is it important to have many different species living together? Why?
- 2. What could we do to help increase species diversity in our schoolyard? In the larger neighbourhood?

#### **Taking it further**

- Follow up on one of the suggestions to help increase species diversity in your community or schoolyard and monitor the effects.
- Put up some bird feeders in your outdoor space and join Project FeederWatch.
- Take part in one of the many citizen science projects. Your observations will help scientists monitor changes in the environment. NatureWatch.ca is a great place to start.
- Create a butterfly or bird garden.
- Take a trip to a different habitat and do a species count. Compare the findings in the new habitat and in the schoolyard, noting similarities and differences.

# **LESSON 4**

# WHAT YOU NEED

 Paper and pencils for recording observations

#### WHAT YOU NEED FOR PART B:

- Plant diagrams (see sample on page 26)
- Various houseplants
- Pencils and paper



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#### **LESSON 4**

# Plants

## **Guiding question**

How are plants important in nature?

## What's the point?

In this lesson, students investigate plants in their schoolyard, make observations about the plants and their environment, and share these observations. They also explore how plants meet their own needs and how human actions affect them.

#### Hook

Watch the video From Seed to Flower at www.pbslearningmedia.org/resource/tdc02.sci.life.colt. plantsgrow/from-seed-to-flower/

Ask: What did you notice and how many different plants did you see?



# Part A: Outdoors

#### What you do

- 1. Take your students outside to find examples of as many plants as possible in their schoolyard. Go in small groups or as a whole class.
- 2. For each plant they find, ask students to make some basic observations (for example, where the plant grows, whether it seems to prefer shade or sun, and how closely it grows to other plants). Students can make notes on such questions and make visual recordings by drawing or taking photos of each plant. If the technology is available in your school, try an iPad app such as ShowMe, which allows students to take photos and record their observations orally.
- 3. Afterward, have students share their observations with the class. Sort the plants into groups, noting similarities and differences.

- 1. How are the plants we saw different from each other? Similar?
- 2. What makes a plant a plant?
- 3. How many plants did we find? How might that change if we were in another place (say, downtown, or in a forest, in your backyard, and so on)?
- 4. What kinds of plants didn't we see when we were outside? Why didn't we see them?
- 5. What do plants need to survive?



## Part B: Classroom

#### What you do

- Begin by introducing the class to the parts of a plant (roots, stem, leaves, flowers, and so on). See below for a simple diagram you can draw for children to label and colour. Many more references can be found online.
- 2. Set up centres around the classroom. Each one should feature a different kind of plant.
- 3. Split students into small groups and assign each one to a centre. Each student is responsible for drawing a different part of the plant. Afterward, they can contribute their drawings to a class chart comparing the plants part by part.
- 4. As a class, discuss the roles of each plant part.

#### **Reflection questions**

- 1. What is the role of each part of the plant?
- 2. How do the plants we saw outside use their parts to survive?
- 3. How have we shaped the environment that our plants live in?
- 4. How do we help or hurt the plants around us?

Name: \_

Label the parts of the plant.



## Part C: Classroom

#### What you do

- To investigate how plants are used by humans and other animals, begin by brainstorming how animals benefit from plants (for example, shelter, food, oxygen). Discuss how animals help plants in return (for example, seed dispersal).
- There are many examples of animal-plant relationships. You might want to explore the relationship between salmon and forests (David Suzuki's *The Salmon Forest* is a great basic book) or the story of the "toilet plant" (watch David Attenborough's BBC video at youtube.com/watch?v=TwL7K\_loRjM).
- 3. Brainstorm how humans use plants every day. Examples include food, building materials, clothing, medicine, and tools.
- 4. As homework, have students list all the plant products they can find at their homes. Then share the lists with the class.

#### **Reflection questions**

- 1. Why are plants important to nature (including humans)?
- 2. What might happen if plants couldn't grow anymore? (Get specific: think about fruit trees, grass in the schoolyard, forests, farmland, and so on.)
- 3. How can we help plants grow?

#### **Taking it further**

- Teach others about the importance of plants by constructing a display for the school. Create artistic representations of plants from plant-based items such as used paper, toilet paper rolls, and old cotton clothing.
- Take a field trip to a different natural environment and repeat the survey from Part A. Make comparisons and discuss differences and the reasons for them.
- Plant a themed garden (for example, a butterfly garden, bird garden, or native plant garden) at your school or in your neighbourhood.
- Find and discuss native plants versus invasive species.
- Create a schoolyard or neighbourhood photographic plant field guide. The app Leafsnap could help you identify plants and plot their locations.

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# **LESSON 5**

#### WHAT YOU NEED FOR PART A:

- Small trowels or other digging tools
- Paper and pencils for recording observations
- Buckets and sieves

#### WHAT YOU NEED FOR PART B:

- Transparent plastic bags or used pop bottles
- Soil samples
- Various types of garbage (food waste, plastic, etc)
- Gloves
- Pencils and paper for recording observations

#### WHAT YOU NEED FOR PART C:

- Used pop bottles
- Soil
- Kool-Aid or another bright-coloured drinl



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#### **LESSON 5**

# Soil

## **Guiding question**

How is soil important in nature?

## What's the point?

In this lesson, students investigate the soils in their schoolyard. They make observations about the living things in the soil and discuss how it supports certain species. They also learn how humans can affect soil in negative and positive ways.

#### Hook

Bring in different types and colours of soil samples to show students. Discuss the differences in the samples and how these might affect the species living in them.



# Part A: Outdoors

#### What you do

- Referring back to the introductory outdoor activity, have students recall the living things they saw in different parts of the schoolyard. Start a discussion about what plants and animals need to live, and get students thinking about how soil supports life. Ask students what they think soil is.
- Divide the class into small groups and head outdoors. Each group will be responsible for collecting soil from a different location in the schoolyard. At each location, have groups first record as many types of plants and animals as they can see.
- 3. Have each group take a soil sample and sieve it over a bucket. Whatever remains in the sieve can be placed on a tray and recorded on the observation sheet.
- 4. Take a second soil sample and fill a glass jar half full with the soil. Then add water to the jar, fasten the lid, and shake to mix the contents.
- 5. Have each group place its jar down and allow the contents to settle. Soil will settle into different layers, and students can make observations about these layers.

- 1. What living things did you see outside? What didn't you see? Why?
- 2. What parts of soil did you observe?
- 3. How do you think each part of the soil might help the plants and animals that live in each location?
- 4. Did you find any evidence of humans in your soil?
- 5. How might humans affect your soil?
- 6. How did working outside help us learn about the soil in our schoolyard?



## Part B: Classroom

#### What you do

- 1. Investigate how garbage affects the soil.
- 2. Use thick transparent plastic bags or used pop bottles to store soil samples from a school or home garden.
- 3. Put one type of garbage in each soil sample. Be sure to include some organic materials such as food waste and some inorganic materials such as plastic and metal.
- 4. Over an extended period, have students make observations of each sample and record the observations on a class chart (see below). Note which types of garbage change and which do not.

GARBAGEOBSERVATION 1OBSERVATION 2OBSERVATION 31 Banana PeelSeptember 30, 1 pm The peel is fresh and yellow.October 7, 2:30 pm The peel has changed from yellow to spotted brown.The peel has changed from yellow to spotted brown.1 The peel is fresh and yellow.October 7, 2:30 pm				
1September 30, 1 pmThe peel has changed from yellow to spotted brown.Banana PeelThe peel is fresh and yellow.September 30, 1 pmThe peel has changed from yellow to spotted brown.The peel has changed from yellow to spotted brown.	GARBAGE	OBSERVATION 1	OBSERVATION 2	OBSERVATION 3
	1 Banana Peel	September 30, 1 pm The peel is fresh and yellow.	October 7, 2:30 pm The peel has changed from yellow to spotted brown. There are water droplets on the inside of the bottle.	

Sample chart:

#### **Reflection questions**

- 1. Why do you think some types of garbage change and some don't?
- 2. What do you think happens to the garbage? How does it affect the soil?
- 3. What do we want the soil in our schoolyard to be like? How can we keep it that way?

# Part C: Classroom

#### What you do

- 1. Investigate how soil helps clean up chemicals in the environment.
- 2. Poke small holes in the bottom of used pop bottles. Fill the bottles with different types of soil.
- 3. Place the bottles over large bowls. Slowly pour Kool-Aid (or another bold-coloured drink) into each bottle.
- 4. Observe the liquid as it comes out the bottom of the bottle into the bowl.
- 5. Record class observations on a chart.

Sample chart:

SOIL	LOCATION 1	LOCATION 2	LOCATION 3
SAMPLE	(e.g., school garden)	(e.g., sandbox)	
Observations	We poured in a purple liquid, and it came out reddish brown.	The liquid that came out looked the same as the liquid poured in.	

- 1. Why did the water come out of the bottle cleaner than it went in?
- 2. Why is it good for humans that soil filters out chemicals?
- 3. How can we help improve the soil in our schoolyard?



### Taking it further

- Have students create a picture and explanation (oral or written) about why it is important to take care of our soil. Put together a class video of each student's contribution and show it to parents, other classes, and/or the rest of the school.
- Examine a soil sample from a different habitat/location and discuss differences and similarities.
- Design an action plan to improve the soil in the schoolyard (for example, planting to fight erosion, mulching around trees, making out-of-bounds areas to protect against soil compaction).
- Install a composter at your school and create an awareness campaign to encourage composting.



# **LESSON 6**

#### WHAT YOU NEED FOR PART A:

 Handouts on pages 45 and 46

#### WHAT YOU NEED FOR PART B:

- Art supplies for making identification labels
- Sidewalk chalk
- Cameras (optional)

#### WHAT YOU NEED FOR PART C:

- Living Sunlight by Molly Bang
- Labels from Part B
- Seeds, soil, and pots
- Pencils and paper



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#### **LESSON 6**

# Sun

#### **Guiding question**

Why is the sun important to nature?

#### What's the point?

In this lesson, students investigate light and shadow and their effects on plants. This investigation will help them understand why the sun plays an important role in nature.

#### Hook

Take students outdoors and explore the sun's light through shadow play. Move around and make different shadow shapes. Challenge students to make their shadows touch without their bodies touching. Work with partners to make shadow monsters with two heads and four arms. Ask: What is a shadow? Where and how do shadows form? Can you make your shadow bigger, smaller, or a different shape?



PHOTO COURTESY WIKIMEDIA COMMONS

## Part A: Classroom

#### What you do

1. Building on the discussions that emerged from shadow play, and using a KWL or RAN chart (see handouts on pages 45 and 46), find out what students know and want to know about the sun.

- 2. Ask questions such as the following:
  - How were we able to make shadows outside?
  - What is the sun?
  - What does the sun do?
  - Is there always sunlight?
  - What would happen if we had no sunlight?

#### **Reflection questions**

- 1. Why is the sun important to us?
- 2. How does the sun help us? How can it hurt us?
- 3. Is there ever too much sunlight?
- 4. Is there ever too little sunlight?



# Part B: Outdoors

#### What you do

#### Observation 1: Where is the sunlight in our schoolyard?

- 1. Invite students to make their own identification labels for four categories: Full Shade, Part Shade, Part Sun, and Full Sun.
- 2. Working in pairs and using their senses, have students place identification labels in four appropriate locations within their schoolyard.
- 3. Conduct a gallery walk to observe where students placed their labels. Discuss why students chose each location for their labels. Ask them how they used their senses to determine the locations.
- 4. After visiting all the locations, challenge students to identify similarities and differences between the locations.

#### Observation 2: How does sunlight in our schoolyard change?

- With chalk, trace the outline of shadows in the schoolyard, especially those of structures near the students' labels. Keep the labels in place and return later in the day to observe how the shadows have changed. In the winter, trace shadows with food colouring and water in squirt bottles.
- Alternatively, have students stand in a specific location and trace each other's shadows. When you return later, have students stand in the same location as before and trace the new shadows.
- 3. Observe how the shadows have changed, and decide whether the students' labels are still in appropriate places. Discuss what these findings say about the sun and its light.
- 4. Continue to monitor the movement of the sun throughout the day, using different colours of chalk to trace shadows. Chalk tracings could be photographed and displayed at a school art show or as an installation piece.

#### **Reflection questions**

- 1. How were you acting as scientists when you chose locations for your labels?
- 2. How did you decide which place was full shade, part shade, part sun, or full sun?
- 3. How does the sun move through our schoolyard and neighbourhood? How do we know?
- 4. What did you learn about the sun from shadows?

## Part C: Classroom

#### What you do

 Read Molly Bang's Living Sunlight (Blue Sky Press), then create a KWL or RAN chart (see handouts on pages 45 and 46) to record students' knowledge and questions about sunlight and energy. Prompting questions could include: Does your body use energy? Where does that energy come from? How do plants grow? Where does that energy come from? How does your body grow? What do you need to grow and be healthy?



- 2. Using the labels from Part B, ask students to choose locations within the classroom where they think plants would like to live.
- 3. As a class, plant four seedlings and place them in different areas around the classroom (full shade, part shade, and so on). Water regularly and observe how the plants change over 10 days. Record observations and discuss results.
- 4. Draw a circle and discuss with students how the sun is a primary source for energy in many ways. Write the word *energy* in the centre of the circle and ask: What uses solar energy? Record students' responses. Have students cut strips of paper, representing sunbeams, and write answers or draw pictures to attach to the sun. Ask students to show their work and explain with they learned about the sun's energy. The main goal is to have students share that the sun is the primary source of energy for a lot of different things.

- 1. Why is the sun important to you?
- 2. Why is the sun important to animals and plants? Who and what uses sun in our neighbourhood?
- 3. Why is energy important?

#### Taking it further

- Share Molly Bang's My Light (Blue Sky Press) with students to explore how energy is used. Work together to create your own book on how energy is used within the neighbourhood. Illustrate with drawings or photos. Develop working titles for the book such as Where Is Energy in My Neighbourhood?
- Discuss how students' findings could lead to, or improve, an existing school garden.
- Research how to create a wind meter and light meter. Repeat experiments with these new devices to see if locations and/or results change. Investigate and discuss how wind and sun may affect results, and share ideas on how possible energy sources could be created.
- Read Dr. Franklyn M. Branley's *The Sun: Our Nearest Star* (Let's Read and Find Out Science), Frank Asch's *The Sun Is My Favorite Star* (HMH Books), Eve Bunting's *The Sunflower House* (Houghton Mifflin Harcourt), or Jennifer Ward's *Forest Bright*, *Forest Night* (Dawn Publications).
- Visit the shadow play website at www.sasta.asn.au/qualityscience/earlyyears/ Nicholas1Notes.html#1scienceinfo



# **LESSON 7**

#### WHAT YOU NEED FOR PART A:

- Balloons filled with water
- Salt, rocks, dirt, or food colouring
- Paper and pencils
- Kettle
- Cold pop can
- Two-litre plastic bottle
- Scissors
- Rocks, pebbles, gravel, sand, soil, and garbage

#### WHAT YOU NEED FOR PART B:

- Bottles or buckets of water (optional)
- Pencils and paper
- Cameras (optional)

#### WHAT YOU NEED FOR PART C:

- Beans for planting
- Cups or small pots
- Paper towels
- Pencils and paper for recording observations



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#### LESSON 7

# Water

## **Guiding question**

How is water important in nature?

#### What's the point?

In this lesson, students investigate water in their lives and local areas. They learn about where water comes from and where it goes and how it is used by living things. They also reflect on how humans can affect water.

#### Hook

Read George Ella Lyon and Katherine Tillotson's *All the Water in the World* (Atheneum).



### Part A: Classroom

#### What you do

- 1. Create a KWL chart (see handout on page 21) representing what the students know and wonder about water.
- 2. Conduct a few of the following experiments as a class. Discuss and make safety rules ahead of each experiment.
  - a) Fill some balloons with water and freeze them. When the balloons are fully frozen, peel away the balloon and try adding samples of salt, rock, dirt, metal, and food colouring to the ice. Have students draw a picture of the experiment and write observations under the picture.
  - b) Boil a kettle in the classroom and make observations of what happens to the water. When the water has boiled, hold a cold drink can above a cup of hot water and note what happens. Have students draw a picture of the experiment and write observations under the picture.
  - c) Create a water filter by cutting the bottom off a two-litre plastic bottle. Turn the bottle upside down and fill it with a layer of rocks, then pebbles, gravel, and sand. (Each layer should have a smaller size of stones or grains.) Next, mix some soil and garbage into some water. Hold the water filter over a bowl and pour the dirty water into the top of the filter. Have students draw a picture of the experiment and write observations under the picture.

- 1. Where do we see water in our lives?
- 2. What can water look like in nature?
- 3. How does water change in nature?
- 4. Where do we see clean water? Where do we see dirty water?
- 5. How does water get cleaned?

## Part B: Outdoors

#### What you do

- If possible, do this activity on a rainy or snowy day when water is visible outside. If the weather is fine, bring bottles or buckets of water outside to empty in various locations around the schoolyard.
- 2. Investigate the schoolyard and neighbourhood for answers to these questions:
  - Where does water come from?
  - Where does water go?
  - Where does water collect?
  - What does water pick up and carry with it?
  - Where is water used?

Students can draw their observations or take photos of the answers to these questions.

3. View the photos or drawings together and sort them as a review.

- 1. How does water move through our schoolyard and neighbourhood?
- 2. Who/what uses water in our neighbourhood?
- 3. How do humans affect the water in neighbourhood?
- 4. Where does dirty or polluted water go? Who or what does it affect?



## Part C: Classroom

#### What you do

- 1. Revisit the KWL chart. Add information gained from your outdoor observations.
- 2. Set up two plant-growth experiments. The first will take a week or two for growth; the second only a few days.
  - a) Plant beans in cups filled with paper towel. Some beans should be soaked in water and kept moist. Others should be kept dry.
  - b) Cut the bottoms off some celery stalks. Plant them in cups filled with a mix of water and food colouring.
- 3. Make observations on the two experiments. Compare the seeds that were placed in wet paper towel to the ones that were kept dry. What do the results tell us about water and plant growth? Observe how food colouring has affected the celery stalks. What do these observations tell us about how plants use and store water?

#### **Reflection questions**

- 1. How is water used by plants? Animals?
- 2. How do animals and plants get water?
- 3. How do humans use water? How do we get our water?
- 4. How does our use of water affect plants and animals?
- 5. How can we use water in a responsible way?

Taking it further

- On a rainy or icy day, find a puddle or ice patch in a location that won't be disturbed and make observations of the collected water over time. Record how long it takes the water to disappear. Note where it goes and how it is used.
- Go outside and make observations of cloud formations. What types of clouds do you see? Where are they going? What do they look like? Draw pictures of the clouds you see.
- Arrange a field trip to a local water treatment facility.
- As a class, perform an audit of the ways that water is used at school. Make posters to encourage other students to use less water.
- Encourage students to perform a water usage audit of their homes and make individual action plans to reduce water usage at home.

# **LESSON 8**

#### CONCLUDING LESSON

# A celebration of nature

#### What's the point?

In this lesson, students celebrate what they have learned about nature and how they are connected to it.

#### What you do

With your students, plan a class celebration of nature. The celebration could be a picnic in the schoolyard or local park, a scavenger hunt, a trip to a local conservation area, or another creative event. No matter what you do, spend time outside exploring your surroundings and appreciating your connections with nature. Invite family and community if possible.

### **Reflection questions**

- 1. What have we learned about how the parts of nature connect and how we are a part of nature?
- 2. How can we use what we have learned to help care for nature in a responsible way?
- 3. How can we share what we have learned with others?



oundation



# KWL strategy

KWL STRATEGY		
What we know	What we want to know	What we learned

The KWL strategy is a useful tool for non-fiction writing to analyze and assemble research. This strategy can help expand students' critical-thinking capabilities.



# **RAN strategy**

Similar to the KWL strategy, the RAN (Reading and Analyzing Non-Fiction) strategy encourages learners to think critically about the information they want to know, investigate, and discover. Extra categories allow for deeper analysis.

RAN STRATEGY				
What we think we know	Yes, we were right / confirmed information	We don't think this anymore / misconceptions	New learning / new facts	Wonderings



David Suzuki Foundation

#### About us

Over 60 staff in offices across Canada work to help further the foundation's goals. We work with government, business, and individuals to conserve our environment by providing science-based education, advocacy, and policy work, and act as a catalyst for the social change that today's situation demands.

#### Our mission and vision

Our mission is to protect the diversity of nature and our quality of life, now and for the future.

Our vision is that within a generation, Canadians act on the understanding that we are all interconnected and interdependent with nature.

# davidsuzuki.org

#### Our top goals

Protecting our climate — ensure that Canada is doing its fair share to avoid dangerous climate change and is on track to achieve a safe level of greenhouse gas emissions.

Transforming the economy — make certain that Canadians can maintain a high quality of life within the finite limits of nature through efficient resource use.

Protecting nature — work to protect the diversity and health of Canada's marine, freshwater, and terrestrial creatures and ecosystems.

Reconnecting with nature — ensure that Canadians, especially youth, learn about their dependence on a healthy environment through experiential education outside.

Building community — engage Canadians to live healthier, more fulfilled, and just lives with tips on building Earth-friendly infrastructure, making smart energy choices, using efficient transportation, and being mindful of the products, food, and water we use.

Download other education guides in the Connecting With Nature series at getbackoutside.ca