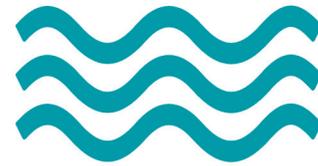
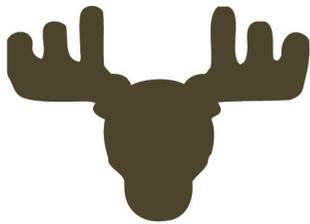


STUDY GUIDE

WILD WILD



WILDERNESS

Part of the Wild Wild Wilderness Program
TAKING IT ONE STEP FURTHER

Written by:

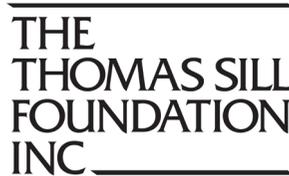
Michael Katopodis, Georgina Licandro & Jaclyn Victor



The following partners have helped us create, develop and tour our *Wild Wild Wilderness* program:



Prairie Dawn Foundation



...and all the generous individuals and schools who have donated to the program. Thank You!

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About Green Kids

Green Kids Inc. is a Winnipeg-based charity, and the only organization in Canada dedicated to Environmental Education through Theatre. Our mission is to educate kids, teachers and families about our environmental issues and to inspire them to take positive action to protect our environment. We deliver our messaging through the use of live theatre, drama and science workshops, and educational resources.



Green Kids classroom workshop

Green Kids was established in 1991 to address the need for creative and inspiring educational programming about the importance of environmental stewardship. Now in our 27th year, we have toured our various programs to over 1,400 elementary and middle schools in Canada and the USA, reaching over 1,500,000 students, teachers and families. We also offer specialized on-site programming in partnership with Assiniboine Park Conservancy and The Forks.

About Wild Wild Wilderness

Wild Wild Wilderness is a program that demonstrates the connections between habitat, wildlife, and human activity. The Play is a dynamic and whacky story of one kid's accidental effect on a nearby forest and its creatures, performed by a single actor/storyteller and armfuls of adorable puppets. The Workshop is an interactive drama class that gets kids, teachers and parents exploring the animals, forest, people and issues from the story with their bodies and imaginations.

The program's message is rooted in connections of nature and our planet, and shows how the air, water, land, and all living things - including humans - affect and support one another. The primary goals of the *Wild Wild Wilderness* program are to encourage participants to respect all living things, and to show children that poor decisions like littering not only impact the parts of the environment they see, but also parts they don't see. Equally, the program will also help young people understand that their simple actions and good decisions, like recycling and using active transportation, can make a difference in creating positive environmental change.

Climate change, sustainable development, biodiversity, water conservation, and waste reduction are among the most important environmental issues the world faces today.

Wild Wild Wilderness has been touring across Canada since 2016.

About This Study Guide

This guide puts focus on all major aspects and themes of *Wild Wild Wilderness*, including biodiversity, wildlife, water quality and the impact of litter and plastics. We have also added other important topics such as sustainable development and climate change. This guide is designed to provide teachers with; brief, uncomplicated background knowledge on the topics and their impact on the environment, interesting and easy to follow in-class elements, as well as homework components to take the knowledge one step further. We've included a long list of reference materials as well.

Our study guide has been broken down into grade sections, each with a lesson surrounding an environmental topic. Most lessons include discussion questions to activate students followed by an activity for classroom exploration. Some lessons are supplemented with additional videos and readings for support as well as a "Next Steps or Homework" section with other suggestions regarding how to expand learning further. Additionally, feel free to modify these lessons to suit other grade levels as you see fit. It is our hope that you will use this guide as a springboard for classroom discussion in order to help prepare students for the play and/or workshop component of the *Wild Wild Wilderness* program, or simply as an instrument to promote fun environmental education and action inside and outside of the classroom.

Director's Notes

Coming to theatre from a background in Science, I have found my work at times creating some dilemmas. The biologist in me has resisted anthropomorphizing animal characters, but the storyteller rooted in the folk tradition sees the value of doing so. So, when it came to developing *Wild Wild Wilderness* with the writer/performers I was reluctant to give dialogue to the animals being portrayed. However, in order to put across the underlying instincts of each animal, and how that creates a problem for each of them on encountering the discarded plastic wrapper, I realized that it would provide a theatrical tool for reaching our young audience. We wanted to make the character of the person littering "real", in fact, the visible actor herself. To avoid her being a didactic voice giving information about animal behaviour, the puppets would portray the creatures of the *wild, wild wilderness*. To make the animals relatable to the young audience they would need distinctive voices, so we set out to give them vocal qualities that might reflect how children perceive them. It is intended that their dialogue carry any information pertinent to the story.

The challenge for the actors who have undertaken performance of *Wild Wild Wilderness* has been as unique and individual as themselves. Yet each interpretation brings richness to the work and presents the same message in a clear and entertaining fashion.

In order to broaden the scope of the lessons within the play teachers can use the study guide to advantage. The consequences of our behaviours are not always obvious but the evidence continues to mount. Our existence on this planet which sustains us, is threatened by our treatment of her - Terra and Gaia are both female and mother figures. Who would want to injure the mother who gives us sustenance?

-Brian Richardson, Director and Dramaturg, *Wild Wild Wilderness*, the play

Litter

Grade: 1-2

Human garbage seems like an easy food source to many animals in nature, or so they think. Animals cannot digest human food, and worse, often choke on plastics, cans, or glass. It is estimated that plastic litter kills more than 100,000 sea mammals and turtles every year. Litter not only has the potential to kill animals, but it also affects humans and even our economy. Litter is unsightly and can easily cause the devaluation of homes in a neighbourhood. There are also great costs incurred to clean up and revert the effects of litter on the environment. The heat of the sun releases chemicals in litter, becoming air pollution, or the chemicals seep into groundwater affecting the water quality, especially for people who rely on wells for their drinking water. What other negative effects can come from litter?

Discussion Topics:

- What qualifies as litter?
- What are we doing to prevent littering?
- What are some of the effects of litter on humans?
- Does litter look good?
- Does dirty water look good to drink?
- Is it fair that if someone litters, someone else should clean it up?
- What are some effects of litter on animals?



Litter on the beach

Objective:

- To show students how litter can cause animals to choke or suffocate.

Materials:

- Empty water bottles
- Plastic wrappers, plastic wrap, or a plastic shopping bag

Lesson Plan:

- Explain how most life forms need oxygen to live.
 - Use an empty plastic water/pop bottle to show how air enters our lungs and the lungs of many types of living creatures that can be found in our environment.
- In *Wild Wild Wilderness*, the crow took some litter to a river where it then travelled to all the creatures in the forest, even an owl! Ask students how they think litter can travel all throughout the city, and from ecosystem to ecosystem.
- Discuss what would happen if the wildlife ate garbage. Lead students to the idea of litter as a choking hazard for animals.
- Cover the bottle top with the litter and squeeze the bottle to show how the lungs work.
 - The bottle will not do anything or will suck up the litter (litter as a suffocation method or choking hazard).
 - Ask the students if they ate the litter what would happen to them?
 - Discuss their results and their thoughts.

Next Steps or Homework:

- On their walk home, challenge each student to clean up the litter they see with a family member or friend.
- Plan a schoolyard clean up with the class.



Volunteers cleaning up litter

Earth Day

Grade: 1-2

Earth Day is every year on April 22. It was created to impress upon citizens of the world that the world needs to be taken care of, so in return, the Earth can take care of us. Originally it began because there was a concern over smog, toxic water, and a hole in the ozone layer of our atmosphere. However over time, more current issues such as global warming from greenhouse gases, environmental issues with deforestation and oil are coming to the forefront due to their extreme effects on the earth. The purpose of Earth Day is to illuminate these environmental issues and instill the importance of a greener lifestyle so that future generations can enjoy all the wonders of our world.

Discussion Topics:

- What is Earth Day?
- When is Earth Day?
- What does it mean to recycle?
- What does it mean to reduce?
- What does it mean to reuse?
- What does the Earth provide for us?

Objective:

- To encourage students to reuse items from the trash or recycling by turning them into something "new".

Materials:

- Glue
- Scissors
- Paper
- Markers
- Tape
- Each student should bring their own item that their household would have normally recycled or thrown in the trash



Lesson Plan:

- Start by asking each student what is one thing they value that is provided to them by the Earth.
- Ask the students what ways they could help take care of the planet.
 - Encourage the conversation or remind them of the motto “Reduce, Reuse, Recycle”.
- Discuss the importance of reducing and as well as reusing items, rather than just throwing them out or recycling them. What products from home can they reuse from the recycling bin or trash?
 - Ask the students to bring in an item the next day that they could reuse and the way in which they might reuse it.
- Some examples include:
- Soup Cans made into pencil holder cups.
- Milk bottles made into pencil holders.
- A large 4L milk carton to make a pot for a plant the class can grow.
- Plastic soda bottles made into small containers for snacks or gifts.
- Review the importance of reducing or reusing items and let the student create their reusable items.



Soup can pencil holders

Next Steps or Homework:

- Get the students to take their reusable item home and show their families what item they saved from the garbage or recycling by reusing it.
- In *Wild Wild Wilderness*, we hear the experience from the point of view of the animals. Have the students write a story from the point of view of the item they reused. Include, why it helps the environment for them to become something “new”.

Keystone Species

Grade: 3-4

A keystone species is an organism that helps define an entire ecosystem. Without its keystone species, the ecosystem would be dramatically different or cease to exist altogether.

Keystone species have low functional redundancy. This means that if the species were to disappear from the ecosystem, no other species would be able to fill its ecological niche. The ecosystem would be forced to radically change, allowing new and possibly invasive species to populate the habitat.

Any organism, from plants to fungi, may be a keystone species; they are not always the largest or most abundant species in an ecosystem. However, almost all examples of keystone species are animals that have a huge influence on food webs. The way these animals influence food webs varies from habitat to habitat.



African Elephant (2)



Sea Otter (3)

Discussion Topics:

- What are ecosystems?
- What is a food web?
- What is a species?
- What are keystone species?
- What are some examples of keystone species?
- Why are they so important to the environment/ecosystem?
- What can we do to help keystone species?

Objective:

- To teach students about the importance of “keystone species” and understand the risk of losing them in an ecosystem.

Materials:

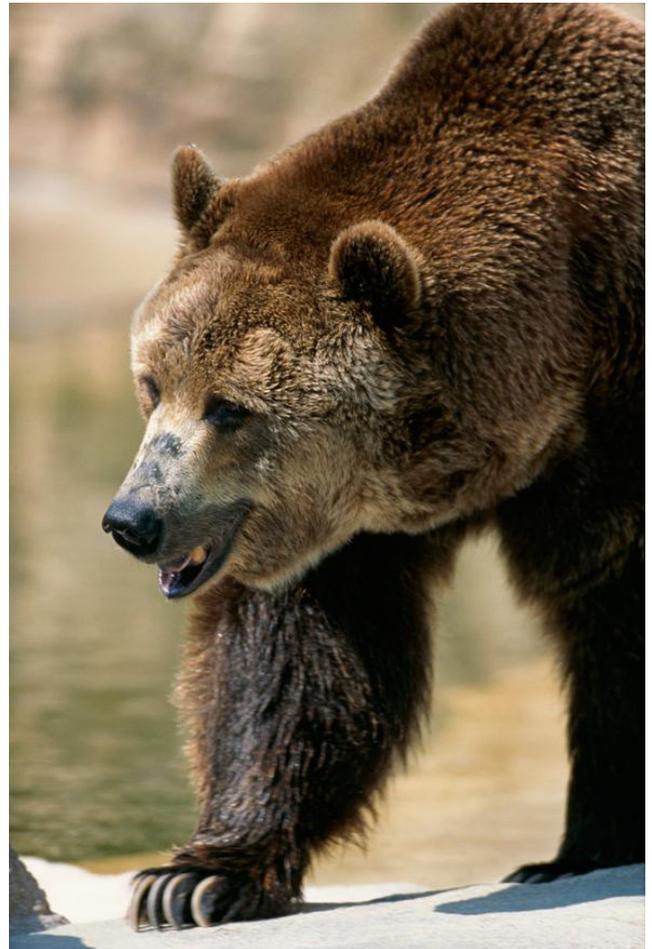
- Paper
- Pencils
- Images of keystone species, can be found at National Geographic website
<https://www.nationalgeographic.org/encyclopedia/keystone-species/>

Educational Videos:

- Keystone Species and Beavers: <https://www.youtube.com/watch?v=N2MemfwGFu4>
- Sea Otters: <https://www.youtube.com/watch?v=2DIVuTrG3N4>
- Sea Star and African Elephant: <https://www.youtube.com/watch?v=TY6rziYCDPk>
- Prairie Dog: <https://www.youtube.com/watch?v=kEh4r4iQiBU>
- Wolves: <https://www.youtube.com/watch?v=NI5l8aumEWE>



Black Tailed Prairie Dog (4)



Grizzly Bear (5)

Lesson Plan:

- Give the definition of keystone species: “A keystone species is an organism that helps define an entire ecosystem. Without its keystone species, the ecosystem would be dramatically different or cease to exist altogether.” (Nat Geo Website)
- Ask the students to think of different animals that they know of that are important to the environment. Follow up by asking why they think they are important.
- Look at a food web, where there are plants, insects, small animals, big animals, and finally predators.
- Ask the students what they think would happen, if you removed one of the links on the food web.
 - Examples (concepts from National Geographic):
- The wolf helps out the environment by making sure the population of elk don't get too big. A large elk population would actually eat all the trees, and without trees, no other life would be growing in the area. The wolves are actually helping out the entire forest ecosystem by controlling the population of the elk.
- The African Elephant, who eats and knocks over trees in the Serengeti (a grassland in Africa) - if the elephants did not eat or knock down the trees, the grassland would turn into a forest. This change would take all of the species out of the area, because they can only survive in a grassland ecosystem.
- Show some of the videos on specific keystone species to the students.
- Discuss invasive species and what threat they pose to keystone species and ecosystems. A relevant example for Manitoba students would be Zebra Mussels and their threat to Lake Winnipeg. <http://www.gov.mb.ca/waterstewardship/stopais/>
- Conclude by reviewing the importance of keystone species.



Grey Wolf (6)



Beaver (7)

Next Steps or Homework:

- Ask the students to research a keystone species on their own; outline that they should know why it is a keystone species and how it is important to its ecosystem. Have students complete a writing assignment on what they learned about their animal. Have students accompany their write-up with a drawing of their chosen keystone species.
 - Some keystone animals include: Alligators, Grizzly Bears, Beavers, Salmon, Black-Bellied Salamander, Hummingbird, Quaking Aspen, Red-Necked Sap Sucker, and Gopher Tortoise.

Deforestation

Grade: 3-4

Deforestation is clearing Earth's forests on a massive scale, often resulting in damage to the quality of the land. While forests used to cover 45% of our Earth's surface, they now cover only 30%. Deforestation leads to loss of habitats for wildlife, negative impacts on the water cycle, more extreme weather and climate change. Slash and burn, clear cutting, and selective cutting are the three main types of human deforestation however, natural elements such as wildfires and overgrazing from herbivores are factors as well. The best solution to human deforestation is selective cutting while replacing the lost trees with new ones.



An example of clear cutting



An example of selective cutting

Discussion Topics:

- Why do we need to cut down trees?
- What is deforestation?
- What are the 3 main types of deforestation?
- What are the environmental impacts of slash and burn?
- What are the environmental impacts of clear cutting?
- What are the environmental impacts of selective cutting?

Objective:

- To experience the effects of deforestation on a habitat due to clear cutting.

Materials:

- One chair (or something to sit on) per student.

Educational Videos:

- CNN Explains: Deforestation - https://www.youtube.com/watch?v=M4jhjt1_eyM

Lesson Plan:

- Discuss with students about how over 80% of all life on land, lives in forests.
- Ask the students how we cut down forests.
- Talk about the three major ways commercial forestry occurs, slash and burning, clear cutting, and selective cutting.
 - “Slash and burn” is when a farmer cuts down all the trees on their land and burn them.
 - “Clear cutting” is when a whole block of land is cut down in one fell swoop.
 - “Selective cutting” is when only the oldest and rotting trees are chosen and cut down. This is the most desired method as it makes way for new trees to grow, while keeping trees around to sustain the ecosystem.
- Have every student sit on their own chair, spread out throughout the room. While everyone is sitting, choose the chair one student is sitting on to get rid of (selective cutting). Maybe their chair is too old or weak. The student can move to make a home in another part of the forest or share a “young budding chair”.
- Ask the chosen student how they feel about giving up their chair.
- Now, “cut” the room in half, and ask the students to all move to the “uncut” area (clear cutting). Students may stand, sit on the ground or share a chair with another student but allow them to discover this on their own. Pause here and ask the students if anyone is sitting on the ground (without a home), or if it is crowded.
- Repeat this step (if space allows). The students should start to get the feeling of being crowded, as an animal living in the forest, having to move due to forestry, would experience.
 - Check in with the students to see how they are feeling when they are sharing chairs or sitting on the ground. The response should be negative.
- Explain to students that this is what clear cutting is like. We remove all the trees from one area and nothing can survive there afterwards. Explain that this is how animals are losing their homes, and without their homes they go extinct.

Next Steps or Homework:

- Have a classroom debate; the forestry industry vs. wildlife and nature. Students can research their sides and see if they can come to a consensus on what is better for the environment.
- In *Wild Wild Wilderness*, we hear the experience from the point of view of the animals. Have the students write a story from the point of view of the animal that needs to find a new home. The experience can be positive like in selective cutting or negative as in slash and burn or clear cutting.
- Have students write a paragraph on what they learned about deforestation. They can choose to write about the benefits and costs of one of the major three types of forestry or the benefits and costs to the earth. Either paragraph should include the effects on humans, animals, and the earth.

Water Quality & Nutrient Pollution

Grades 5-6

Maintaining water quality is presently one of the most pressing environmental issues. From our household items such as detergents and shampoos to agricultural herbicides and pesticides, once they are washed away, they all release harmful toxins into the environment. Pollutants from our day-to-day lives can make their way undetected and untreated into our streams, rivers and eventually, into our oceans through runoff. These pollutants accumulate rapidly and are very hard to contain or separate once they have entered our water source. Even with today's technology, untreated, polluted runoff continues to be a top threat to our clean water bodies.



Litter pollutes water

Definitions:

Phosphorus: An inorganic chemical.

Phosphorus Cycle: A system of processes that describes the movement of phosphorus through the environment.

Fertilizer: A substance like manure that is added to soil to help the growth of plants.

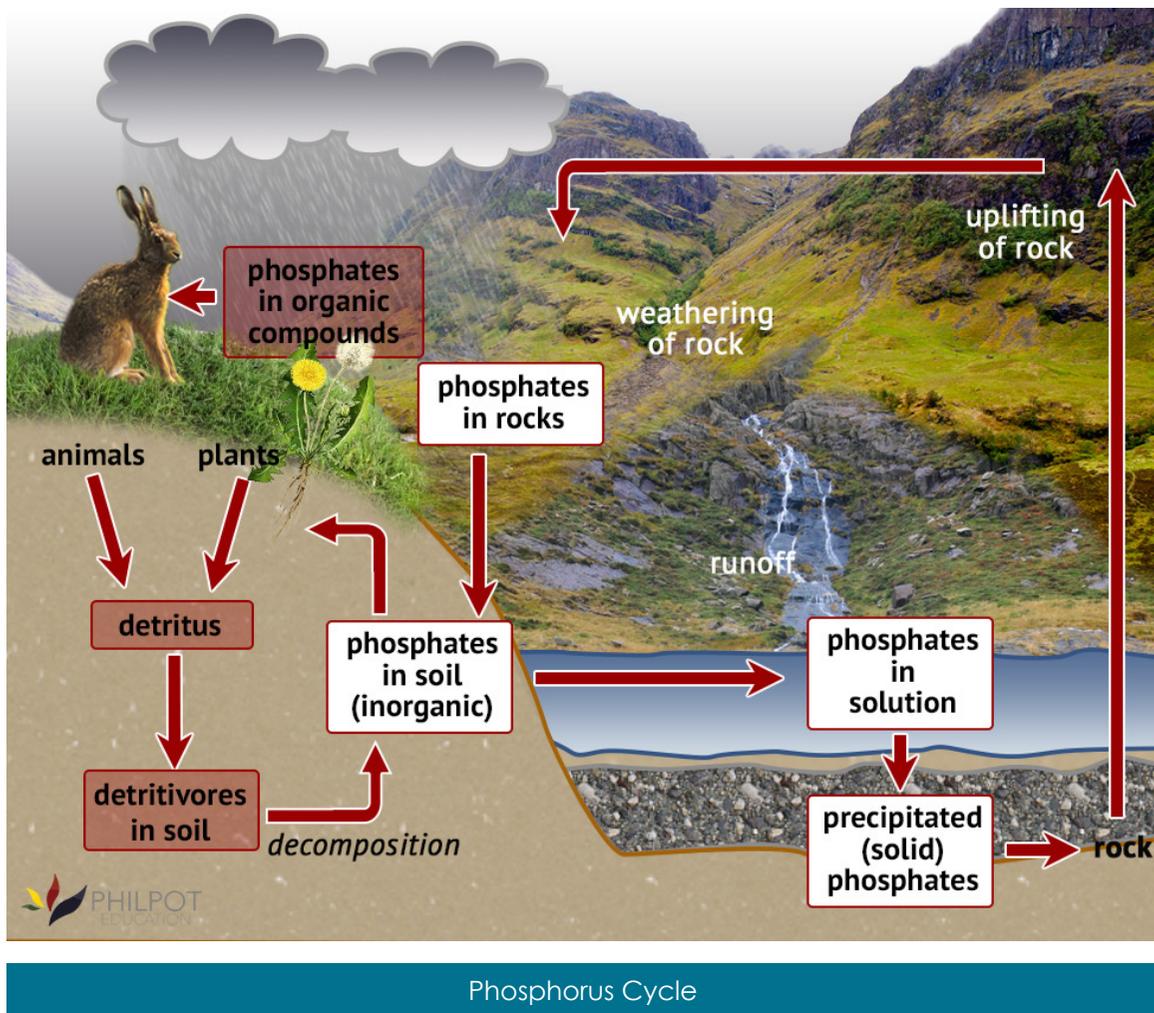
Toxin: A poisonous substance.

Runoff: The flow of excess water that occurs during storm water, melt water, or other sources. Runoff is a major component of the water cycle and a primary agent in soil erosion.

Leaching: The process of extracting substances from a solid by dissolving them in a liquid, either in nature or through an industrial process.

Weathering: The process by which rocks are broken down into small grains and soil.

This can happen through rainfall, ice formation, or the action of living things, such as algae and plant roots.



Objective:

- To build a filtration device to remove “harmful chemicals” from water runoff.

Materials:

- Pitcher of water
- Salt (mysterious fertilizer)
- Rocks
- Plastic cups
- Small bowls
- Scissors
- Gravel
- Sand
- Cotton balls

“On average, 22 million tons of fertilizers and chemicals are used each year.”

(Water Pollution)

Educational Videos:

- Nutrient Pollution - <https://www.youtube.com/watch?v=vCicSNnKUvM>
- Types of Pollutants - <https://www.youtube.com/watch?v=yEci6iDkXYw>

Activating Questions:

- How is water important to nature?
- How is clean water important to us?
- How do we use water at home? ex. Bathing, watering garden, etc.
 - Do we waste a lot of water? ex. Keep taps running
- What are some effects polluted water can have on nature around it?
- For the experiment, what materials do you think will filter out the fertilizer?

Lesson Plan:

- For this experiment, we will use table salt as a mock pesticide. Since salt is soluble in water and colourless when dissolved, this will symbolize harmful chemicals we cannot see.
- The filter you will build acts as the soil in crop land/fields and is used to filter out visible debris. All filters will be different, based on the group designs.
- Organize the students into small groups that will build their own water filters in a competition to see whose filter produces the cleanest water.
- Hand out the materials to create the filters.
 - Cups, rocks, gravel, sand, cotton balls, etc.
- Use cups to build a filter that will filter out most of the large debris using sand, gravel, and cotton.
- Mix up salt water in a pitcher. This step will imitate watering crops with fertilizer. Pour through filter.
- Examine the water collected at the bottom of the cup for any invisible pollutant left.
 - Important: Just because a pollutant is not visible, does not mean it is not there.
- Poke small holes at the bottom of your filter cups.
- Test the filtered water to see which group's water is most pure by using the saltwater tester.
 - The buzzer will beep if there are still traces of salt. (Since all groups would have used different amounts of materials, expect different outcomes.)

To Make the Salt Water Tester

Materials:

- Masking tape
- 9-volt battery
- Buzzer
- 2 Popsicle sticks
- Aluminum foil

Steps:

- First, cover two Popsicle with aluminum foil.
- Then, get a buzzer - you can buy one at an electronics store - and tape the red wire of the buzzer to the positive end of the battery. The positive end will have a plus sign on it.
- Next, tape one foil-covered Popsicle stick to the black wire of the buzzer. Tape the other one to the negative end of the battery. The negative end will have a minus sign on it.
- You can see if your tester is working by touching the metal together. This will complete the circuit and make the buzzer buzz. If it doesn't buzz, check your connections to make sure everything is taped together in the right way.

To use your saltwater tester, put just the tips of the metal in saltwater, about an inch apart. Make sure the two metal parts don't touch. The saltwater will act like a wire, connecting the metal sticks, completing the circuit, and making the buzzer buzz.

- This experiment is based off of a Zoom experiment, (Saltwater Tester)
<http://pbskids.org/zoom/activities/sci/saltwatertester.html>

Conclusion Questions:

- What materials did you use to make the filter?
 - Did you leave any materials out?
- In regard to the materials you thought would filter out the fertilizer:
 - Did they work?
 - If you had a chance to remake the filter, what would you change?

“In developing countries, 70% of industrial wastes are dumped untreated into waters, polluting the usable water supply.”

(Water Pollution)

Biodiversity & Food Web Interactions

Grades 5-6

Biodiversity is the variety of plants and animals found on the planet and as humans, we are dependant on it. Our ecosystems provide us with everything we need to sustain our lives including food, medicines and raw materials. Our ecosystems also moderate climate and turn waste into nutrients or materials such as oil and gas. (Biodiversity Loss: Facts and Figures, 2004) Loss of diversity among an ecosystem has an immense impact on species development as well as the health and vitality of that ecosystem. Our ecosystems connect on many more levels than we could ever imagine. These connections are key to the systems around us.



Biodiversity: the more, the merrier

Definitions:

Biodiversity: The variety of life in the world, or a specific habitat.

Species: A group of closely related organisms that are very similar to each other.

Species richness: The number of species in a given habitat.

Keystone species: A species that has a big effect on its environment, where its removal would have an immense impact.

Ecosystem: A biological community of interacting organisms and their environment.

Extinction: A continuous loss of species population, leading to the collapse of the species itself.

Environment: The surroundings or conditions in which a person, animal, or plant lives.

Discussion Topics:

- Which animals and plants are in our daily lives?
 - Talk about the biodiversity of your ecosystem.
- How do these animals and plants benefit from each other?
 - Are you surprised by these connections?
- How do we (as humans) benefit from the ecosystems around us?
- What effects do we have on the diversity around us?

“An estimated 80% of the original forest that covered the Earth 8,000 years ago has been cleared, damaged or fragmented...”

(Biodiversity Loss: Facts and Figures, 2004)



Biodiversity: Variety is
the spice of life

Objective:

- To help students gain insight into the connections of the ecosystems in their own backyard.

Materials:

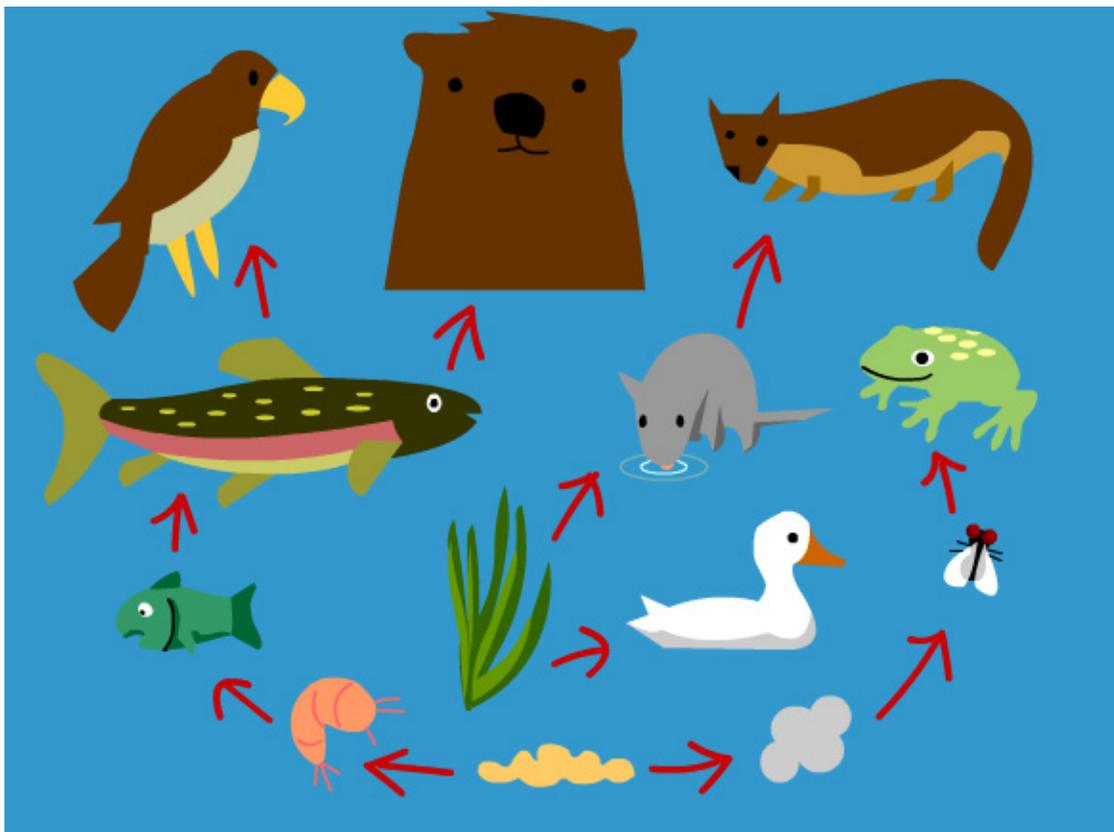
- Coloured markers
- White board or drawing paper

Educational Videos:

- Human Impacts on Biodiversity - <https://www.youtube.com/watch?v=wXJiHr8jWBs>
- What is Biodiversity and its Importance - <https://www.youtube.com/watch?v=ErATB1aMiSU>
- Food Webs: Crash Course for Kids - <https://www.youtube.com/watch?v=Vtb318VzIfg>

Lesson Plan:

- Start off by listing all of the animals and plants that are found in your local ecosystem. Try and incorporate which species are herbivorous, omnivorous, carnivorous, etc.
- With the plants and animals from that list, ask the students to draw a food web.
- Have the students add other animals that you might not have come up with as a class.
- In addition to writing the names of the animals, have students draw a picture to accompany their animal.
- On their webs or separately, add in humans and their connections.
- Once their webs are completed, take away or cover up certain species and discuss the impact of the species loss when removed from the ecosystem.
 - Notice any empty/unfulfilled connections?
 - Are there any risks in low species richness?
 - What are the consequences of species extinction?
 - Which species do you think are keystone species?



An example of a food web

Next Steps or Homework:

- Ask students to observe the diversity in their own back yard or community. Have students list the different types of animals and plants (as specifically as possible) and how many of each they saw. Give the table provided on the next page to help simplify and keep notes orderly.

-Note: The amount of plants is not relevant to this experiment. Observing plants as well as animals is a tool to help students understand that animals are not the only important aspect of an environment.

-A specific insect count is also unneeded. Since insects are numerous, it would be unrealistic for students to count exactly how many. However, the understanding that they outnumber other animals is important.



A healthy, biodiverse ecosystem compared to an area with little variety in plant or marine life

Backyard Biodiversity

What animals did you see?	How many?	What kinds of plants did you come across?
Ex. Rabbit Mosquito	3 Many	Daisies

Oil Sands

Grade: 7-8

It is likely that most of us have heard people talking about the tar sands or oil sands in Alberta. But do you know what oil sands really are? With 70% of the world's oil coming from Canada, it's worth a closer look.

The term "oil sands" describes an underground substance that is made up of clay, sand, water, and bitumen. Similar to how we can take water out of the ground using a well, we can also take bitumen out of the ground in order to extract oil from it. However, it is a little more difficult to extract bitumen compared to water, as bitumen is a very viscous material that does not flow freely. There are several methods used to extract bitumen, the two most common types being surface drilling and water flooding. Surface drilling is very similar to how a water well works; you drill into the ground and simply bring the bitumen up. With water flooding, water (or gas) is injected into the ground to force the oil out. Bitumen must then flow via pipeline to a processing station so that the oil can be extracted. The process of oil production can damage air quality, water quality, wildlife habitats, and local populations.



Oil sands



Ducks occasionally land in toxic tailing ponds, creating high numbers of duck deaths

Definitions:

Fracking: Another method of oil extraction that consists of controlled explosions that break rock away, making more bitumen accessible.

Tailing ponds: Ponds that used liquid materials are pumped into. These often introduce new and unnatural toxins to the local environment, which can negatively impact species and ecosystems.

The Environmental Protection and Enhancement Act: A piece of provincial legislation in Alberta that protects the environment while enhancing it and gaining economic benefits from it.

Discussion topics:

- What have you heard about oil sands in your community?
- Many Indigenous communities have been affected by oil sands (either water pollution, or drilling on their lands) - what are your thoughts on this? Is it possible to reduce these negative effects?
- What are the domino effects that can come from oil production processes?
- What are the provincial and federal government's positions on oil production? Are they for oil sands or against? Why?

Objective:

- To acquire a greater awareness regarding how we use oil in our everyday lives.

Materials:

- Groups of four-five students
- Devices with internet access (one or two per group, computers preferred)
- White board and whiteboard markers

Lesson Plan:

- Place students in their groups.
- Give them about 20 minutes to use the Internet to research aspects of their life that use crude oil. Encourage them to think outside the box!
- Get one member from each group to write their ideas on the white board or collect them on paper.
- Have each group discuss their different ideas. How many different things requiring crude oil can you come up with as a class?

What You Can Do:

Recalling the discussion regarding what products have oil in them - are there any that you can live without? If you can't live without them, can you cut back or try to use them less? Share your new knowledge with family and friends who might not know how harmful to the environment these everyday activities can be.

Next Steps or Homework:

- Make a survey with five questions you have for your family and friends (outside of class) about oil sands or their personal oil usage. Ask at least five different people your questions. Once you have their data gathered, look for common trends.
 - When you determine what some common answers are, make a one-page pamphlet with oil facts that could help your friends and family gain a greater understanding of oil sands or of oil usage. Distribute your pamphlets to the people you interviewed.
- Try to stay up-to-date on new pipelines being proposed in Canada. If you think some of them aren't a good idea, write to your local politicians and to the oil companies voicing your concerns.

Greenhouse Gases

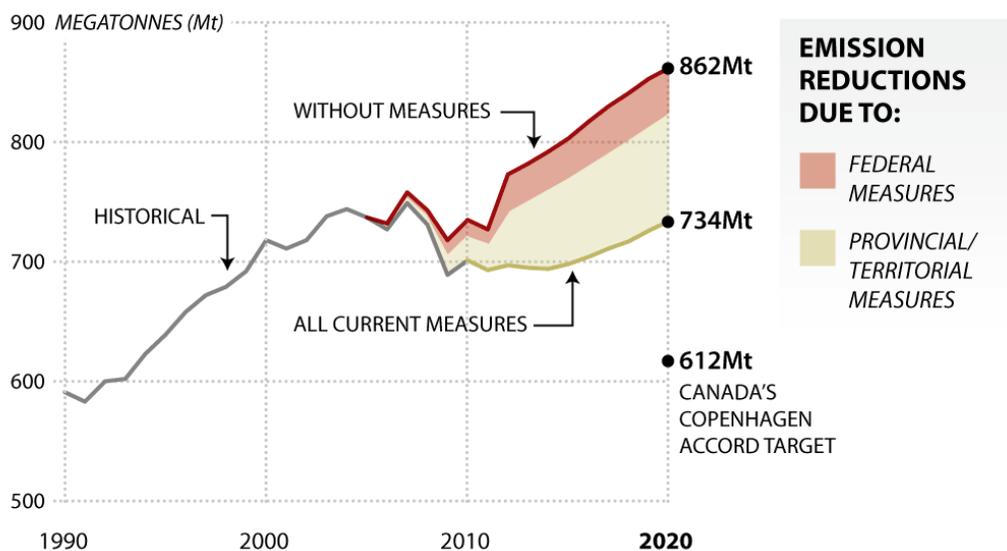
Grade: 7-8

The atmosphere is full of naturally occurring gasses that help heat the earth. These naturally occurring gasses are important because without them, the earth would simply be too cold. We refer to the Earth's atmosphere as a "greenhouse" because it resembles an actual greenhouse for plants. Greenhouses allow the sun's rays to heat them, but trap the heat from escaping - this allows them to be constantly warm.

The earth is also full of negative gasses. Large numbers of greenhouse gasses come from burning fossil fuels that are used for transportation, industry, and electricity; even the agriculture industry creates greenhouse gas emissions. Cattle, for example, release large amounts of methane, a leading greenhouse gas. Greenhouse gasses are a problem because humans create too many of them; they build up in the atmosphere, trapping more heat and in turn, overheat the earth. The results are higher temperatures in the atmosphere and oceans, and more dramatic weather patterns worldwide.

CANADA'S GREENHOUSE GAS EMISSIONS

A look at the projected effect of government measures on Canada's greenhouse gas emissions



SOURCE: COMMISSIONER OF THE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

THE CANADIAN PRESS

Graph showing Canada's greenhouse gas emissions with and without projected reduction measures

Definitions:

Greenhouse effect: The permanent heat increase observed across the world and caused by gasses in the air that trap solar energy.

Greenhouse gasses: The gasses in the air in which solar energy is trapped.

Fossil fuels: The fuels we derive from decomposed life forms. The most common fossil fuels are coal, petroleum, and natural gas.

Discussion Topics:

- What are greenhouse gasses and where do they come from?
- What are ways we can reduce greenhouse gas emissions?
- What is the ozone layer and how does it relate to greenhouse gasses?
- What steps are provincial and national governments taking to reduce greenhouse gasses?
- How do greenhouse gasses affect humans? What about other animals or even ecosystems?



Factory emissions contributing to greenhouse gasses

Objective:

- To have students experience the greenhouse effect.

Materials:

- 2 thermometers
- One clear and sealable container (jar)
- Paper and a pen/pencil
- Timer
- Sunshine

Lesson Plan:

- Place the two thermometers in the sunshine for ten minutes.
- After ten minutes, record the temperature shown on each thermometer.
- Next, place one thermometer into the container and seal it. Keep the other one as is, in the sunshine.
 - Note: Be careful not to touch the thermometers any more than you have to and make sure that neither thermometer is covered by a shadow.
- Monitor the temperature of each thermometer for ten minutes, writing down the temperature of each thermometer at each minute mark.
- Observe the greenhouse effect in the jar.

What You Can Do:

It is impossible to live without releasing some amount of greenhouse gasses. However, even by reducing your transportation by automobile, you can greatly reduce the amount of greenhouse gasses you emit. By being more aware of the food that you eat - eating local foods (they don't have to travel as far) and even reducing the amount of beef in your diet, can lower your emissions. Another simple way to help is to plant some trees. Trees absorb CO₂, a leading greenhouse gas; the more trees we have, the better.

Next Steps or Homework:

- Some of the leading contributions to greenhouse gasses come from energy usage (electricity: charging your phone or turning the lights on), transportation (by motorized vehicle) and transportation of food (if it comes from far away, it likely created a lot of greenhouse gas pollution by being transported to your city or town). Consequently, doing things such as active transportation (or public transit or carpooling), eating locally produced foods, and using less electricity (turn lights off when possible, don't keep devices charging for long periods of time), can help reduce your greenhouse gas emissions.
 - Make two categories: one of everyday activities that contribute to greenhouse gas emissions, and another of areas where you don't emit as many greenhouse gasses. Put five examples in each category.
 - For a week, track how many times you partake in activities that contribute to greenhouse gasses, as well as how many times you partake in activities that help reduce your greenhouse gas emissions. Write these down. After a week, bring in your data and share it with your classmates. Try to categorize what greenhouse gas emitting activities are most common.
- Students can write a public service announcement to their school or to the provincial or federal government to raise awareness about greenhouse gasses. Using the data the class collects over the week as examples, include where they come from, what they do, and how these effects can be mitigated.

Sustainable Cities

Grade: 7-8

Cities are constantly expanding, making the distance between one end and the next, farther and farther away. With everything being so spaced out, cities produce a lot of pollution as we are forced to spend more time driving, thus producing more vehicle emissions. This also creates extra costs for road maintenance and reduces the time in which we have to be physically active. Expanding cities are also a threat to farmers. As cities expand, we are taking agricultural land away from farmers (which is their livelihoods) not to mention we are reducing the amount of food being produced for our constantly growing global population.

Some cities have implemented measures to become more sustainable. Sustainable cities are high density, meaning that services are close together and living spaces are close to those services - living closer to one another and closer to the services we need. Sustainable cities have efficient modes of transportation to reduce reliance on vehicles. This can range from well-planned transit systems, to convenient bike paths. Some examples of such cities are Tokyo, Vancouver, Copenhagen, and Frankfurt. By taking the time to design these cities so that they are primarily compact, connected, and diverse, we reduce the impact their citizens are having on the environment.

Definitions:

Sustainable: Being able to meet your everyday needs, without taking necessary resources away from future generations.

Sustainable city: Other terms are “urban sustainability” or “eco-cities”.

Outputs: Everything from CO₂ emissions, to waste, to water pollution. Sustainable cities are aimed at reducing these negative outputs.

Walkability: How easily accessible services are by foot. The walkability of a certain area can be found at <https://www.walkscore.com/>



“Green” transportation featuring fewer vehicles, many pedestrians, and large bike lanes

Discussion Topics:

- In addition to the above introductory paragraph, are there any other aspects you think sustainable cities have?
- What has your local community done to implement aspects of sustainability?
- What can you do in your household to bring in more aspects of sustainability? What can you do in your school?
- Focus on one example of sustainability such as buildings - talk about all aspects of a building (from materials, to construction, to usage). How we can improve on sustainability in all those aspects?
- What is the danger of non-sustainable cities?
- What are governments doing to implement sustainable strategies into cities?



The vertical gardens Vancouver calls "Living Walls". They are visually appealing, and good for purifying air

Objective:

- To conceptualize a uniquely green and sustainable city.

Material:

- Groups of around four students
- Poster board sized piece of paper
- Pencil crayons or crayons (as well as other desk/classroom supplies - rulers, pencils, etc)

Lesson Plan:

- Watch the following video:
<https://www.youtube.com/watch?v=wZCV-JFvuZo&feature=youtu.be>
- Make notes on what makes sustainable cities from the video.
- Assign class into groups of four.
- Groups will be designing their own sustainable city. Discuss what “green” ideas you will implement in your city. Encourage students to design their green city in a climate that is similar to the city that they live in.
 - Students should include:
 - a. A name for their city,
 - b. A diagram of their city on the poster board,
 - c. What makes their city sustainable,
 - d. How it differs from the city they live in,
 - e. Where their food will come from,
 - f. What kinds of homes people will live in, and
 - g. What makes their city unique.
 - h. Have groups share and present their green cities with the class.

What You Can Do:

Make use of the various means of active transportation available to you (bike paths, skating trails, walking paths, etc). Try not to drive unless you absolutely have to. Encourage friends and family to use active transportation as well. Make efforts to eat locally produced and grown foods, as well as products that are made close to home.

Next Steps or Homework:

- Think about things you added to your sustainable city that you do not have in your current city. Would any of them be possible to implement? Perhaps more bike paths or rooftop gardens? Do some Internet research to see if measures are in place to make these things happen in your city or not.
 - Choose a politician (either your local MLA, your mayor, premier, or even Justin Trudeau). Write them a letter about sustainability in your city. Tell them where your city is now in terms of sustainability, what things you think should be changed first, and offer possible suggestions (locations, companies to help) that would be able to help make your ideas happen.
 - Have an adult or friend review your letter to edit then put your letter in the mail or send it to your chosen politician via email.

Fresh Water

Grade: 7-8

Water is essential to life – it removes wastes from our bodies, and helps food grow. Less than 1% of earth's water supply is accessible freshwater. The rest of our water is either frozen in glaciers or is ocean water, which is too salty to drink. Unfortunately, much of our freshwater is not drinkable due to water pollution. Freshwater can be polluted through many means including raw sewage, fertilizers, sediment, or tar sand residue. Once water has been polluted, it becomes too toxic to swim in, to support aquatic life, or to drink. In Canada, we are fortunate to have a lot of fresh water and not a lot of people. Some Canadians take that for granted and use as much water as they like. The issue of water wastage is something that is becoming increasingly problematic in Canada.

<http://www.pollutionissues.com/Ve-Z/Water-Pollution-Freshwater.html>



A map showing The Great Lakes that span across Eastern Canada and the United States.

Definitions:

Salinity: The saltiness of water.

Physical scarcity: When there is simply not enough water in an area (drinkable or not).

Great Lakes: The Great Lakes in Ontario hold 20% of the world's freshwater supply.

Potable: Drinkable water.

Discussion Topics:

- In what aspects of your life do you think you waste water?
 - ex. running water while brushing teeth, excessively long showers, dumping full water bottles.
- Some people collect rainwater and use it in various ways (flushing toilets, watering gardens, etc.) – is your family making any efforts to catch rainwater? If not, would it be possible to implement something like this into your household?
- Along the same lines as the previous topic, think about rainwater wastage. By having a lot of ground covered in concrete, none of the rainwater is absorbed, thus increasing the likelihood of flash flooding. By having more green space, we are giving rainwater a place to be absorbed. Think about your city - does rainwater have enough room available to be absorbed? Where are these areas? Where would more green areas be able to be implemented?
- As a nation with more freshwater than we need, how can we help provide water to countries that aren't as fortunate as us?

Educational Videos:

- Crash Course Kids- Fresh Water Problems (4:59)
<https://www.youtube.com/watch?v=jNOc7mHr5gl>
- TEDx Talk- Saving our Lakes and Fisheries (13:21)
<https://www.youtube.com/watch?v=1E6nkAMadao>
- Conservation International - Fresh Water: The Essence of Life (4:48)
<https://www.youtube.com/watch?v=k4HXCtV1y-w>
- NASA- Show Me The Water (2:49)
<https://www.youtube.com/watch?v=4HSFKwho7MQ>

Objective:

- To use their knowledge of freshwater in a creative way.

Materials:

- Paper and a pen/pencil

Lesson Plan:

- Have students write a poem or rap about fresh water. It can be about what happens when we don't conserve water or why we enjoy fresh water (other ideas at the teacher's approval).
- Host a classroom "Rap Battle" or "Poetry Slam".

What You Can Do:

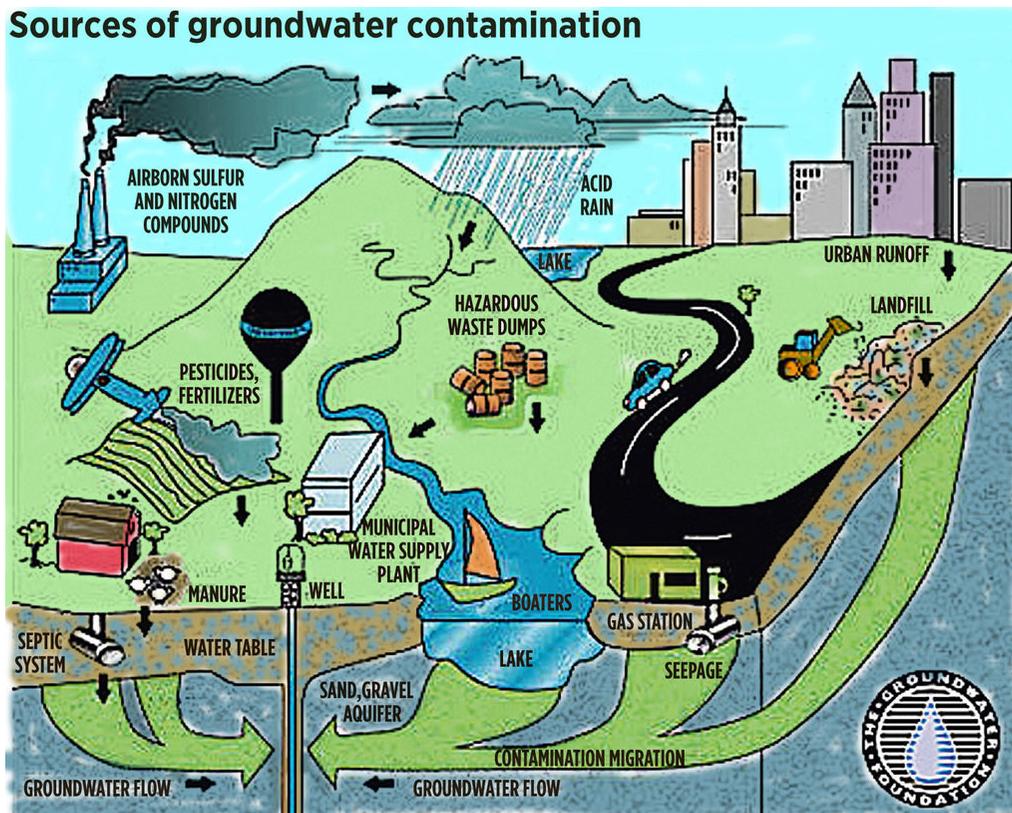
This is a two-step process of mindfulness and conservation.

First we must look at what we are putting into our water. Be wary of what you pour down the sink. Don't pour cooking oil, cleaning agents, or solid food (using a garbage disposal) down the sink. Instead, these items can be discarded at appropriate facilities or in the case of food, composted. When doing laundry, refrain from using more detergent (which should be phosphate free) than you need and ensure that the laundry machine is full before starting the load.

The second step is freshwater conservation. In order to use less water, an easy change is asking your parents to install water conserving showerheads and toilets. Pay attention to how much water you are using daily and don't use more than you have to. Advocate for more green spaces to absorb water, and talk to your family about installing water barrels to catch rainwater.

Next Steps or Homework:

- Despite being a nation with an abundance of freshwater, there are still residents of Manitoba and other provinces where people do not have access to clean drinking water. Should clean drinking water be a basic human right? What should be done about this issue? Host a classroom debate on the issue.
 - Use your voice to stage an awareness rally for your local or provincial government officials on this issue.



Source: The Groundwater Foundation, Illustration by C. Mansfield

GAZETTE

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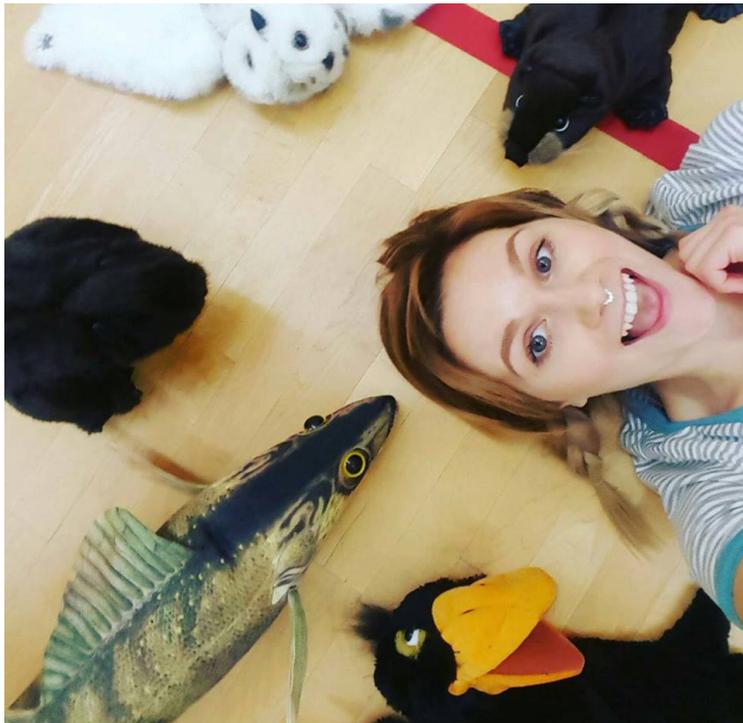
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Aileen Audette
and the cast of
Wild Wild Wilderness



Spenser Payne
and the Walleye in
Wild Wild Wilderness



Wild Wild Wilderness Teacher Evaluation

Thank you for participating in *Wild Wild Wilderness*. Your feedback is important to us.
Please send your feedback to daina@greenkids.com

What did you appreciate most about the program?

How would you improve the program?

How relevant was the program to your science curriculum?

How relevant was the program to your drama curriculum?

Additional comments or questions:



Wild Wild Wilderness Student Evaluation

Thank you for participating in *Wild Wild Wilderness*. Your feedback is important to us.

What did you like most about the play?

What did you like most about the workshop?

What do you already do to help our environment?

What's a new thing you are going to do to help our environment?

Anything else to tell us?





Gwen Collins and the Crow
in *Wild Wild Wilderness*



For more information on Green Kids, contact:

Daina Leitold, Executive Director, Green Kids Inc.

P 204.940.4745 E daina@greenkids.com

www.greenkids.com

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