

ELEMENTARY TEACHERS' FEDERATION OF ONTARIO

2011 Aboriginal Curriculum and the Sciences Intermediate



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Intermediate Lesson Plan

Background

Oren Lyons observes that the first mandate of traditional Haudenosaunee [Iroquois] chiefs is to ensure that their decision-making is guided by consideration of the welfare and well-being of the seventh generation to come:

What about the seventh generation? Where are you taking them? What will they have?
~ Lyons, 1980.

The seventh generation principle applies to the ancestors as well. In honoring the ancestors, one expresses gratitude to them as the seventh generation, which they kept foremost in their decision making and for whom they sacrificed.

As a general injunction to live responsibly and respectfully, and as a practical guide to specific moral decision-making, the seventh generation principle may be without equal:

We say that the faces of coming generations are looking up from the earth. So when you put your feet down, you put them down very carefully—because there are generations coming one after the other. If you think in these terms, then you'll walk a lot more carefully, be more respectful of this earth.

~ Lyons, 1995.

Objectives

The purpose of this lesson is to introduce students to the idea of sustainable living with a focus on water use and the effects of consumerism on the environment.

Science and Technology

GRADE 7 | UNDERSTANDING LIFE SYSTEMS INTERACTIONS IN THE ENVIRONMENT

Specific Expectations

Understanding Life Systems: Interactions in the Environment

- 1.1 Assess the impact of selected technologies on the environment.
- 2.4 Use appropriate science and technology vocabulary in oral and written communication.
- 3.4 Describe the transfer of energy in a food chain and explain the effects of the elimination of any part of the chain.
- 3.8 Describe ways in which human activities and technologies alter balances and interactions in the environment.
- 3.9 Describe Aboriginal perspectives on sustainability.

Understanding Matter and Energy: Pure Substances and Mixtures

- 1.1 Assess positive and negative environmental impacts related to the disposal of pure substances and mixtures.

Science and Technology

GRADE 8 | UNDERSTANDING EARTH AND SPACE SYSTEMS: WATER SYSTEMS

Understanding Earth and Space Systems: Water Systems

- 1.1 Evaluate personal water consumption, compare it with personal water consumption in other countries, and propose a plan of action to reduce personal water consumption and help address water sustainability issues.
- 3.3 Explain how human and natural factors cause changes in the water table.

Lesson Plan

Task 1: Brainstorming Uses of Water

Divide the class into small groups of three to five students each. Have the groups brainstorm a list of uses of water and report back to the class. Humans' dependence on water may seem obvious, but students might need a reminder to consider all creatures, plants, and processes that also require clean fresh water.

Task 2: Representing Earth's Land and Water

In their groups, have students designate a group calculator, a recorder, and a reporter. All group members are to give assistance to each other. Have the recorder begin by drawing a large circle on a piece of paper. Students will be building a pie graph, so a compass and protractor should be used. Inform students that this circle represents the Earth's surface.

Ask students to divide the pie into land and water: 28% of the Earth's surface is land and 72% is water. Have the calculator (with the group's assistance) convert the percentage into degrees so they can draw the graph accurately.

Focusing on the water portion of the graph, ask students to estimate how much of that water they believe is productive for human use. Invite them to share their predictions as a class. Inform students that 4% of the Earth's surface is lakes and oceans that are biologically productive for human use (i.e., they yield more than 95% of the global fish catch). Have the recorders colour 4% of the water section in blue and the remaining section black to show the 68% of the water on the Earth's surface that is only marginally productive or unproductive for human use (it yields only about 5% of the global fish catch).

Task 3: Calculating Water Consumption

Have students return to the list of uses for water. Remind students that Earth's water is shared among 6.8 billion people and 10 million or more other species. Inform students that this is not meant to scare or depress them, but rather to give them information on which to base choices about their own water use and which they can share with others.

Have students visit Zerofootprint (<http://goblue.zerofootprint.net/>) to calculate their water consumption.

Task 4: Finding "Virtual Water"

As consumers we are often so far removed from processes that involve raw materials and elements of nature that we do not consider what our purchases mean for the environment.

Explain to the students that the majority of our water footprint is not the water we drink, feel, or see. It is in fact hidden or "virtual water." Discuss the issues of wasting our natural resources. Have students read *The Story of My T-Shirt* (Appendix 1) to see an example of virtual water use around a common, familiar item. Further, you or the students might gather information from Jane Goodall's website (<http://www.janegoodall.ca/project-blue/WaterinCanada.html>). You might wish to use the questions in Appendix 2 as a springboard for further research and discussion.

Task 5: Spreading the Word

Have students choose one aspect of environmental conservation that appeals to them, perhaps around protecting the environment, conserving water, or the environmental impact of wasting our natural resources. Invite students to design a T-shirt, using a logo and slogan that they devise to spread the word and share with others the importance of minimizing our effect on the Earth. They can use the T-shirt blank in Appendix 3 to present their final design.

Task 6: Reading *The Lorax*

The Lorax is an endearing Dr. Seuss story about a mossy old hermit who lives in a psychedelic forest that abounds with bizarre wildlife until greedy capitalists, personified by the evil Once-ler, descend upon the forest and start to fell the beautiful Truffula Trees in order to turn their foliage into a completely useless clothing item: Thneeds. The website <http://www.squidoo.com/the-lorax> features an overview of the story and its characters, and expands on the message behind the story. It also contains links to lesson plans, videos, activities, and information about Dr. Seuss and his other books.

Resources

Down the Drain

<http://www.k12science.org/curriculum/drainproj/index.html>

EcoKids

http://www.ecokids.ca/pub/eco_info/topics/water/water/index.cfm

EcoVoyageurs

<http://www.ecovoyageurs.ca/en/page.cgi?stage=links/water>

Engineers Without Borders

<http://www.ewb.ca/en/whatwedo/canada/projects/hso/index.html>

Jane Goodall – Project Blue

<http://www.janegoodall.ca/project-blue/>

Kids Going Green

<http://www.kids-going-green.com/water-conservation-tips.html>

***The Lorax* by Dr. Seuss**

<http://www.squidoo.com/the-lorax>

***The Story of My T-Shirt* by Annie Leonard. Simon and Schuster, 2010.**

Water Use It Wisely

<http://www.wateruseitwisely.com/100-ways-to-serve/index.php>

Zerofootprint

<http://goblue.zerofootprint.net/>

Appendix 1

The Story of My T-Shirt (Task 4)

By Annie Leonard

Consumerism and the Environment

My T-shirt started its journey as a plant believe it or not. The cotton plant, a shrub native to the tropics but today grown all over the world, with a big enough global harvest to produce fifteen T-shirts for everyone in the world each year.

Cotton plants are very thirsty and love water. In fact, cotton fields are one of the world's most heavily irrigated crops. The irrigation process involves running sprinkler type systems through fields to provide them with a steady amount of water. Irrigation systems often lose water before it reaches the plants through seepage and evaporation. Growing cotton is not just depleting the quantity of water that exists but is also affecting the quality of water that remains through pollution caused by agricultural chemicals and pesticides. In conventional cotton farming, chemicals are first sprayed on the fields before planting to fumigate the soil. The cottonseeds themselves are often dipped in fungicide. Then the plants are sprayed with pesticides several times over the course of the growing season. Water use for growing cotton means that there's less water overall for drinking and the water that is left is highly polluted.

We've now left the cotton fields, but we're not even close to the finished product: my T-shirt. Taking raw cotton and turning it into fabric requires many industrial processes including the use of machines that consume energy and yes ... more water.

The next journey my T-shirt makes is to get coloured. Since my T-shirt is white it is going to get an especially strong dose of bleach. But even coloured T-shirts get bleached before being dyed. The bleaching chemicals leave the factory in wastewater. (That's right, it's even called WASTEWATER!) The dyeing process involves a whole host of chemicals and because cotton naturally resists dyes, one-third of them run off into more wastewater. The contamination from the wastewater from fields and factories ultimately affects the entire global food chain.

Finally my T-shirt is shipped to store and tagged. It's comfy and breathable, washable (which is another use of water), and versatile. I can buy my T-shirt almost anywhere and I'll only have to spend \$6.99 or \$1.99 if I get a multipack or catch a sale! But the price tag that we see in stores does not reflect all of the hidden costs of one plain white cotton T-shirt.

Is there anything we can do?

Organic and fair trade cotton products are a better choice for the environment, but they also come with a higher price tag. The best choice of all is to cherish the T-shirt you have. Wear it and care for it with the same preserving love you have for an heirloom piece of jewellery. Resist the urge to replace it with the newest colour or neckline. When they become too old to continue wearing you can turn them into rags or rugs even!

Appendix 2

Questions (Task 4)

1. When you buy clothes, do you pay attention to the place where they were made? Does this influence your final choice? Why or why not?
2. How does the contamination of wastewater affect the entire food chain?
3. What does *sustainable living* mean?
4. Do you think that it is important to consider the impact of our decisions on the next seven generations? Why or why not?
5. What are some ways that we can reduce our water usage?



Appendix 3

Spreading the Word (Task 5)

