

Our Relationship with Mother Earth

From Rights to Responsibilities

“The Earth does not need us to survive. We need the Earth and each other to survive. Respect is how we conduct ourselves to make the world a better place. We should be encouraged to listen to our hearts. We need to trust our feelings. Too often we live in our minds which creates fear and anxiety. We no longer trust in that we will always be looked after by Mother Earth, that she provides us everything that we need. We must also show our love to Mother Earth through gratitude, giving thanks to creation and to acknowledge all things that came before us.”

~Nancy Rowe, Mississaugas of New Credit First Nation

“What our human story needs now, is to gather all of the strengths from all of the good things about human beings in the past, what we have accomplished, take those and move forward in a good way. We can find new innovative technologies that will be less harmful to the environment. We can live with the animals and the trees without being destructive. We can find cleaner forms of transportation and different energies out there that are not intrusive to the environment. There are many ways to move forward without completely destroying everything. We need to hold onto this belief. We need to find a way to gather the strength of the Great Spirit of this land to move forward. We can learn how to do this from the animals, the plants, the sky, the stars and the moon.”

~Isaac Murdoch, Serpent River First Nation

OVERVIEW:

Throughout a series of explorations students will examine a variety of ways that the land is used for our benefit. Students will compare traditional practices with the extractive processes of resource development and investigate the impacts these have on our relationship with the land. Key ideas will focus on our beliefs and values with respect to our relationship with the land while comparing and contrasting a rights versus responsibilities based approach to our interactions with the Earth. By the end of the explorations students should be able to answer the inquiry question:

INQUIRY QUESTION:

How do our beliefs and values influence our relationship with the land?

Guiding Questions:

- Where do our beliefs and values come from?
- What are the consequences of resource extraction?
- Who benefits from resource extraction?
- What conflicts arise of opposing views on land use?
- What can we learn from the natural environment about relationships?
- How can we improve our relationship with the land?

Science and Technology Curriculum Expectation Connections:

GRADE 4

Understanding Life Systems:

1. analyse the effects of human activities on habitats and communities;

Understanding Earth and Space Systems:

1. assess the social and environmental impacts of human uses of rocks and minerals;

GRADE 5

Understanding Life Systems:

- analyse the impact of human activities and technological innovations on human health;

Understanding Matter and Energy:

- evaluate the social and environmental impacts of processes used to make everyday products;

Understanding Earth and Space Systems:

- analyse the immediate and long-term effects of energy and resource use on society and the environment, and evaluate options for conserving energy and resources;

GRADE 6

Understanding Life Systems:

- assess human impacts on biodiversity, and identify ways of preserving biodiversity;
- investigate the characteristics of living things, and classify diverse organisms according to specific characteristics;
- demonstrate an understanding of biodiversity, its contributions to the stability of natural systems, and its benefits to humans.

GRADE 7

Understanding Life Systems:

- assess the impacts of human activities and technologies on the environment, and evaluate ways of controlling these impacts;
- investigate interactions within the environment, and identify factors that affect the balance between different components of an ecosystem;
- demonstrate an understanding of interactions between and among biotic and abiotic elements in the environment.

Understanding Matter and Energy:

- evaluate the social and environmental impacts of the use and disposal of pure substances and mixtures;

ASSESSMENT:

Assessment for, as, and of learning is developed through the co-creation of learning goals and success criteria with students, based upon chosen overall and specific expectations. Teachers are encouraged to choose focus areas from the overall expectations listed in relation to this lesson.

Examples on effective instructional strategies eg., learning goals and success criteria can be found at Ontario's Edugains series:

<http://www.edugains.ca/newsite/aer/aervideo/learninggoals.html>

EXPLORATION ONE: Where Does Everything Come From?

TEACHER LEARNING GOAL: By the end of this exploration, students will be able to recognize and identify the different ways we can use the land.

MINDS ON

Note - the point of this exploration is to have students discover that everything originates from the earth before it is manufactured into something we use - this will be uncovered through the action portion of the activity. This understanding will serve as the provocation for the following explorations that will involve Indigenous perspectives and relationship to the land.

1) Brainstorm with students

Create a list by asking students: What are things that you use everyday? (*Possible answers: ipads, phones, cars, paper etc.*)

Have students sort their list into what things come from the earth and what things do not.

ACTION

ACTIVITY ONE: Small group investigation

Have students in their groups choose one item from the list of “what things do not come from the earth” (eg., cell phone)

Through their investigations using websites such as “How It’s Made” (<http://www.sciencechannel.com/tv-shows/how-its-made/>), by consulting packaging, or by interviewing a salesperson about the components of the item, students will make the connection between the product and how it comes from the earth.

After a period of exploration into the source of the components, gather the class in a knowledge circle to share their findings. Decide as a class whether the item still belongs in “What things do not come from the Earth”

ACTIVITY TWO: The Shirt Off Your Back

Using the labels inside the shirts students are currently wearing, map out where clothing has come from. The different shirts may also have different locations for printing/processing and maybe even distributing written on the label. Write all of these down on a whiteboard or online spreadsheet and create a graph.

How far has this shirt travelled to get to you? What resources were involved in making the shirt? Where are the sources of waste and pollution? What about the packages used in shipping the clothing to you, the energy used displaying the clothing in malls, and the eventual fate of your clothing when you grow or the clothing is damaged? What about the labour costs? Why does a shirt made in Canada cost more than a shirt made in China? How does paying such a low price for wages and workplace conditions hide the real price of the garment?

Note to teachers: Clothing manufacture and dyeing of clothes is the second largest human made source of water pollution after agriculture according to the United Nations. Wages and working conditions in the garment manufacturing industry have recently come under the social media lense due to a factory collapse killing many workers in Bangladesh in 2013. A fact sheet on wages and other associated costs in 2015 can be found here:

<https://cleanclothes.org/resources/publications/factsheets/general-factsheet-garment-industry-february-2015.pdf>

In small groups, have a recycled fashion challenge. Choose an item of clothing which is stained or ripped. Find out where it came from and how the land and water has been affected by the process of growing/making the clothing, colouring/printing the clothing, selling the clothing, and shipping the clothing.

As a group, create a way to extend the life of the clothing by turning it into something else. Use the clothing to create a bag, a notebook cover, a pencil case, a seat cushion, fabric bookmarks, hair ties, or other creative uses of as much of the clothing as possible. Take pictures of the whole process for use in a display or wikihow video.

Once the group has created the best option for extending the life of damaged clothing, display what you have learned about clothing and respectful use of the land. Show why extending the life of clothing is important, what you can find out on a label, and options for when a shirt is no longer usable as a shirt. Invite other classes to a fashion expo, display creations in a school display case, or present to parent council.

EXTENSION ACTIVITY: Disposable Technology

A key understanding for Grade Four students is that minerals which come from the ground are found in all parts of our daily lives, including “disposable” items. The hope is that they value the environmental cost of upgrading to a new video game system or phone before the old one has broken.

The How It’s Made series has many examples of product manufacturing (<http://www.sciencechannel.com/tv-shows/how-its-made/>).

Have students consider what electronic devices they use in their everyday lives. The metals used in these devices often include those that are dangerous to the students as well as the environment such as lead, mercury, and cadmium.

In a group, select a device which students would like to purchase. Use the internet links below, call the local e-waste recycler, or the city/town waste management site to find out which metals are in the device.

Video game systems:

<https://sites.google.com/site/azvaelectronicsrecycling/home/video-game-consoles>

Televisions:

<http://tv.about.com/od/hdtv/qt/e-waste.htm>

Tablets:

<http://urbanmining.org/2014/11/precious-metals-tablets>

In their investigations have students locate a mining site for two of the minerals in their device and visit the site remotely using Google Earth.

A map showing the location of the mines in Canada can be found here

<http://www.nrcan.gc.ca/earth-sciences/geography/atlas-canada/selected-thematic-maps/16878#minerals>

Have students consider:

Where does that device come from? How does the metal get from where it is mined to where the device is made? What is the cost to the environment of making these complex devices?

For a look at mining, the Mining and Minerals Institute in the USA has an animation on copper mining at <https://www.youtube.com/watch?v=zq1W5Noi3Sk&feature=youtu.be> or watch the video on gold mining here <https://www.youtube.com/watch?v=EoRenQKnTY> as both metals can be found in devices.

Ask the students to create a dramatic version (such as a tableau) of the steps showing the process from huge rock to small amount of ore. Before beginning, discuss the steps they wish to portray. For example, the students could gather together to represent the initial rock with a small object such as a marble representing the iron ore. As the rock is blasted, the students would move quickly away from each other. The sorting of the rock may have the student rock pieces move to a different location where the student holding the marble “ore” is separated from the students holding no ore. The students continue to act out the steps until the iron ore is extracted and sent for manufacturing.



CONSOLIDATION

Invite students to share their findings with each other.

Ask the question:

What have you discovered about where things come from?

EXPLORATION TWO:
How Do Our Beliefs & Values Influence Our Interaction With the Earth?

TEACHER LEARNING GOALS: By the end of this exploration, students will be able to compare and contrast different belief and value systems and how they influence our interactions with the Earth. Students will also be able to demonstrate why having a responsible and respectful relationship to the Earth leads to a sustainable future.

“Humans are a part of the natural cycle and have interconnectedness to everything including rocks. Rocks are alive, bring teachings, and are a respected member of our ecosystem. Our relations with Rock is that we treat it in the same way we would treat any other relative, human or non-human.”

Nancy Rowe, Mississaugas of New Credit First Nation

MINDS ON

1. Have students come with answers for the following:

The Earth is important because.....

Keep this list posted somewhere in the class so that you can revisit this throughout the activities and when consolidating new learning.

ACTION

ACTIVITY ONE: Indigenous Views on Land

Have students identify some of the characteristics or criteria for a responsibilities-based approach to using the land by reading the passage below on Inaaknigewin and watching the video on the harvesting of wild rice. (*examples may include: not taking too much, making sure harvesting techniques are not harmful to the environment, people should consider their impacts of their actions first, etc.*)

Inaaknigewin: How We Live With Mother Earth

By Isaac Murdoch, Serpent River First Nation

Inaaknigewin is a form of governance on how we live on the land. It's a set of principles and guidelines we follow to ensure that we live with nature. It's very important that we try to understand this in today's world because today we seem to go against nature. For the Ojibwe Peoples we believe in the thunderbirds and the serpents and we believe in the spirit of the animals and the water and such. I think the world is screaming for that right now.

Inaaknigewin, it means that everything gives everything to everything all the time. For example, birds and plants rely on other birds and plants to survive. When you look at a river, forever all it does is give everything to everything all the time and so we recognize that. With inaaknigewin the main principle is always being able to give.

Today you always hear people talk about rights-based agendas, but with inaaknigewin, it is more of a responsibility-based agenda. With inaaknigewin, it is about principles of the heart, principles of how you conduct yourself and it's really about your interaction with nature.

ACTIVITY TWO: Picture Analysis

In this activity students will examine the different approaches to interacting with the Earth through the analysis of a variety of pictures/images. Students will be given a collection of pictures (this can either be done by providing them to small groups to review or by projecting them individually so the whole class can view. Another option might be to use technology such as Nearpod or a similar application).

Students will analyze the images and then infer **what type of relationship the individuals or organization has with the Earth as well as their beliefs and values regarding the natural world.**

Possible pictures: individuals protesting an environmental issue such as oil pipelines, deforestation, green energies (e.g. wind turbines, solar energy, electric cars), motion sensor light switches VS. the tar sands, crowded highways, water pollution, litter in and around the school yard, gravel pits, water pollution from a factory...

An example of pictures can be found here: [Picture Analysis Example](#)

ACTIVITY THREE: Greed vs. Gratitude

To model the importance of planning, respect and sharing, begin by conducting a simple simulation. Put out a bowl of chips or another snack and simply tell the class to enjoy. Observe what happens. The intent is that in this first attempt some students will help themselves and most likely take more than their "share". The bowl will quickly empty and the distribution of the food will not be fair.

Discuss with the class what happened. Some possible questions:

Did everyone get some of the snack? Why not?

Was this a fair way to give out the snack?

Now repeat the above but this time before inviting the students to enjoy the snack ask them how they could possibly eat it in a manner that would ensure that everyone got some. Sample responses:

- 20 cookies - there are 15 of us - each take 1 and leave 5
- Divide the snack amongst everyone and then give away any leftovers to another class.
- Divide the snack and cut up any leftovers and give the pieces equally to the group

Class discussion:

As a whole group discuss how the simulation might relate to the use of trees for wood. *What might happen if we take too many and don't cut them down in a sustainable manner?*

What about mining?

Why is it important to be aware of what and how much we take from the Earth?

ACTIVITY FOUR: The Fisher Story

Source: www.helpingourmotherearth.com used with permission

You can either read the Fisher Story to students or you can play the video of Isaac re-telling the story by going here: <http://www.helpingourmotherearth.com/sacred-fisher-story.html>

Ask students if they can add to the list of characteristics/criteria of having a responsibility-based approach to using the land. Ask them to consider what some of the consequences are if we do not use this approach.

ACTIVITY FIVE: A Drop of Water

Use a piece of yarn and blue beads to show the movement of water through the system.

Cut the yarn about three metres long, thread on four blue beads (or small (ten centimeter) paper strips rolled into tubes) and tape the ends together with a small amount of tape (the beads will need to travel around the whole circle).

You will also need scissors, a bit more tape and three yellow beads (or yellow paper tubes) for later.

Have a student sit on the floor representing a pond he/she can think of some creatures which may live in the pond such as insects or fish and students representing these creatures can sit near the pond.

A student representing a plant such as a cattail (or a local example) can kneel (or sit on a chair) to the right of the pond.

Behind the student representing the cattail, two students stand representing air and wind

A student representing a fish eating bird (such as an eagle) stands an arm's distance away from the student representing wind and slightly back,

Another student stands an arm distance away from the student representing the eagle. He/she represents clouds.

A student stands beside the clouds to represent rain.

Finally a student kneels or sits to the left of the pond representing storm drains or running water downhill. The teacher represents humans.

The teacher holds onto the blue beads/tubes on the yarn circle and asks a student to make sure the yarn is held by both hands of the students representing the water in the storm drains, the pond water, the cattails, the air, the clouds, and the rain. The students representing the fish, insects, wind, and bird do not touch the yarn for now.

The blue beads/tubes represent water. Tell a story a couple of times as the water moves through the system and the beads are threaded along smoothly.

The human washes his/her car in the driveway and the water runs into the storm drain (thread beads over to the student representing the water in the storm drains).

The water runs through the storm drains and into the pond (the beads are threaded through the pond. The insects and fish don't help yet.).

Cattails growing near the pond use this water to grow and stay strong (the water beads get threaded up the cattail.)

Water from the pond and inside the plant turns into vapour as it absorbs energy and enters the air (the beads are passed up into the air.)

They travel past the eagle, carried by the wind (the student representing the wind physically walks the beads in front of the eagle toward the student representing clouds).

As the water travels, it loses energy and becomes clouds. (the water beads are passed to the clouds).

The clouds store the water droplets in the sky until they return down as rain which is collected by the human in his/her rain barrel.(beads are moved by the student representing rain to the teacher)

Tell the story twice so the students get a sense of the story.

As a class, decide how the fish, insect and eagle should interact with the water beads and try it out with a student narrator.

The teacher cuts the yarn and adds two yellow beads to the string. Use masking tape to seal the circle again. The yellow beads represent the soap added to the water used to wash his/her car and should be at the end so that students touch the blue beads first. As the beads get passed around and the story is told, tell one of the fish and the cattail to hold onto the yellow bead.

Discussion questions:

How do the insects, fish, and cattails feel about the water shared in the first version of the story? How does the water meet the needs of the creatures in the pond? How do plants react if they do not have water? How is the eagle related to the water in the pond?

In the second story, some of the soap the human used to wash the car ended up in the fish. *How would the fish feel about that? What might happen to the fish? What other creature might be affected by the cleaning chemical in the fish? (the eagle, when it eats the fish)*

The chemical also ended up in the plant. *What other creatures might be affected by the plant absorbing the cleaning chemical? If the human continued to add the chemicals to the water, where will the chemical end up?*



CONSOLIDATION

With regards to how we interact with the Earth what have we learned so far?

There are different views and beliefs on how we should interact with the Earth but this doesn't mean that technology and indigenous knowledge are always in opposition to one another.

Let's take a look at the following video. While you watch think about whether the scientist and the Elder agree or disagree about the topics.

Watch the following video:

<http://videos.sorensonmedia.com/NCSA/Two+Sciences+HD/60cda847s192cE4a70r876cP6b7fab844229>

EXPLORATION THREE
Responsibilities or Rights to a Sustainable Future?

TEACHER LEARNING GOAL: By the end of this exploration, students will be able to distinguish between a rights-based and responsibilities-based approach to their relationship with the land and discuss the consequences of each.

MINDS ON

Based upon the prior learning from the previous exploration ask students to help create a list of properties and characteristics for the two different outlooks on their relationship to all living things.

For example, consider the difference between having a “right” to clean water versus a “responsibility” to clean water. If we believe that we have a “right” to clean water, then it becomes easier to put all the blame on plastic water bottle companies who may be causing pollution or limiting access to clean water. However, if we believe that we have a “responsibility” to clean water then we also have to look at our role with plastic water bottle companies. If we didn’t purchase the water bottles then the company could not exist and therefore not cause that pollution. Our beliefs and values shape how we interact with our natural environment.

Sample chart

Rights-based Relationship	Responsibility-based Relationship

ACTION

ACTIVITY ONE: Conflicting Ideas

Ask: What can happen when two groups have different ideas about something? Can you think of an example of when this has occurred and what the result was? [think, pair, share]

Opposing views about how we should interact with the natural world can also lead to conflict and disagreement.

Have students read the article [Wild Rice Harvesting Begins on Pigeon Lake](#).

There are two opposing views about the wild rice that is growing in a lake in cottage country.

More information on what wild rice harvesting entails can be found at this link for Wild Rice Harvest - Northern Minnesota: <https://www.youtube.com/watch?v=Zs8UyGIL3iU>

Working in pairs, have students consider each side of the argument and each perspective then decide who they would support and why.

Display Suggestion: the weighted continuum

Use post it notes or repurposed paper (GOOS-"good on one side"-paper) cut to identical size. As students listen to calming music or ambient natural sounds, they write one reason (for either side) per piece of paper. While they are working, draw a continuum ranging from "harvesting wild rice is necessary here" to "harvesting rice should be banned here".

A weighted continuum involves placing each reason on the line in what they feel is the appropriate place. A reason such as "traditional land, traditional crop" (student example) was placed closer to "harvesting wild rice is necessary"; "rice is tasty" went close to the centre and "rice clogging the motors of boats could be a safety risk" went closer to "harvesting rice should be banned here". Listen while students place their reasons on the continuum, often they challenge each other's points of view or relative importance of the reasons.

This can be a highly visual representation of conflicting ideas. Simple writing "What did you learn?" on an exit pass is valuable assessment at this stage.

ACTIVITY TWO: Alternative views on Arctic Development

The World Wildlife Fund (WWF) successfully prevented Shell Oil from continuing to operate trade routes through a sensitive portion of Nunavut called Lancaster Sound. The court case they filed in February 2016 was won when Shell voluntarily agreed to remove traffic routes in the Northwest passage.

Use the website to learn more about this part of Canada.

<http://tinyurl.com/he767vp>

Using the hallway, gym, or outdoor space (lines on the soccer field work well) find a line to create a continuum ranging from strongly disagree to strongly agree. Read out the following statements and give students time to silently place themselves on the continuum.

Where the class is spread out for an issue, "fold the line" by having the right half of the line stay where they are and walking the left side over to face them. Give them time to state their opinion and listen to the other side. Let them know that learning the truth of others, especially when we disagree, is the first step in reconciling the differences.

Some sample questions:

Oil is needed for our society.

I have the right to get cheap gasoline to drive a car.

If oil can be sold for more money overseas, we should take it there and get more profit.

Whoever takes the oil out of the ground, owns the oil.

Oil companies need to have permission from First Nation communities to drill near their reserves.

The money we get from selling oil and plastics makes the environmental problems no big deal.

When oil is spilled, it is only the fault of the oil company. They should be the only ones cleaning it up.

ACTIVITY THREE: Water Walkers

Have students either read the article or watch the podcast: [Water walkers: Indigenous women draw on tradition to raise environmental awareness](#)

For more information about the Water Walkers: <http://www.motheearthwaterwalk.com>

Share with students the story of the Nibi (Water) Song told by Beatrice Menase Kwe Jackson, Migizi Clan and then listen to the song:

http://www.motheearthwaterwalk.com/?attachment_id=2244

Nibi (Water) Song
By Beatrice Menase Kwe Jackson, Migizi Clan

This song was written by Doreen Day at the request of her grandson. She attended a conference about the water in which the internationally known speaker, Dr. Masaru Emoto said, the very least we should do every day, is to speak to the water:

Water, we love you.

We thank you.

We respect you.

So she did this. Every day on their drive to drop Mashkoonce (Little Elk) to school, they passed a body of water. And every day they said these words to the water as they drove by. They made games by saying it in different voices and then would say it as fast as they could.

Then one day Mashkoonce, said, “Nokomis why can’t we say this in our language?” So, Dorene asked her daughter’s language teacher to write it in Ojibwemowin. Dorene had the words taped to the car visor as they learned the words.

One day this grandson Mashkoonce said, “Nokomis why don’t we sing the words, don’t you think the water would like it to be sung?” So she thought about it and came up with the tune. They sang this song to the water every morning on their drive to school.

It is sung like a lullaby and we don’t use shakers or drums.

Doreen and her grandson, Mashkoonce, give permission for everyone to share this song... sing it to the water every day.

Ne-be Gee Zah- gay- e- goo
 Gee Me-gwetch -wayn ne- me - goo
 Gee Zah Wayn ne- me- goo

http://www.motherearthwaterwalk.com/?attachment_id=2244

Extension activity: students could develop their own song based on a responsibility they connect with personally.

Ask students if they can add anything more to the chart from the Minds On section:

Rights-based Relationship	Responsibility-based Relationship

ACTIVITY FOUR: Investigating Water

For this activity, students will travel to a local water reservoir such as a stream or pond. They will bring with them magnifying glasses, rulers and/or calipers, recording devices, such as a notepad on a clipboard and a pencil. Explain they will be going to visit the home of a number or organisms and they are to be respectful. Much like one does not break down the door of the

neighbour's home and run through the rooms screaming, we are going to be respectful of the organisms which live near the water and the work they are doing.

When you approach the water, identify the boundaries. They are not to go into the water, but look from a distance. They will be observing silently first and looking for how many different kinds of organisms they see. Remind them to look from three vantage points: standing on feet, sitting or kneeling, and close to ground level. After a brief period of time observing, gather the students in a knowledge circle.

Ask the students in the circle what they noticed. Ask them how they can decide if the habitat is healthy. Does a healthy ecosystem need many different kinds of plants, or just many plants? What about the creatures in the water?

If protocols permit, the teacher or supervisors can use a kicknet to gather a sample of the benthic invertebrates by disturbing the rocks upstream and allowing the water to pass through a net. By emptying the invertebrates into a white tub containing water from the pond or stream, the students will be able to see the invertebrates present.

http://www.ecospark.ca/sites/default/files/currents/ID_guides.pdf has a nice guide which can be put into sheet protectors or laminated to keep a record of the organisms you spot.

Make sure the invertebrates return to the correct spot in the stream/pond.

Return back to the knowledge circle and discuss the organisms in the stream/pond. How can these organisms show us how healthy the habitat is? What would happen to the organisms if the water became polluted? Where is the water coming from, other than rain? Where does water from the surrounding houses, streets, sidewalks, and parking lots run to? How do the plants around the pond or stream help when the water becomes polluted?

As you travel back to the school, pause to identify sources of pollution such as windows which might be washed with detergent, lawns which may get fertilizer, litter in gutters, and driveways which may have cars being washed or cars with leaks. Note the sewer drains and slope of the land toward the water. You may also want to refer back to the understanding of the plants near the pond absorbing pollution from the water and the lack of vegetation around driveways and sidewalks results in pollution being carried by surface water and groundwater.

Once back in the classroom, use internet resources or pictures of labels on containers found locally to look at the chemicals and warning symbols on cleaning/waxing products, soaps, and paints. Look at the metallic compounds which may end up in the pond/stream through the runoff or sewer system. What effects may the use of these chemicals have on the water habitat? Why is it important to choose biodegradable or "eco friendly" soaps and detergents when outside? How could you reduce your impact on the water ecology when washing a car?(use a biodegradable soap, use a bucket and empty into the household sink, use less soap) Why

should you avoid pouring liquids into sewer drains? What should you do when you are camping to help the local water source?

Take Action. Using scientific terminology and facts from your investigation, write a letter to the local newspaper, speak to parent council, create a podcast, or write an article for your school newsletter about how local choices with cleaning products can help save the local water habitat. Don't forget to mention why the habitat is so important to protect!

ACTIVITY FIVE: Mining

Rocks in Ontario are a mixture of sedimentary rocks from when this area was an ancient lake, igneous rocks deposited or brought to the surface by glaciers during the ice age, and metamorphic rocks which have changed during their journey through the Earth's crust. For a map of the main deposits in Ontario, see [Simplified Geology and Selected Mineral Deposits](#). This long time on the Earth brings with it ancient knowledge which many Indigenous peoples believe can be learned by spending time with the rocks. Time is a relative thing. To a rock, a year is a fraction of a blink. Rocks, in eurocentric science, are resources to be used. In a larger context, however, rocks are necessary for life itself. Rocks erode to form rigid parts of the soil which provide air pockets for roots to grow. Living things also require trace minerals which are found in rocks and brought to soil by wind and water. Copper found in the veins of rocks made the first copper vessels for moving water. This interdependence with rocks gives a responsibility to only take what is freely given. When minerals are eroded to the surface, they can be used with the appropriate acknowledgement of the gift. When we use machines to cut holes in the land to expose rocks underground, we are taking more than what was given and damage to the water and ecosystem often occurs.

(Paraphrased from Braiding Sweetgrass, Dr Robin Wall Kimmerer, Pages 184-185)

“Taking coal buried deep in the earth, for which we must inflict irreparable damage, violates every precept of the code. By no stretch of the imagination is coal “given” to us. We have to wound the land and water to gouge it from Mother Earth. What if a coal company planning mountaintop removal in the ancient folds of the Appalachians were compelled by law to take only that which is given? ...

It doesn't mean that we can't consume the energy we need, but it does mean that we honorably take only what is given. The wind blows every day, every day the sun shines, every day the waves roll against the shore, and the earth is warm below us. We can understand these renewable sources of energy as given to us, since they are the sources that have powered life on the planet for as long as there has been a planet. We need not destroy the earth to make use of them. Solar, wind, geothermal, and tidal energy-the so-called “clean energy” harvests-when they are wisely used seem to me to be consistent with the ancient rules of the Honorable Harvest.”

Dr Robin Wall Kimmerer, Braiding Sweetgrass, Page 187

Try one of the cookie mining activities from the links below:

Cookie Mining Activity by Development & Peace:

https://www.devp.org/sites/www.devp.org/files/documents/materials/devpeace_fall2013_student_activity_guide_for_printing.pdf

Cookie Mining Activity by Earth Science Week:

<http://www.earthsciweek.org/classroom-activities/cookie-mining>

The purpose of this activity is to give the player an introduction to the economics of mining. Each player buys "property," purchases the "mining equipment," pays for the "mining operation," and finally pays for the "reclamation." In return, the player receives money for the "ore mined." The object of the game is to develop the mine, safeguard the environment, and make as much money as possible.

Note - each of these examples of cookie mining have debriefing questions in the examples

ACTIVITY SIX: One Drop of Water: The Pipe Puzzle

You will need a section of PVC pipe about 75 cm long, a ping pong ball, and a few unbreakable cups for each team.

Before the activity, drill 10-15 holes randomly in each pipe. The holes should be able to be plugged by placing a finger over the hole, but it should not be possible for one person to plug all the holes at the same time. Seal one end of the pipe with a pipe cap or duct tape.

Fill a few buckets with water and place them at one end of an outdoor space.

Have each team sit behind the pipe assigned to them. Give the pipe, sealed side down, to a team member and place the ping pong ball inside while you discuss the challenge.

"There are many challenges that seem impossible when we are working alone, but can be solved with a team effort"

"Your challenge will be to rescue this ping pong "egg". As it is an egg, it can not be bounced out of the pipe. The pipe also must remain vertical. The water is there for you to float the egg to the top of the pipe."

"Sometimes companies assign one person to solve the problem and the rest of the people in the company are encouragers. For the first round, one person will hold the pipe just to stop it from tipping over. One person will try to fill the pipe. The rest of the team will be encouragers, promoters, givers of verbal Facebook "likes", and imaginary photographers, but can not actually touch the pipe or the water."

For the first round, let them try to fill the pipe, but they will get frustrated easily because the water will just pour out.

Stop the first round and ask what went wrong.

“One person acting alone can not solve the problem, no matter how strong the encouragement, promotion, or social media support. Meet with your team and try to find a way to rescue the egg in as quick a time as possible. The water buckets must stay where they are and your pipe must stay vertical at this distance away. Remember, water is precious so we do not want to waste any. An environmental cleanup is not a cleanup if it makes another problem. Once the egg is rescued, see if the team can return the water to the bucket.”

Allow teams a couple of minutes to plan and then try the challenge again.

“What roles were needed to solve this problem? Did you still need the encouragers/promoters with the second round? What advice would you give to other teams trying to solve this problem? Even though the cups you were given were little, you were able to fill the whole pipe. What might this say about the small contributions we make in problems such as sorting garbage or saving power? How does the idea of balancing roles in this activity relate to the environmental issues we have discussed so far?”

ACTIVITY SEVEN: Leave No Trace

Potential introductory video: <https://www.youtube.com/watch?v=8suiEKvZq5s>

(Produced by Buzzfeed, a woman carries around her trash for a week and discusses the composition and weight of the contents)

Using a binder clip, attach a plastic bag to the student’s desk. If they have rotary, they should move the bag with them to the other classroom. The bag should also travel home with them and return the next day. Any dry garbage goes into the bag (no liquids, used tissues, or food).

After 24 hours, sort the garbage on a tarp into the resources used. Plastics go into the oil pile, paper goes into the tree pile, and so on. Find the mass of each pile. If you produced the same amount of waste every school day, how many kilograms of waste would you produce? How much waste would the class produce?

Choose a stream of resources and try to reduce that stream to zero. What will you do to reduce your use of that valuable resource? Think of the four R’s: reduce, repurpose, recycle, refuse (as in “say no”) and try to make recycling the last option.

Some ideas for inspiration:

The zero waste bag: <https://www.youtube.com/watch?v=gqu0e-gZeHI>

The no straw movement: <http://www.plasticpollutioncoalition.org/no-straw-please/>

Staples marker/pen recycling

<https://www.terracycle.ca/en-CA/brigades/writing-instrument-retail-based-brigade>

Terracycle’s recycling brigades <https://www.terracycle.ca/en-CA/brigades>

Follow your plan to reduce waste for a month and then repeat the experiment with a new bag to store your waste. After 24 hours check to see if your efforts have reduced your total amount of

waste. How does reducing the mass of waste produced, even recycled, show respect for the land and its resources? How could you inspire others to follow your example?

ACTIVITY EIGHT: Shifting from Rights to Responsibilities

In this final activity students will look at examples of ways we can restore our relationship with the land through responsible use of resources.

Some examples are:

http://urbanminingsquared.com/wp-content/uploads/2013/07/UrbanMining_TraditionalMining.pdf

<https://www.statista.com/chart/5497/cell-phone-upgrade-cycles/>

<https://youtu.be/CJqs3nvj3q8>

<http://milkbagsunlimited.ca/>

<http://www.cbc.ca/news/technology/textile-recycling-1.3569138>

<https://www.evergreen.ca/blog/entry/2016-rbc-evergreen-watershed-champions-award-winners/>

There are many inspiring stories about youth developing technologies, forming advocacy groups and taking action on the environment.

Some examples are:

<http://www.theoceancleanup.com/>

<http://blogs.worldbank.org/youthink/why-young-people-are-ready-fight-climate-change>

<http://www.boyanslat.com/>

<http://www.ocean-sole.com/>

https://www.ted.com/talks/richard_turere_a_peace_treaty_with_the_lions?language=en

Submissions to the OurCanada project, for example this class near Orillia:

<http://ourcanadaproject.ca/place/food-drive-for-orphaned-wildlife/>

Working in pairs or small groups have students create an infographic on their selected topic



The Land and Me - students will discuss their own relationship with the land and how it has changed based on what they have learned throughout the activities in this exploration. You may wish to offer choice in terms of how students communicate this learning (eg., blog, oral presentation, through art).

Now that students have had an opportunity to explore these concepts they should be able to demonstrate their ability to answer the inquiry question. Prior to any assessment or evaluation teachers are encouraged to co-construct the success criteria with their students in order for them to demonstrate their new learnings.

ADDITIONAL RESOURCES

The following is a list of supplementary resources to support this topic:

VIDEO:

Indigenous Perspectives on Climate Change: Amanda Nahanee produced by B.C. year of science, Vanaqua Sci Lecture https://www.youtube.com/watch?v=OwH_0jXYOQU

Alberta Oil Sand and the Indigenous people of Alberta
<https://www.youtube.com/watch?v=ZvVhj46WD6s>

Downstream - Pat Marcel Ft. Chpewyan First Nations elder on the impacts of the oil sands on his community. <https://www.youtube.com/watch?v=tu7I5Jn2Occ>

David Suzuki host a informative discussion on the Alberta Oil Sands. Neil Young speaks out on oil sands and treaty rights. <https://www.youtube.com/watch?v=Y967MKhZq9g>

WEBSITES:

Guided Inquiry

http://www.lsf-1st.ca/media/Yellow_Fish_Road_-_Elementary_-_EN_-_with_Cover_Page_-_2012.pdf explores household chemicals which can run into storm drains and asks students to explore the effect these chemicals could have on waterbased wildlife. An action project at the end asks them to help Trout Unlimited bring attention to wastewater which directly enters watersheds by painting yellow fish on the storm drains. Contact lsf-1st.ca a month before you plan to do this activity for the appropriate forms.

<http://www.lsf-1st.ca/media/water.en.pdf> encourages students to look for invasive species in their area and explore the adaptations which make animals successful. Most activities have a section entitled “a bit about” which can be easily turned into a oral story on the effect of that particular invasive species in the watershed and the adaptations which have made those animals or plants successful.

<http://www.neok12.com/Global-Warming.htm> Global Warming for Kids

TEXT:

Turtle Races With Beaver (Seneca, Eastern Woodland)

Found in The Native Stories from Keepers of the Animals, told by Joseph Bruchac

<http://www.goodminds.com/turtles-race-beaver-traditional-seneca-story-paper-ed>

Also found in Pearson Canada’s Diagnostic Reading Assessment Bridge Pack

Picture book recommendation: A Drop of Water by Walter Wick

<http://www.scholastic.com/teachers/book/drop-water#cart/cleanup>

This book uses images of the many states of water using stop motion photography to show phenomenon such as evaporation, condensation, capillary action, and snowflake formation.

Cloudwalker by Roy Henry Vickers and Robert Budd

Tells of a Gitksan (British Columbia) hunter who is brought to the clouds by a group of swans. With only his cedar box of water, he walks on the clouds trying to find a way home. When he does make it home, he finds the water he dropped has made lakes and rivers.

<http://www.goodminds.com/cloudwalker-hardcover-ed>

Who Wants Rocks? By Michael Arvaarluk Kusugak and Vladyana Kanger Krykorka

Inuit writer and storyteller Michael Arvaariuk Kusugak tells the story of a prospector who learns the living nature of rocks and eventually works to preserve the true richness of Little Mountain.

(Available from Goodminds <http://www.goodminds.com/who-wants-rocks-hardcover-ed>)

The Little Hummingbird by Michael Nicoll Yahgulanaas

Haida artist and storyteller Michael Nicoll Yahgulanaas tells the story of the power of one person doing the best they can. Inspired by the story of a forest fire and the courage and determination of a tiny hummingbird who put out the flames one drop of water at a time. The story was also published by the author on youtube <https://www.youtube.com/watch?v=naj6zZakgEg>