

7.2 We Are All Connected

Story Extension for This Lesson:

This lesson is linked to the journey that Alex and Sam go on with the wolf as their guide. A good entry point to connect the lesson with the intermediate story is this passage:

Alex and Sam carry their canoe as quickly as possible to the water's edge and step carefully into the decomposing muck on the shore of the bay. They lower their boat into the Bay of Quinte, breaking through the thin layer of green film that coats the top of the water.

Just as Alex is about ask Sam about the green goo, a thudding sound approaches and is punctuated by Mahigan, their wolf guide, bounding into the canoe, almost tipping it over.

The canoe slips out of Sam's hand as it rocks back and forth from Mahigan's impact, but Sam grabs the canoe before it's swept away.

"I thought you could use some guidance," the wolf says gently.

Grade: 7

Strand: Interactions in the Environment

Big Ideas:

- Ecosystems are made up of biotic (living) and abiotic (non-living) elements, which depend on each other to survive. (Overall expectations 2 and 3)
- Ecosystems are in a constant state of change. The changes may be caused by nature or by human intervention. (Overall expectations 1 and 2)
- Human activities have the potential to alter the environment. Humans must be aware of these impacts and try to control them. (Overall expectation 1)

Overall Expectations:

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

Specific Expectations:

2.3 use scientific inquiry/research skills to investigate occurrences that affect the balance within a local ecosystem

2.4 use appropriate science and technology vocabulary, including sustainability, biotic, ecosystem, community, population, and producer, in oral and written communication

2.5 use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes

3.1 demonstrate an understanding of an ecosystem as a system of interactions between living organisms and their environment

3.2 identify biotic and abiotic elements in an ecosystem, and describe the interactions between them

3.3 describe the roles and interactions of producers, consumers, and decomposers within an ecosystem

3.4 describe the transfer of energy in a food chain and explain the effects of the elimination of any part of the chain

3.9 describe Aboriginal perspectives on sustainability and describe ways in which they can be used in habitat and wildlife management

Inquiry Skills:

Searching, Discussing, Reporting

Instructions:

Alex and Sam are sent on a journey with the wolf to determine why their water supply is contaminated. By encountering producers, herbivores, carnivores, omnivores, scavengers, and decomposers, Alex and Sam developed a deeper understanding of how their local ecosystem is connected to other ecosystems. This activity will demonstrate how these connections are important in the health of local and global ecosystems.

NOTE: This activity is similar to the Grade 6 lesson "Circle of Life."

Procedure:

1. Each coloured card represents one element in an ecosystem:
 - Blue represents non-living elements in an ecosystem (e.g., sunlight, water, air)
 - Green represents producers (e.g., grasses, trees)
 - Yellow represents herbivores (e.g., rabbits)
 - Red represents carnivores (e.g., bears)
 - Orange represents omnivores (e.g., fox)
 - Brown represents decomposers and scavengers (e.g., fungi and crow)
2. Divide your class into six groups: producers, herbivores, carnivores, omnivores, and decomposers/scavengers. Each group is responsible for finding as many living and nonliving things that live in an area near water (e.g., lake, river) and a forest based on the coloured cards they are given. For example, a group that is given a stack of red cards are responsible for writing on each card their carnivore and a brief description (on the back of the card) of what the animal needs to live for survival. This step will take 50 minutes to complete.
3. Collect all completed cards in a basket.
4. As a class, form a large circle. Make sure you distribute different coloured cards to your students. Avoid having students with the same coloured card stand beside each other.
5. The student with the "Sunlight" blue card begins the game. Give this student a ball of yarn or string. This student begins the game by saying "I am sunlight. I provide energy for the grasses to make food." The student passes the ball of yarn or string to the student who has the "Grasses" green card making sure he/she is holding to other of the strong.
6. The second student then names another card and states what his or her's connection to it. The second student passes the yarn or string to the third student.
7. Continue to string connections and passing the ball of yarn or string. There may be several connections to any one card.
8. Once all of the connections have been made, gently tug on the yarn or string you are holding. Count how many people feel the tug on their yarn or string. Repeat this step for each member of the circle.

9. Determine which components of the web is deemed "less important". Remove it from the web by having the person drop their card and yarn/string. Tug on the yarn and note any differences in sensation.

Guided Questions:

- What happens when the web becomes less complex? Are the changes dramatic as fewer elements remain in the web? Explain.
- Which cards had the most impact on the web? Which cards had the least impact on the web?
- Identify three food chains that interconnect with each other.
- Identify three food webs with five food chains.
- What would happen if more cards (species) were added to the circle?

Inquiry Question:

There are three lines of inquiry students can choose to pursue.

- Would adding humans into the circle affect the web positively, negatively, or both?
- What technologies could have affected Alex and Sam's community? Would the location of certain technologies impact the health of the water systems in Alex and Sam's community?
- Could international shipping and travel be a possible source of ill ecosystem health in Alex and Sam's community?

Students will produce a report to discuss the results of their investigation. Reports could be in the form of a five paragraph essay, a PowerPoint or Keynote presentation, or a Rick Mercer-inspired rant. Be open to different ways students can communicate their research with the class.

HINT: This is a perfect opportunity for students to investigate how the Indigenous peoples of the North used all resources provided by the animals they hunted, and the plants they eat were used for their survival.

Materials List:

- coloured cards: blue, green, yellow, red, orange, brown
- tape
- string or yarn
- markers

Connections:

This lesson can be used in conjunction with the Language curriculum under the reading, writing, and communication strands. To complete this activity, students are required to produce a multimedia report of what they have learned.

Subject Area:

Environmental, English

Connects to:

Grade 7, Grade 8

Assessment Strategy:

It is recommended you focus your assessment on process skills. To help get you started on this path, a series of charts have been provided for you. Information provided in the charts: Introducing the Framework.

Handouts/Assessments:

- Process-Skill-Searching-1
- Process-Skill-Discussing-7
- Process-Skill-Reporting-2

Process Skill - Searching

Process Skill	Students	Teachers	What This Skill Should Lead To
Searching	☐ locating their own sources of information based on their own questions ☐ re-framing their current understanding in light of new evidence ☐ evaluating the reliability of sources of information ☐ identifying potential sources of error and/or bias ☐ developing and using criteria to establish relevance, accuracy, and reliability of information ☐ discussing research with peers and teachers to gain additional perspective and construct new meaning ☐ developing and using strategies to collect, organize, and communicate relevant research ☐ developing and using strategies to interpret scientific vocabulary	☐ giving students sufficient time and resources for research ☐ giving students guidance and activities to develop research skills ☐ developing criteria for reliability ☐ giving students opportunities to discuss and question their research ☐ guiding the development of strategies to interpret scientific text	☐ critical literacy skills that enable assessment of information for accuracy, reliability, and relevance ☐ strategies for interpreting and understanding scientific text ☐ cooperative learning (through discussion of research with peers)

Teacher Notes:

Process Skill - Discussing

Process Skill	Students	Teachers	What This Skill Should Lead To
Discussing	☐ sharing and interpreting collected data to make sense of it; analyzing whether the data supports or disproves their hypothesis ☐ listening carefully to what others say ☐ talking about problems that may have influenced the results and possible ways to correct them in the future ☐ making connections between their results, previous research, and existing theories ☐ debating or exchanging views about a concept ☐ evaluating the impact of the results and their applications in the real world ☐ generating new questions that may lead to further investigation	☐ prompting students to be clear and precise, and to use the appropriate scientific vocabulary ☐ prompting students to choose the best facts to support their ideas ☐ ensuring that discussions in written form (e.g., comments on blogs or social networks such as Ning) have structure and flow	Discussion allows students to expand their knowledge about a topic and understand different points of view. They learn to express themselves precisely and to explain their reasoning (e.g., how they arrived at their conclusion). Debate is a healthy part of the scientific enterprise, and discussions are an effective way to explore opposition and skepticism.

Teacher Notes:

Process Skill - Reporting

Process Skill	Students	Teachers	What This Skill Should Lead To
Reporting	□ sharing ideas, based on facts and evidence, with others □ using creative and original presentation formats □ using an extensive vocabulary, yet writing or speaking succinctly □ giving others the opportunity to understand the world as the reporter does	□ encouraging connections, inferences, and predictions □ promoting the sharing of ideas and evidence in a logical and concise manner □ encouraging creativity and the use of technology □ differentiated. Permitting and encouraging different presentation formats allows all students to successfully communicate their findings. □ scaffolding the process for students. Students can start by using a structured report format which evolves into a more sophisticated self-structured format. □ a natural literacy link	Students acquire research, speaking, and presenting skills through reporting. It is this step in an inquiry that establishes the factual and investigative background that informs their investigation. They gain an improved sense of logical sequences and often improve their ability to use vocabulary. A skilled reporter knows how to summarize background information and present it in a manner that piques the audience's interest.

Teacher Notes: