



**Mother Earth:
A Lesson to Support Science 10
by
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S106.5

**Teaching Materials
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These units were developed by the following team of teachers, Elders, and cultural advisors: Yvonne Chamakese, David Hlady, Anna-Leah King, Duane Johnson, Marcia Klein, Lana Lorensen, Sally Milne, Joseph Naytowhow, Lamarr Oksasikewiyin, Stuart Prosper, Ron Ray, Ted View, John Wright, and Laura Wasacase.

All resources used in these lessons are available through the Stewart Resources Centre:
http://www.stf.sk.ca/services/stewart_resources_centre/online_catalogue_unit_plans/index.html

Information regarding the protocol when inviting Elders into the classroom can be found in the document: *Elders in the Classroom* by Anna-Leah King (attached as Appendix A). Further information can be found in the Saskatchewan Learning document: *Aboriginal Elders and Community Workers in Schools*.

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Overview

Many cultures around the world, including the First Nations and Métis cultures of Canada, use stories as teaching tools. MacLean and Wason-Ellam (2006) state that storytelling indigenizes the curriculum and is an empowering link to a sense of identity and the traditional knowledge of Indigenous people.

This lesson has a story as its central point. Although the lesson is based on one specific story, teachers are encouraged to look for books in their own libraries with similar themes. The picture book is written as a letter from Mother Earth asking people to take care of the environment.

This lesson incorporates objectives from the unit entitled Life Science: Sustainability of Ecosystems (SE) in the *Science 10 Curriculum Guide*. It can be used as an introduction to the unit or as a review and closure.

Foundational Objectives

SE1 Explore cultural perspectives on sustainability.

SE5 Investigate human impact on ecosystems.

Source: These and other objectives are found in the following document:
Saskatchewan Learning. (2005). *Science 10 curriculum guide*.
Regina: Saskatchewan Learning.

Timeframe

1-2 hours.

Resources

Gibb, T., et al. (2002). *Science 10: Concepts and connections*. Toronto: Nelson Thomson Learning.

Grace, E. et al. (2000). *Sciencepower 10: Science, technology, society, environment*. Toronto: McGraw-Hill Ryerson.

MacLean, M., & Wason-Ellam, L. (2006). *When Aboriginal and Métis teachers use storytelling as an instructional practice: A grant report to the Aboriginal Education Research Network*. Regina, SK: Saskatchewan Learning.

Schimmel, S. (1994). *Dear children of the earth: A letter from home*. Minocqua, WI: North Word Press.

These titles are available for borrowing from the Stewart Resources Centre of the Saskatchewan Teachers' Federation.

Mother Earth

Foundational Objectives

- SE1** Explore cultural perspectives on sustainability.
- SE5** Investigate human impact on ecosystems.

Key Understandings

- Different cultures, including First Nations and Métis cultures, view the relationships between living organisms, the Earth, and humans in different ways.
- A paradigm is the set of experiences, beliefs, and values that constitute a way of viewing reality.
- There have been changes in the scientific worldview (paradigm shift) of sustainability and human's responsibility to protect ecosystems.

Essential Questions

1. What is sustainability?
2. What is a paradigm and a paradigm shift?
3. What is your personal understanding of human's relationship with the environment?
4. How have some worldviews regarding human's relationship with the environment changed over the past few centuries? Why?

Learning Objectives (LO)

Students will be able to:

- SE1** LO1 Examine how various cultures view the relationships between living organisms and their ecosystems.
- SE1** LO2 Explain changes in the scientific worldview (paradigm shift) of sustainability and human's responsibility to protect ecosystems.
- SE1** LO3 Select and integrate information from various human, print and electronic sources (government publications, community resources, and personally collected data) with respect to sustainability and the environment.
- SE1** LO4 Communicate questions, ideas, and intentions, and receive, interpret, understand, support, and respond to the ideas of others with respect to sustainability and the environment.
- SE5** LO5 Propose a course of action on social issues related to sustainability, taking into account human and environmental needs.
- SE5** LO6 Predict the personal, social, and environmental consequences of a proposed action.

Assessment Evidence

1. Discussion questions (formative).
2. Understanding of key concepts (formative).
3. A letter to Mother Earth (summative).

Notes to the Teacher

Different cultures around the world, including First Nations and Métis cultures, use stories as teaching tools. This lesson uses a story to capture the students' interest in order to introduce ideas, to inspire creativity with a purpose, and to ignite the imagination of the students. The story also creates empathy for the earth through personification. As the students begin to feel compassion for the earth, they begin to realize how the impact of humans on the earth is very serious and shouldn't be taken lightly. The students begin to feel how the earth would feel if it were a person.

Lesson Plan

1. Introduce the Essential Questions through classroom discussion.
2. Introduce Key Concepts and terms. Hand out the *Key Concepts* student sheet (included) and discuss the definitions together. (See *Science 10 Curriculum Guide*, p. 30-31 for definitions.)
 - Teacher's answer key included - *Possible Definitions*.
3. Distribute the *Questions for Discussion* handout (included). Ask students for their opinions and input. Brainstorm questions 2 and 4 with the entire class, and write student comments on the board or overhead.
 - Student handout included - *Questions for Discussion*.
 - Teacher's key included - *Possible Answers*.
4. Reinforce background knowledge by asking students to read, to make notes, and to answer questions from a textbook or other source:
 - *Sciencepower 10* - 4.3 Sustainable Future, p. 116-122.
 - *Nelson Science 10* - p. 86-92.
5. Read the book *Dear Children of the Earth* by Schim Schimmel to/with the students.
6. Distribute the *Dear Mother Earth* assignment page and explain. Students will be writing a letter back to Mother Earth. Discuss the evaluation criteria as outlined in the rubric.
 - Student handout included - *Dear Mother Earth*.
 - Teacher/student copy included - *Evaluation Rubric*.

Possible Extension Activities

Create a visual representation illustrating sustainability, sustainable development, and/or the student's personal relationships with Mother Earth. Presentations may include visual art, dance, drama, or music. See *Sciencepower 10 - 2.4 Closing the Loop*, p. 66-68 (poster instructions).



KEY CONCEPTS



NAME: _____

1. Sustainability of ecosystems:

- What does “sustain” mean?

- What does “ability” mean?

- What is an ecosystem?

- So what does “sustainability of ecosystems” mean?

2. Write a definition of the word “paradigm.”

- Provide an example of a paradigm:

3. What does the term “biodegradable” mean?

- Provide some examples of biodegradable items:

4. What does the term “non-biodegradable” mean?

- Provide some examples of non-biodegradable items:

5. Explain the concept of conservation.

KEY CONCEPTS

(Teacher Answer Key of Possible Definitions)



1. Sustainability of ecosystems:
 - What does “sustain” mean?
To make something last longer.
 - What does “ability” mean?
To be able to do something.
 - What is an ecosystem?
The living (plants and animals) and non-living (air, water, soil) components of a biological community and their interrelationships.
 - So what does “sustainability of ecosystems” mean?
The ability to help ecosystems last longer by not impacting the living and non-living components and their interrelationships too much when we take what we need from the environment.
2. Write a definition of the word “paradigm.”
The set of experiences, beliefs, and values that constitute a way of viewing reality.
 - Provide an example of a paradigm:
The scientific worldview of human’s relationships with the environment is that humans are at the top of the food chain, so this implies that we can take what we want, when we want, because we are the most important.
3. What does the term “biodegradable” mean?
Items that can be broken down by the microorganisms in the ecosystem.
 - Provide some examples of biodegradable items:
Apple core, banana peel, cotton cloth, leather, wood, etc.
4. What does the term “non-biodegradable” mean?
Items that cannot be broken down by natural systems in the ecosystem.
 - Provide some examples of non-biodegradable items:
Glass, rubber, plastic, etc. (mostly human-made materials).
5. Explain the concept of conservation.
To control or regulate how a natural resource, such as a forest or river, is used; to manage a resource so it is available for present and future users.

QUESTIONS FOR DISCUSSION



NAME: _____

As these questions are discussed in class, write your own and others' answers and comments in the spaces provided.

1. Create a definition for the term "sustainable development" using the definitions we have already established? To whom do you think this term applies?

2. Brainstorm a list of things that humans are doing now in terms of "sustainability" that were not happening even 50 or 75 years ago?

3. Now that you have an understanding of what a paradigm is, do you think there has been a paradigm shift in the last century regarding human's relationship with the environment? Why or why not? Use your new science vocabulary.

4. Make a list of the non-biodegradable items you have thrown away in the last month. If you cannot remember exactly, estimate amounts of items. Example: milk jugs, tin cans, plastic wrappers, etc. How does this make you feel?

5. If you put these items into a pile, how big would the pile be? Estimate: as big as a milk crate, a car, a house, etc.

6. Think about where the pile of non-biodegradable garbage goes. What does “throw away” mean? Is it really going away? What has happened and/or is happening to the ecosystem where the landfill is?

7. What should be done about this wastefulness of non-biodegradable items? Form groups of 2-3 students and brainstorm some ideas. What can the government do? What can the community do? What can **you** do?

QUESTIONS FOR DISCUSSION

(Teacher Key of Possible Answers)



1. Create a definition for the term “sustainable development” using the definitions we have already established? To whom do you think this term applies?
If sustainable means trying to make things last longer, and development means to move ahead on something or to build something, then “sustainable development” would mean: building and moving ahead into the future while trying to make the environment last longer, so that future generations can do the same.
2. Brainstorm a list of things that humans are doing now in terms of “sustainability” that were not happening even 50 or 75 years ago?
People may have done these things for other reasons, such as poverty, but now they are being done for conservation’s sake. Recycling, reducing, fuel efficient vehicles, composting, conservation of any kind, etc.
3. Now that you have an understanding of what a paradigm is, do you think there has been a paradigm shift in the last century regarding human’s relationship with the environment? Why or why not? Use your new science vocabulary.
For example: Cars made in the 1970s were gas guzzlers. The mentality was that gas was cheap enough, so if you could afford it, why not burn it. Now we realize the impact of burning fossil fuels on the environment. We know about the greenhouse effect, global warming, climate change, acid rain, etc. The consequences of our ignorance have changed our thoughts about burning fuel as fast as we get it. Conservation is the key.
4. Make a list of the non-biodegradable items you have thrown away in the last month. If you cannot remember exactly, estimate amounts of items. Example: milk jugs, tin cans, plastic wrappers, etc. How does this make you feel?
Student answers will vary.
5. If you put these items into a pile, how big would the pile be? Estimate: as big as a milk crate, a car, a house, etc.
Student answers will vary.
6. Think about where the pile of non-biodegradable garbage goes. What does “throw away” mean? Is it really going away? What has happened and/or is happening to the ecosystem where the landfill is?
Student answers will vary.
7. What should be done about this wastefulness of non-biodegradable items? Form groups of 2-3 students and brainstorm some ideas. What can the government do? What can the community do? What can **you** do?
Student answers will vary.

Preparation for Dear Mother Earth Activity

Read the book *Dear Children of the Earth* by Schim Schimmel to the class.

- Introduce the analogy of the Earth as our mother. Ask students to suggest ways in which the Earth may be seen to have the characteristics of a mother. One suggestion may be that a mother supplies all the needs of a newborn infant, such as food, shelter, warmth, clothing, etc.
- Which of these needs does the Earth also supply?
- What other comparisons might you make between the Earth and a mother?



DEAR MOTHER EARTH

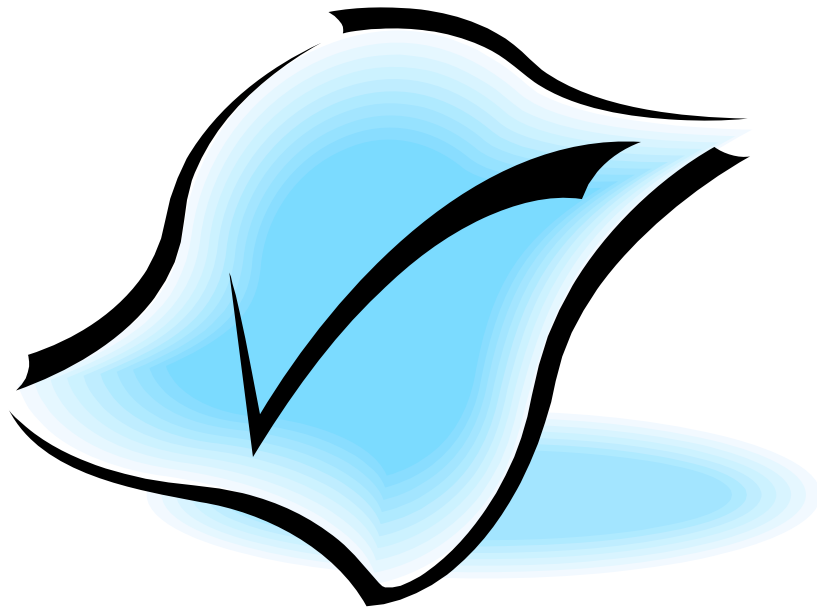
Write a letter to Mother Earth as a response to her letter to you in *Dear Children of the Earth*. Use the science language (key concepts and terms) you have learned in this unit. Here are some issues that you may want to address in your letter:

1. Mother Earth is our home. You are her children. We are all one Earth family.
2. What do you love about Earth?
3. In the book, the animals are worried about what people are doing to the Earth with pollution, extinction, poisoning, etc. Are you worried? Why or why not?
4. A little thing can turn into a big thing. What is a bad thing that you can stop? What is a good thing that you can start or are already doing now? (Use as many of the “key concepts” as possible.)
5. Tell Mother Earth how her letter makes you feel.
6. Include in your letter if you can or can’t do what she asked you to do. Explain why.
7. Use your imagination.
8. Your letter should be a minimum of 1 page in length (4 or more paragraphs).



Evaluation Rubric

	Level 4	Level 3	Level 2	Level 1
Key Understandings	The student demonstrates complete understanding of the concepts of sustainability and of human impact on the ecosystems in the writing of a letter. Addresses all of the points on the assignment, and the student's writing reflects the key concepts discussed.	The student demonstrates understanding of the concepts of sustainability and of human impact on the ecosystems in the writing of a letter. Addresses at least five of the points on the assignment, and the student's writing on these points reflects the key concepts discussed.	The student demonstrates some understanding of the concepts of sustainability and of human impact on the ecosystems in the writing of the letter. Addresses three to five of the points on the assignment, and the student's writing on these points reflects the key concepts discussed.	The student demonstrates little understanding of the concepts of sustainability and of human impact on the ecosystems in the writing of the letter. Addresses one or two of the points on the assignment, and the student's writing on these points reflects the key concepts discussed.
Product	The product is neat, tidy, and in the format of a letter.	The product is missing one of: neat, tidy, and in the format of a letter.	The product is missing two of: neat, tidy, and in the format of a letter.	The product is not neat, tidy, or in the format or a letter.



APPENDIX A

Elders in the Classroom

by
Anna-Leah King

It is the Elders' responsibility to guard sacred knowledge and to maintain the ceremonial oral tradition of knowledge transmission. In Saskatchewan, the territory is home to four First Nations, namely Cree, Saulteaux, Dene, and Ojibwe - Dakota/Nakoda/Lakota.

Source: Office of the Treaty Commissioner. (2002). *Teaching treaties in the classroom: Participants manual*. Saskatoon, SK: Office of the Treaty Commissioner.

All of these First Nations have a home here and it is entirely appropriate to represent any or all of these First Nations when approaching curriculum content. The Elders bring with them traditional knowledge and perspective passed down from generation to generation through the oral tradition. The reference to Elders' wisdom has lately been termed "Indigenous knowledge" or "traditional knowledge." Their traditional knowledge and wisdom will give insight to teachers willing to reshape curriculum and validating First Nations content and perspective.

Inviting the Elders

Protocol

The Elders would expect to be approached in the traditional way, respecting traditional protocol. They are given a small offering of tobacco in exchange for their commitment to invest their time and energy into the work at hand. They can be asked to lead the gatherings with prayer and ceremony. First Nations gatherings always begin with prayer and ceremony. It is entirely appropriate to ask this of them. It may not be what you are familiar with, but you will soon realize the benefits of respecting First Nations protocol and ceremonial practice. The Elders may want to begin with a smudge on the first gathering and offer prayer for the task at hand and the team that has been brought together. The Elders are well aware that any given group put together is there to learn from one another and so blessings towards this endeavour are prayed for. Sometimes, depending on the size of the project, a pipe ceremony may be requested. Each Elder may have a slightly different approach to opening and closing ceremony. Some may speak for a while. Others will ask you to share so they can become more familiar with everyone. Simply inviting them with an offering of tobacco and asking that they open and close the gatherings is enough. The Elder will take it from there.

Elder Expectation

When you invite Elders, it is important that you are clear on what you expect from them. If you are asking them to contribute with their knowledge, wisdom, and guidance, then say so. They may not all be familiar with education and what teachers and curriculum writers are trying to do, so explaining what curricula is and what is needed of them is essential to a good working relationship. You want them to contribute First Nations and Métis content and perspective. The Elders need to feel confident that they will be of assistance. Let them know that you see their role as wisdom keepers and they need to draw upon their personal experience, cultural knowledge, and teachings to contribute to the process. The Elders will share what is acceptable and give caution for what they view as sacred knowledge that is only to be shared in the context of ceremony.

Elders need time to think before they answer. Do not be impatient and feel they are not answering soon enough, as they will answer your questions in time. Some Elders are reflective, philosophical thinkers. They will review holistically what you have asked of them. A concept that you think is simple and straightforward has many different dimensions to a First Nations speaker, and they must put the concept into the context of the whole and analyze the dimension of its interrelatedness. Sometimes they translate what you are saying to themselves in their language. They think things out in their mother tongue first and then find the words of closest approximation in English. Not all words and concepts are readily translatable. That is why letting the Elder know what is expected of them beforehand is important because it gives them time to think it over and to find some area of common ground.

Elder Care

Elders do not expect anything but it would be nice to assign one person to see to their needs. Offer them a comfortable seat and debrief them on the expectations for the gathering. Introduce them to everyone and generally make them feel welcome. See to it that they have water, juice, coffee, or tea. It is good to have a snack for them at coffee break. Invite them to pray over the food before you eat. Allow them to be first in line for lunch or let them know you will serve them. This is an example of First Nations protocol. These are small things, but kind gestures go a long way with Elders. They appreciate when younger people make efforts to lighten their load. These gestures make the Elder feel welcome and cared for in a respectful way.

Gifts

It is appropriate to have a small gift for the Elders. If they are paid for their time, this would be considered the gift. Some give a small gift in addition to the honorarium, such as a basket of teas or jams.

- Further information can be found in the document: *Aboriginal Elders and Community Workers in the Classroom*, available from the First Nations and Métis Branch of the Ministry of Education.