

**Grade 9 Science - Sustainable Ecosystems**  
**7 Grandfather Teachings**  
**Lessons in - Honesty, Truth, Humility, Love, Wisdom, Courage, Respect**

**About The Seven Grandfather Teachings**

Wisdom: To learn from life experiences and the teachers in our lives, including Elders and children. (e.g. Nature's way of purifying water - the beaver)

Love: To be at peace with yourself and able to express love to your children, family, friends and community through your actions and words.

Respect: To accept everyone as they are without judgment. Respect The Creator's work, including yourself.

Courage or Bravery: To do the things that are difficult but need to be done or said, even in the most difficult of times.

Honesty: To say and act in an honest way, with no hidden agenda. To be honest in every action and provide good feelings in your heart. (e.g. Honesty and large industries in Canada)

Humility: To be modest by not showing off or bragging of one's own importance. To know that you are equal to everyone else in the world — no better or no less.

Truth: To know and believe in the Seven Grandfather Teachings and to live by them. (e.g. What if truth is not proven through a hypothesis)

**Science and Technology Curriculum Expectations - Connections:**  
**Grade 9 Science - Sustainable Ecosystems**

**Overview:**

Throughout a series of explorations involving the use of Indigenous People's stories students will learn about sustainable ecosystems and their importance to humans and how ecosystem health is vital for both terrestrial and aquatic environments. By deepening their understanding and appreciation of the natural world, students will begin to establish a more intimate relationship with their surroundings. The key ideas that will be focused on are the concepts of The Seven Grandfather Teachings with regards to how we interact with our natural world. By the end of these activities students should be able to answer three driving questions.

It is important for educators to understand that one of the main ways Indigenous People's Knowledge and Ways of Knowing are passed down is through storytelling. These three lessons explore the story of The Seven Grandfather Teachings and their lessons in Honesty, Truth, Humility, Love, Wisdom, Courage, Respect and how these traits connect to the ecological world around us.

### **Assessment:**

Assessment for, as, and of learning is used when teachers use triangulation to collect their assessment data.

### **Driving Questions:**

1. Why is it important to know about the different relationships that exist between humans, their actions, and long term ecosystem sustainability?
2. How does the human activity affect terrestrial and aquatic ecosystems, and what effect does this have on ecosystem sustainability?
3. In order to live in a responsible and sustainable way, what must we as humans understand about ecological balance and the impact of human activity on sustainability in terrestrial and aquatic environments?

Lesson	Title
1	Ecosystem Sustainability in a Local Environment - Poster Assignment
2	Impact of Human Activity - Water Study
3	Ecological Balance - Research Assignment

## Grade 9 Science

### Unit: Sustainable Ecosystems

#### Lesson 1: Ecosystem Sustainability in a Local Environment - Poster Assignment

<b><u>Stage 1: Desired Results</u></b>	
<b>Establish Curriculum Goals (Learning Goals):</b> B1.1 assess, on the basis of research, the impact of a factor related to human activity (e.g., urban sprawl, introduction of invasive species, overhunting/overfishing) that threatens the sustainability of a terrestrial or aquatic ecosystem  B1.2 evaluate the effectiveness of government initiatives in Canada (federal, provincial, municipal), and/or the efforts of societal groups or non-governmental organizations, such as Aboriginal communities, environmental groups, or student organizations, with respect to an environmental issue that affects the sustainability of terrestrial or aquatic ecosystems (e.g., wetland restoration, recycling programs, Canada–Ontario Environmental Farm Plans, stewardship of national and provincial parks)  B3.1 compare and contrast biotic and abiotic characteristics of sustainable and unsustainable terrestrial and aquatic ecosystems	
<b>Success Criteria</b>	
<b>Learning Goals:</b> Understand the importance of the different relationships that exist between humans, their actions, and long term ecosystem sustainability	<b>Success Criteria:</b> Co-constructed with student and outlined in Rubric. Leading question “What makes a good poster?”
<b><u>Stage 2: Assessment Evidence</u></b>	
Poster Assignment <ul style="list-style-type: none"><li>• A reminder that student products may vary and students may want to create digital or hard copy posters</li><li>• A sample rubric is included as a starting point.<ul style="list-style-type: none"><li>○ This could be used formatively or summatively.</li></ul></li></ul>	
<b><u>Stage 3: Lesson Outline</u></b> <b>Background/Intro (15 minutes):</b>	

**Focus**

The purpose of this assignment is to have students explore outside, and connect with their local environment. Do you have a wooded area on campus to explore? Perhaps a nearby stream or pond? This sample assignment outlines for students how to get started. It is suggested that the teacher act as a facilitator, lead the class outside, and brainstorm some environmental issues students may notice. In the class, the teacher can then lead the students through the poster assignment with the class example issue, and model what a successful assignment looks like. This also lends itself well to co-constructing criteria.

Ensure that the assignment is introduced first, and then co-construct criteria for the rubric. A sample rubric is included as a starting point.

**Developmental Activities (30 minutes):****Explore, Analyze**

Students should begin to research vital information for their poster. Remind students to think about how they can incorporate The 7 Grandfather Teachings into their poster. For example, *courage* of a local Not-For-Profit group to stage a protest regarding illegal dumping into our waterways from industries here in Ontario. This may be over 2-5 classes.

**Closing Activities (25 minutes):****Share**

Share the poster via Gallery Exhibit with the rest of the class.

**Accommodations:**

- Students can use IT to support their learning
- Students may not need to complete as many of the criteria on the rubric

**Modifications:**

- At teachers discretion based on students IEP

**Web Resources/Technology Integration/Materials:**

## Grade 9 Science

### Unit: Sustainable Ecosystems

#### Lesson 2: Impact of Human Activity - Water Study

<b><u>Stage 1: Desired Results</u></b>	
<b>Establish Curriculum Goals (Learning Goals):</b> B2.2 interpret qualitative and quantitative data from undisturbed and disturbed ecosystems (terrestrial and/or aquatic), communicate the results graphically, and, extrapolating from the data, explain the importance of biodiversity for all sustainable ecosystems [PR, AI, C]  B2.4 plan and conduct an investigation, involving both inquiry and research, into how a human activity affects water quality (e.g., leaching of organic or inorganic fertilizers or pesticides into water systems, changes to watersheds resulting from deforestation or land development, diversion of ground-water for industrial uses), and, extrapolating from the data and information gathered, explain the impact of this activity on the sustainability of aquatic ecosystems [IP, PR, AI, C]  B2.5 analyse the effect of human activity on the populations of terrestrial and aquatic ecosystems by interpreting data and generating graphs (e.g., data from Statistics Canada, Parks Canada, and other websites on: the concentration in water of chemicals from fertilizer run-off and their effect on the growth of algae; stressors associated with human use of natural areas, such as trampled vegetation, wildlife mortality from motor vehicles, and the removal of plants, animals, and/or natural objects; suburban developments and their impact on the food supply for animals such as foxes and racoons) [PR, AI, C]	
<b>Success Criteria</b>	
<b>Learning Goals:</b> Explore how human activity affects terrestrial and aquatic ecosystems, Explain what effect this has on ecosystem sustainability	<b>Success Criteria:</b> Student designed lab report - water study
<b><u>Stage 2: Assessment Evidence</u></b>	
Student Designed Water Study <ul style="list-style-type: none"><li>A reminder that student products may vary and students may want to create digital or hard copy lab reports</li></ul>	

- The marking scheme for the lab questions can be determined by the teacher
  - This could be used formatively or summatively.

### **Stage 3: Lesson Outline**

#### **Background/Intro (15 minutes):**

##### **Focus**

##### **Notes for the Teacher:**

Students would need to make the link between ground cover and effect on filtration. Depending on the soil composition of the area, water is not filtered as efficiently. There should be link on how to construct a filtration system that is similar to a natural filtration system. A suggestion to inquire about the beaver (nature's water filter) is also recommended.

##### Lab and Questions are included for easy access

Pre-Lab Questions to be completed as a class during a Knowledge Circle Discussion as they relate to The Seven Grandfather Teachings

#### **Developmental Activities (30 minutes):**

##### **Explore, Analyze**

Facilitate students designing and constructing their own lab (this should be scaffolded so that students feel prepared to make their own observation tables, recordings, predictions, etc)

Here is a link to an example water filter.

<https://www.homesciencetools.com/article/water-filtration-science-project/>

#### **Closing Activities (25 minutes):**

##### **Share**

Answer the analysis questions and submit.

##### **Accommodations:**

-

##### **Modifications:**

- At teachers discretion based on students IEP

##### **Web Resources/Technology Integration/Materials:**

Environment Canada - <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=6A7FB7B2-1>

## Grade 9 Science

### Unit: Sustainable Ecosystems

#### Lesson 3: Ecological Balance - Research Assignment

<b><u>Stage 1: Desired Results</u></b>	
<b>Establish Curriculum Goals (Learning Goals):</b> B2.1 use appropriate terminology related to sustainable ecosystems, including, but not limited to: <i>bioaccumulation, biosphere, diversity, ecosystem, equilibrium, sustainability, sustainable use, protection, and watershed</i> [C]  B3.5 identify various factors related to human activity that have an impact on ecosystems (e.g., the introduction of invasive species; shoreline development; industrial emissions that result in acid rain), and explain how these factors affect the equilibrium and survival of ecosystems (e.g., invasive species push out native species and upset the equilibrium in an ecosystem; shoreline development affects the types of terrestrial and aquatic life that can live near lake shores or river banks; acid rain changes the pH of water, which affects the type of aquatic life that can survive in a lake)	
<b>Success Criteria</b>	
<b>Learning Goals:</b> Explain what must be done as humans in order to live in a responsible and sustainable way Understand ecological balance and the impact of human activity on sustainability in terrestrial and aquatic environments	<b>Success Criteria:</b> 2 page research paper
<b><u>Stage 2: Assessment Evidence</u></b>	
Ecological Balance Research Assignment <ul style="list-style-type: none"><li>• A reminder that student products may vary and students may want to create digital or long hand research papers</li><li>• A sample rubric is linked here as a starting point.<ul style="list-style-type: none"><li>○ This could be used formatively or summatively.</li></ul></li></ul>	
<b><u>Stage 3: Lesson Outline</u></b>	
<b>Background/Intro (15 minutes):</b> <b>Focus</b> Warm up in a class “chalk talk”. Have students spread out around the room to different chart papers and have them silently record their thinking to the following question in a few words “What are some	

factors related to human activity that have an impact on ecosystems?” After students write down their items, bring the chart paper to the front of the class, and have students make connections between each others ideas. For example, a student may come up and connect “runoff” with “eutrophication”.

**Developmental Activities (30 minutes):**

**Explore, Analyze**

Play the web clip “[Bring Back the Bees](#)” and have a class discussion about what happened here, and why there is a commercial for such an initiative.

Explain to students they will be connecting one of The Seven Grandfather Teachings to a Canadian issue centered around ecological sustainability.

**Closing Activities (25 minutes):**

**Share**

Students are encouraged to peer edit their work, prior to submitted it for marking.

**Accommodations:**

- Students may use IT, and write at a different Grade levels expectation

**Modifications:**

- At teachers discretion based on students IEP

**Web Resources/Technology Integration/Materials:**

[https://www.youtube.com/watch?v=Rgi\\_6guRI54](https://www.youtube.com/watch?v=Rgi_6guRI54)

<https://bringbackthebees.ca/>



## References

Lesson	Title and APA References
1	Building Self Esteem in our Children. (date unknown). Completing the Circle: Teaching our First Teachers: Facilitators Notes. Accessed from <a href="https://onlc.ca/wp-content/uploads/2014/06/Session_04.pdf">https://onlc.ca/wp-content/uploads/2014/06/Session_04.pdf</a>
2	Government of Canada. 2017. Ground Water Contamination. Accessed from: <a href="http://www.ec.gc.ca/eau-water/default.asp?lang=En&amp;n=6A7FB7B2-1">http://www.ec.gc.ca/eau-water/default.asp?lang=En&amp;n=6A7FB7B2-1</a>
3	<p>Honey Nut Cheerios: Bring Back The Bees 2016. Video accessed from: <a href="https://www.youtube.com/watch?v=Rgj_6guRI54">https://www.youtube.com/watch?v=Rgj_6guRI54</a></p> <p>General Mills. 2018. Honey Nut Cheerios. #BringBackthBeeds. Accessed from: <a href="https://bringbackthebees.ca/">https://bringbackthebees.ca/</a></p>