

Science 11 Resource Package

Life Science: Sustainability of Ecosystems

Suggested Lessons and Activities

The following lessons and activities meet some of the foundational and learning objectives as outlined for Science 11 – Life Science: Sustainability of Ecosystems. Teachers should be reminded that these are only suggested activities and that they can and should be adapted to meet individual learning needs. The order that the lessons appear in is only a suggested order. Teachers can and should integrate their own lessons and ideas within the suggested lessons outlined in this unit.

The lessons outlined in this document consist of four sections. “Foundational and Learning Objectives” provides the numbers that correspond to the objectives that are identified in *Guidelines for Developing Modified Courses: Science 11 (Basic)*. “Lesson Overview” provides a brief description of the suggested lesson or activity. “Instructional Documents” lists Teacher Support Material or Student Handout documents that are directly related to the lesson. “Supporting Resources” lists resources from various sources that may be directly related to the lesson, that may support instructional content within the lesson or that may be alternate ways of meeting all or some of the foundational and learning objectives outlined in the lesson.

The guidelines and objectives for Science 11 have been chosen to reflect the units of the renewed Science 10 (2005) curriculum. Therefore, in addition to the *Guidelines for Developing Modified Courses: Science 11 (Basic)*, teachers should use the document *Science 10: Curriculum Guide* to assist with unit planning and instruction for Science 11. *Science 10: Curriculum Guide* provides sections on key questions, key concepts, pre-instructional questions as well as suggested teaching strategies and activities for each of the foundational objectives within each unit. Curriculum documents are available on-line at <http://www.learning.gov.sk.ca/>.

List of Lessons for Sustainability of Ecosystems

Lesson #	Name of Lesson
1	Visit a Vegetated Area
2	Study of Saskatchewan Native Plant Species
3	Ecology Related Careers
4	Impact on the Earth’s Ecosystem
5	Portable Pond

Foundational and Learning Objectives

SE1 - Explore cultural perspectives on sustainability

1. Examine how various cultures view the relationships between living organisms and their ecosystems. (PSD, CD 9.3)
3. 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. (COM, NUM)

SE2 - Examine biodiversity within local ecosystems

1. Observe and document a range of organisms to illustrate the biodiversity within a local ecosystem.
2. Select and use apparatus and materials safely when documenting biodiversity.
3. Identify biotic and abiotic components of an ecosystem.
4. Explain how the biodiversity of an ecosystem contributes to its sustainability.
5. Identify energy flow in ecosystems using the concept of the pyramid of energy, numbers, or biomass. (NUM)
9. Demonstrate a sense of personal and shared responsibility for maintaining a sustainable environment. (PSD)
12. Explore ecology-related work settings and work roles in the community. (CD 5.2)

SE3 - Analyze population dynamics within an ecosystem

1. Explain various ways in which natural populations maintain equilibrium and relate this equilibrium to the resource limits of an ecosystem.
4. Discuss the ethics of studying biotic components of ecosystems. (CCT, COM)

SE4 - Identify cycles, change, and stability in ecosystems

1. Illustrate the cycling of nutrients and matter through biotic and abiotic components of an ecosystem by tracking carbon, nitrogen, and oxygen.
3. Identify and respect various cultural perspectives on the cycling of nutrients and matter through the environment. (CCT)

SE5 - Investigate human impact on ecosystems

2. Compare a natural and a disturbed (altered) ecosystem and suggest ways of assuring their sustainability.
5. Propose a course of action on social issues related to sustainability, taking into account human and environmental needs. (IL, PSD, TL)
6. Predict the personal, social, and environmental consequences of a proposed action. (PSD)
7. Defend a decision or judgement and demonstrate that relevant arguments can arise from different perspectives. (CCT, COM)

Lesson 1 – Visit a Vegetated Area

Foundational and Learning Objectives: SE1: 3; SE2: 1, 2, 3, 4, 5, 9; SE3: 4; SE4: 1, 3; SE5: 2

Lesson Overview:

This lesson consists of several separate activities which alternate between classroom components and field studies in a vegetated area. Through the eight activities of this lesson students will be introduced to ecology related terminology, find a local area for their field study, examine the transfer of food energy in ecosystems, define, observe and explain the importance of biodiversity in an ecosystem, and learn about the carbon and nitrogen cycles.

Instructional Document(s):

1. Visit a Vegetated Area (Teacher Support Material).
2. Visit a Vegetated Area - Activity Sheet (Student Handout).

Supporting Resource(s):

1. A Schoolyard Ecosystem, pp.18-19 *Nelson Science 10: Concepts and Connections* or A Schoolyard Ecosystem, pp. 24-26 *Nelson Science 10*.
2. Seeing Patterns in Nature, pp. 11-13 *Sciencepower 10*.

Lesson 2 – Study of Saskatchewan Native Plant Species

Foundational and Learning Objectives: SE1: 1; SE2: 1, 3, 4, 5, 9; SE3: 1, 4; SE5: 2, 5

Lesson Overview:

In this lesson students will have the opportunity to study a number of Saskatchewan native plant species. While studying these plants they will be questioned about various ecosystem concepts such as; the abiotic and biotic influences within the ecosystem, the plants role in food chains, the number of species that exist in the ecosystem and possible human interference with the various species. Students will complete worksheets on various ecological features of individual plant species.

Instructional Document(s):

1. Study of Saskatchewan Native Plants (Teacher Support Material).
2. Saskatchewan Native Plants Worksheets – Cattail, Cow Parsnip, Dandelion, Prairie Coneflower and Willow (Student Handouts).

Lesson 3 – Ecology Related Careers

Foundational and Learning Objectives: SE2: 12

Lesson Overview:

This lesson will begin with students brainstorming career opportunities in various ecology related work settings. The students will then research to identify the educational requirements and the duties and responsibilities of one particular ecology related career and present their finding in the form of a poster.

Instructional Document(s):

1. Ecology Related Careers (Teacher Support Material).
2. Poster Evaluation Rubric (Teacher Support Material).

Supporting Resource(s):

1. Environmental Careers Organization Canada (ECO) Website:
<https://www.eco.ca/portal/default.aspx>
2. ECO Canada – Environmental Career Awareness (Teacher’s Guide). Available online by registering as an educator on ECO’s website.
3. Career Profile - Tree Planter, p. 45 *Nelson Science 10: Concepts and Connections*.

Lesson 4 – Impact on the Earth’s Ecosystem

Foundational and Learning Objectives: SE1: 3; SE5: 5, 6, 7

Lesson Overview:

In this lesson students will learn about the impact that personal and collective actions and activities have on the Earth’s ecosystem. They will read and discuss an article regarding the impact of human activity on an ecosystem before looking at their own personal impact through the completion of a personal ecological footprint quiz. Finally, they will create and carry out an action plan with the goal of reducing their personal ecological footprint.

Instructional Document(s):

1. Impact on the Earth’s Ecosystem (Teacher Support Material).
2. Reducing My Ecological Footprint – Action Plan (Student Handout).

Supporting Resource(s):

1. How Do We Affect the Environment? pp. 6-7 *Nelson Science 10: Concepts and Connections*.
2. Ecological Footprints, pp. 112-113 *Sciencepower 10*.

Lesson 5 – Portable Pond

Foundational and Learning Objectives: SE2: 1, 2, 3, 4; SE5: 2

Lesson Overview:

In this lesson a portable pond will be set up in the classroom so that students can study the biotic and abiotic components of the pond ecosystem. Students will illustrate the biodiversity within a local ecosystem by observing and documenting the range of organisms within the pond. By discussing the roles of the organisms within their ecosystem students may develop a greater appreciation for how the biodiversity of ecological communities contributes to their sustainability.

Instructional Document(s):

1. Portable Pond Activity (Teacher Support Material).

VISIT A VEGETATED AREA

Overview:

Through a series of classroom based and field observation activities students will be introduced to ecology related terminology, examine the transfer of energy in ecosystems, identify the importance of biodiversity within an ecosystem and learn about the carbon and nitrogen cycles.

Materials:

- Publications such as *Common Range Plants of Saskatchewan* and *Wildflowers Across the Prairies* can be used to help identify plants.
- Pictures of plants common to the area can be printed off the Internet and laminated for student use.
- Reference sheet with definitions of important terms: biotic, abiotic, biodiversity, food chain, food web, pyramid of energy, pyramid of biomass, photosynthesis and respiration.
- Clipboard and pencil
- Meter square apparatus (4 m string to be made into a square or hoop could be used)
- *Nelson Science 10: Concepts and Connections* or other similar resource textbook which provides students with information about: abiotic and biotic factors, food webs, trophic levels, biodiversity and matter cycles.

Method:

1. Find a vegetated area close to the school that the class can visit. Possible areas include: park, naturalized school grounds, school grounds, vegetated ditch, nearby green space, field, and riverbank. The area should be close enough that students can walk there safely, complete their field investigation and return to class in a normal class period. A detailed investigation may take more than one class period. Initial data could be collected through field examination and the teacher could have students complete their activity sheets in class during subsequent periods, or, the class may revisit the area.
2. Prior to visiting the vegetated area the teacher could discuss the terminology sheet with students. Alternately, the teacher could have students learn the terms as they are being used on the field investigation.
3. Walk to the vegetated area. Have students work in small groups to complete the activity sheets.

Activities:

Suggested Sequencing:		
Activity	Description	Assignment
1	<p>Introduce terms in the classroom: biotic, abiotic, ecosystem, community, population, food chain, food web.</p> <p>Show students options for finding names of plants such as field guides, picture books, flora, government publications, or Internet based pictures and descriptions.</p>	<p>Reading: <i>Nelson Science 10: Concepts and Connections</i> pages 8-9; 14</p>
2	<p>Field study: Take students to a local area. Have them make observations.</p>	<p>Field Assignment #1 Analyze Your Findings 1</p>
3	<p>As a class share and discuss food chains.</p> <p>Identify producers, herbivores (primary consumers), carnivores (secondary and tertiary consumers)</p> <p>Facilitate the process of combining individual student created food chains into a food web.</p> <p>Model the effect of impact on one of the species in the food web. On an overhead put an X on the species affected. Using a check mark identify other species that may also be impacted.</p> <p>Identify how energy flow in a food chain can be represented by energy pyramids.</p>	<p>Reading: <i>Nelson Science 10: Concepts and Connections</i> pages 22 -25</p> <p>Analyze Your Findings 2, 3</p>
4	<p>Define biodiversity and explain that more diverse ecosystems are generally more stable.</p>	<p>Reading: <i>Nelson Science 10: Concepts and Connections</i> pages 12-13</p>
5	<p>Field study: Have students compare the biodiversity of a disturbed area and a natural area.</p>	<p>Field Assignment #2 Analyze Your Findings 4,5</p>
6	<p>Familiarize students with the carbon and nitrogen cycles.</p>	<p>Reading: <i>Nelson Science 10: Concepts and Connections</i> pages 26-31</p>
7	<p>Field study: Return to the same local area again. Have students make observations relating to the carbon and nitrogen cycles.</p>	<p>Field Assignment #3 - Part A and B Analyze Your Findings 6,7</p>
8	<p>Have students work in groups to deliberate / discuss as they reflect on their field experiences.</p>	<p>Analyze Your Findings 8-10</p>

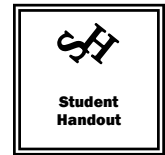


VISIT A VEGETATED AREA - ACTIVITY SHEET

Field Assignment #1 – Biotic and Abiotic Components of an Ecosystem

Observe living organisms but do not disturb them. Leave the plants in place. Watch the insects interact.

Record the names of any organisms identified throughout the field trip. These are the biotic components of the ecosystem. Also record any abiotic components observed.	
Biotic	Abiotic



VISIT A VEGETATED AREA - ACTIVITY SHEET

Field Assignment #2 – Comparing Biodiversity

Compare the biodiversity of two areas. Possible comparisons are a disturbed area and a natural area, a groomed lawn or football field and a natural area, a ditch and a lawn. Set down a meter square in each area. Count the number of different kinds of plants in the meter square. Name them if you know the name or simply record them as species 1, 2, 3, etc. Record the number of individuals of each species in each meter square.

Area 1 Description of area:	Area 2 Description of area:
Species: number of individuals (name if known) 1 - 2 - 3 - 4 - 5 -	Species: number of individuals (name if known) 1 - 2 - 3 - 4 - 5 -

VISIT A VEGETATED AREA - ACTIVITY SHEET

Field Assignment #3 - Part A: The Carbon/Oxygen Cycle

Matter is cycled in an ecosystem but never lost.

- Draw the Carbon/Oxygen cycle after reading the description below.
- Illustrate the diagram with plants and animals found in your study area.

Description of the Carbon/Oxygen Cycle:

- Photosynthesis takes carbon dioxide out of the air, converts it to sugar and it becomes part of a plant.
- Respiration converts the sugar to energy for both plants and animals.
- Photosynthesis releases oxygen to the atmosphere.
- Respiration uses oxygen.

VISIT A VEGETATED AREA - ACTIVITY SHEET

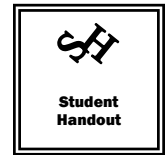
Field Assignment #3 - Part B: The Nitrogen Cycle

Matter is cycled in an ecosystem but never lost.

- Draw the Nitrogen cycle after reading the description below.
- Illustrate the diagram with plants and animals found in your study area.

Description of the Nitrogen Cycle:

- Nitrogen is a nutrient essential for growth of plants and production of protein in animals. Greater than 75% of the atmosphere is nitrogen gas (N_2), but plants and other organism can not use this form of nitrogen.
- Bacteria, found in the soil, convert nitrogen from the air into a form that is usable by plants, nitrate. Such bacteria live in a mutualistic relationship with some plants, in their roots.
- Plants then pass nitrogen on to animals when the animals consume plants.
- Plants and animals return nitrogen to the soil, as ammonia, when they die or give off waste.
- Bacteria change ammonia to nitrite and then nitrate.



VISIT A VEGETATED AREA

Analyze Your Findings

1. Draw a food chain using the names of some of the organisms observed in Field Assignment #1.
2. As directed by your teacher, share your food chain with the class. Together with your teacher you will combine individual food chains to create a food web. Record the class food web in the area provided below.
3. In class, you discussed the impact if one of the species were to be removed from the food web. In your own words describe how the removal of one species from an ecosystem can impact other species present.
4. Biodiversity is the number of different species in an ecosystem. Use your observation notes from Field Assignment #2 to answer the following questions.
 - a) Which field study area, #1 or #2, would be considered to have greater biodiversity? Explain.
 - b) Is the area with the greater biodiversity going to be more stable? Explain.
5. Why is it important to protect species in an ecosystem?

6. Explain why photosynthesis and cellular respiration are considered complementary processes?
7. How do animals obtain the usable nitrogen that they need to make proteins?
8. Did you disturb any organisms in your field investigations? How might you conduct yourself differently another time?
9. What can you do to preserve or protect a natural ecosystem?
10. What can you do to restore a disturbed ecosystem?

STUDY OF SASKATCHEWAN NATIVE PLANTS

Overview:

Students will study a number of Saskatchewan native plant species as a bases for learning about abiotic and biotic components of an ecosystem, the role of plants in food chains and possible human interference with species within an ecosystem.

Materials:

- Sufficient copies of the following worksheets to allow one for each student.
- Pencils
- Pencil crayons
- Writing surfaces such as firm cardboard, clipboards, etc. for each student.
- Blank paper

Method:

Find a nearby field, river bank, valley or ditch that is vegetated with native prairie species in the worksheets. Hike until one of the species on the worksheet is located. Read the write-up. Discuss additional material. Orally ask questions such as:

1. What is necessary to grow these plants?
2. What are additional uses for these plants?
3. How do these plants fit into the food chain?
4. How many of the species exist in this ecosystem?
5. What biotic and abiotic factors are of influence?
6. How is the population kept in equilibrium?
7. How do humans interfere with species in this area?
8. How can this area be preserved to protect these species?

Activity:

Each student will draw either from actually looking at the plant in the field or by copying the given picture or from memory. Use colour pencils.

While students are making sketches, draw attention to the special features of each plant such as:

- How large it can grow
- Changes through the seasons
- What type of seeds, how seeds are spread
- Shape, color, texture of leaves
- Petal colours and purpose of colour, scent and taste
- Roots and stem purpose and function
- Abiotic growth requirement

Read the story and answer the questions. Have students add to the discussion their experiences such as the name of the plants in their native tongue; stories they have heard from parents, grandparents, friends, elders; or make connections to books, magazines, movies, videos or television programs.

Extension:

Bring extra paper to draw and study other plants in the area. Research the new plant when you return to the school. Create a biological scrapbook with the assignment sheets.

Assessment:

Grade based upon assignment completion and discussion participation.

CATTAIL

English name: Cattail

Botanical Name: *Typha latifolia*

Generic Name: _____

Specific Name: _____

Other names: Cattail Flag, Bulrush (list names) _____


Height: 4 feet to 8 feet

Habitat: swamps, wet ditches, lakeshores

Bloom Season: August- November

Human Uses: Aboriginal people used the long slender leaves to make mats. The fine “down” of the seeds served as insulation from the cold in mattresses or pillows, as a liner for the first “disposable diaper”, or to light fires. Also, the down could be packed into a bandage to treat burns. Young cattail flowers can be cooked like corn and the roots can be eaten raw or cooked.

Animal uses: Geese, elk and muskrat love to feed on cattails. The plant creates a cover from predators for many waterfowl as well as landing places for songbirds.

	<p style="text-align: center;">Draw a Cattail</p>
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Questions:

1. What use did humans have for cattail plants? _____

2. Name two roles of the cattail for animals? _____

3. In what habitat are cattails commonly found? _____

4. What do cattails need for growth? _____

5. When is the best time to look for cattail blooms? _____

COW PARSNIP

English name: Cow Parsnip

Botanical Name: *Heracleum lanatum*

Generic Name: _____

Specific Name: _____

Other names: Indian Rhubarb, Cow-cabbage (list names) _____

Height: 6' to 12' / 1.8 to 3.7 m

Habitat: Rich, damp soil of ditches or valleys

Bloom Season: Late May to early July

Human uses: Leaf and stems can be peeled and eaten raw or cooked. Roots can be cooked like potatoes or pounded into flour for baking.

Cow parsnips belong to the celery family and taste like celery. Do not attempt to eat this plant unless you are sure you know its identity. Hemlock, a poisonous plant, looks similar and contains a deadly poison.

Animal uses: Bears like to dig for roots which are starchy. Wild animals like deer and domestic animals such as cattle forage for leaves in the spring.

	<p>Draw Cow Parsnip</p>
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Questions:

1. What use did humans have for cow parsnip plants? _____
2. Name a role of the cow parsnip for animals? _____
3. In what habitat are cow parsnip commonly found? _____
4. Why should a person not eat cow parsnip unless they are *absolutely* sure they know what it is?

5. When is the best time to look for cow parsnip blooms? _____

DANDELION

English name: Dandelion

Botanical Name: *Taraxacum officinale*

Generic Name: _____

Specific Name: _____

Other names: Lion's Tooth, Wet-a-bed (list names) _____

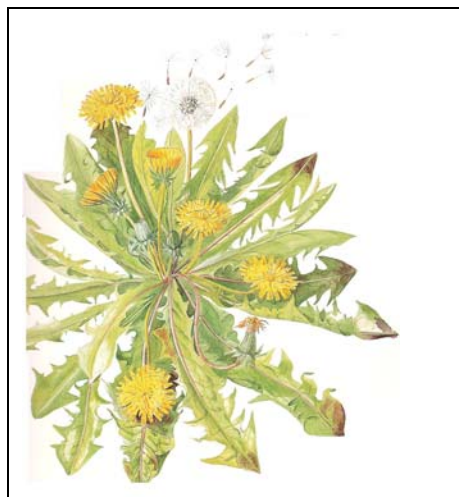
Height: 4"-15"/ 10-37.5 cm

Habitat: fields, lawns roadsides

Bloom Season: April to August

Human uses: During the early spring, fresh vegetables were scarce, and the prairie homesteader housewife was delighted to see dandelions appear. They were a welcomed change from the winter diet of preserves and salt pork. Dandelion salad is rich in vitamins A and C. Dandelion was also used as fabric dye by the Scotsmen for their tartans. Weavers say it is the only natural yellow dye this side of the Atlantic. The bitter milky juice is said to cure warts if applied directly. Tea was made from the leaves is believed to help coughs, fevers and stomach problems. Coffee was made from roasting and grinding the roots during World War II when regular coffee was in short supply.

Animal uses: Many animals like rabbits or birds like finches love to eat the flowers. Deer and other herbivores will graze on the juicy leaves.



Draw a Dandelion

Questions:

1. What use did humans have for dandelion plants? _____
2. Name a role of the dandelion for animals? _____
3. In what habitat are dandelion commonly found? _____
4. What do dandelion need for growth? _____

PRAIRIE CONEFLOWERS (yellow, brown and purple)

English name: Prairie Coneflower

Botanical Name: *Ratibida columnifera* (yellow), *Ratibida pulcherrima* (brown), *Echinacea angustifolia* (purple)

Generic Name: yellow and brown _____ purple _____

Specific Name: _____ (yellow) _____ (brown)
 _____ (purple)

Other names: yellow coneflower, brown coneflower, purple coneflower


Height: 10-24"/25-60 cm

Habitat: dry prairie, roadside

Bloom Season: July to September

Human uses: *Ratibida* and *Echinacea* look very similar, but are not from the same family. *Echinacea* is no longer common in Saskatchewan and was used by the Aboriginal people and early pioneers for medicine. It was drunk as a tea for sicknesses or used as a poultice to heal wounds, snake bites and stings. *Ratibida* has no known medicinal value.

Animal uses: Bees and butterflies are attracted to the bright colored petals.

	<p>Draw and color a Coneflower</p>
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Questions:

1. What use did humans have for the purple coneflower plant?

2. Did the early pioneers and aboriginals use the yellow and brown coneflowers for medicine?

3. In what habitat are coneflowers commonly found?

4. Why would butterflies become attracted to coneflowers?

5. When is the best time of year to look for coneflower blooms?

WILLOW

English name: Willow

Botanical Name: *Salix discolor*

Generic Name: _____

Specific Name: _____

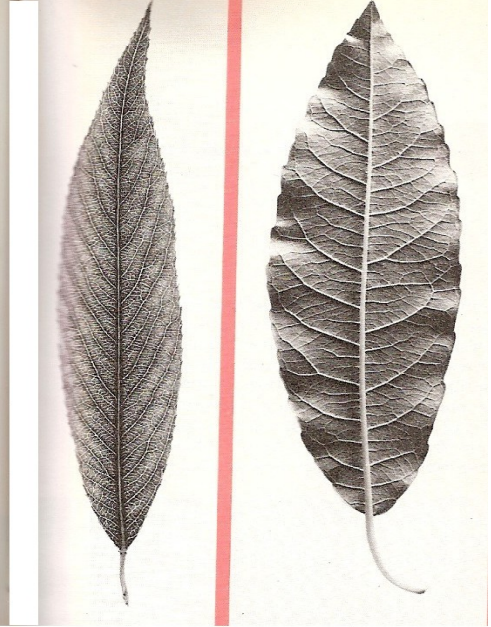
Other names: Pussy Willow (list names) _____

Height: shrub

Habitat: swamps, riverbanks and streams

Bloom Season: March- April

Human uses: The wood of the Pussy Willow is light, soft but tough and shock-resistant. It can be used to make many useful products such as baskets. Some are used for ornamental purposes. A relative to the Pussy Willow is a tree called the White Willow or *Salix alba*. White willow is known to contain a chemical in its bark called *salicin*. Salicin was the original ingredient of Aspirin and was used to reduce fever and relieve pain.

	<p style="text-align: center;">Draw a Willow leaf</p>
White Willow Pussy Willow	

Questions:

1. What use did humans have for the willow shrub or tree?

2. The little points on the side of a willow leaf are called “teeth”. How many “teeth” are on the White Willow leaf and on the Pussy Willow leaf?

3. In what habitat are willow commonly found?

4. When is the best time to see Pussy Willow blooms? _____
5. What can we do to protect the Pussy Willow’s ecosystem? _____



ECOLOGY RELATED CAREERS

Objective of the Lesson:

- To have students explore career opportunities in different ecology related work settings.
- To have students identify educational requirements and the duties and responsibilities of an individual in that particular career.

Method:

1. As a class brainstorm for career opportunities in ecology related fields.
2. Each student will choose one of the career opportunities.
3. Students will research to find information on educational requirements and the duties and responsibilities of the career.
4. Students will report their findings in the form of a poster.

Useful Websites:

[Careers in Ecology](#) detailed information provided by The Ecological Society

- what kinds of jobs are available
- how to gain experience during college
- job outlook
- searching for jobs



POSTER EVALUATION RUBRIC

4 – Exceptional 3 – Good 2 – Acceptable 1 – Unacceptable

Element	Score
Focus/Purpose The intent/topic of the poster is clear when you first look at it. The purpose of the poster is clearly accomplished.	4 - 3 - 2 - 1
Content The main ideas are appropriate to the topic and are presented correctly. Appropriate and accurate details support each main idea.	4 - 3 - 2 - 1
Design and Creativity The overall organization, design, use of colour and space help to make the poster interesting and communicate the message. All illustrations, photographs and drawings add to the purpose of the poster.	4 - 3 - 2 - 1
Mechanics (C-U-P-S) There are no errors in capitalization, usage, punctuation, or spelling.	4 - 3 - 2 - 1
Neat and Presentable The poster is neat and presentable.	4 - 3 - 2 - 1

Total: /20

Comments:

IMPACT ON THE EARTH'S ECOSYSTEM

Objective of the Lesson:

- To have students come to realize the impact that personal and collective actions and activities have on the Earth's ecosystems.
- To have students take action to reduce their personal ecological footprint.

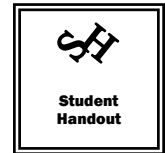
Method:

1. Read and discuss one of many articles regarding the impact of human activity on the ecosystems.
 - Human Footprint Too Big for Nature: <http://www.panda.org/index.cfm?uNewsID=83520>
 - Collapse of Ecosystems Likely if Plunder Continues: <http://environment.guardian.co.uk/conservation/story/0,,1930722,00.html>
2. Complete a personal ecological footprint quiz to determine the impact that your current lifestyle is having on the Earth.
 - Earth Day Foot Print Quiz: <http://www.earthday.net/footprint/index.asp>
 - Ecological Footprints: http://www.royalsaskmuseum.ca/gallery/life_sciences/footprint_mx_2005.swf
3. Reflect on what you have discovered about your impact on the earth and write a paragraph in which you share your initial thoughts.
4. Use a number of different resources to research the types of changes that you could make in order to help lessen your impact on the earth.

Resource Suggestions:

- Regina's Green Book \$mart Ways to Save – Class sets mailed out free of charge by contacting the Regina City Hall (306) 777-7000 (weekdays 8 a.m. - 4:45 p.m.).
- David Suzuki Foundation: http://www.davidsuzuki.org/Climate_Change/What_You_Can_Do/
- Save the Earth with a Simple Change of Lifestyle: 12 Easy Things You Can Do to Lessen Your Impact on the Environment: http://www.associatedcontent.com/article/224681/save_the_earth_with_a_simple_change.html

Create and carry out an action plan which will result in reducing your personal ecological footprint. See attached.



REDUCING MY ECOLOGICAL FOOTPRINT ACTION PLAN

Element of Action Plan	Action	My Action Plan
What	Set a specific goal which will act to decrease your impact on the earth.	
When	<ul style="list-style-type: none">• Set a start date.• Set the date(s) of the activities.• Set the due date of the action plan.	
Why	List the environmental benefits of achieving the goal.	
Who	Identify the people who will support you with this activity.	
How	Outline your step-by-step plan which will enable you to achieve your goal.	
Where	Location where the plan will be put into action.	

Student's Signature:

Teacher's Signature:

Guardian's Signature:

PORTABLE POND ACTIVITY

(Adapted From Project Wet workshop)

Lesson Rationale:

Sometimes it is impractical or otherwise prohibitive to take students out of the classroom. This activity brings the pond to them. By bringing in pond water and sediment to study in the classroom, pouring contents on a plastic sheeting “pool” and identifying organisms within and discussing their role in the ecosystem, students may develop a greater appreciation for ecological communities.

Materials:

- Thick plastic sheeting (at least 5 mill) and at least 2 metres square (bigger is better).
- Bucket to collect sample.
- Pond water and sediment (about 2 – 4 litres of water with some sediment)
- Hand magnifiers (one per student or pair).
- White plastic spoons (one per student or pair).
- Pond organism identification guide or keys (simple sheets for each student and a more comprehensive one for tougher IDs).
- Rags or towels for the inevitable small spills.

Setup:

- This activity is best done in the spring or early fall as the number and diversity of pond organisms is higher at these times. Samples may be collected in advance and should be returned to their source when completed.
- Stretch out plastic sheet with students around the outside. Fold up edges several times to create a pool in the centre of sheeting.
- Carefully pour contents of bucket into centre of pool while students hold up edges of plastic. A thin layer of water should be formed in the pool deep enough for organisms to move about easily.
- Give water and sediment a few minutes to settle while students observe the organisms from the edge of their pond.
- While some students hold onto the plastic others can attempt to catch organisms with the plastic spoons and identify organisms.
- Students should try to maintain a checklist of organisms they find and be encouraged to share interesting finding with the rest of the group. The relative abundance of some organisms should be noted as should the location of organisms (e.g., surface, bottom, etc.).
- When the activity is complete the water and organisms should be carefully returned to the bucket by gently lifting one end of the plastic into the bucket and lifting the other side. Small amounts of clean water can be used to wash organisms off the plastic and into the bucket.

- The water should be returned to its source as soon as possible.

Follow-up:

- The class should review the type and amount of organisms discovered and relate any other interesting findings.
- Students may wish to learn more about some of the organisms that they discovered. This could result in a formal write-up, a small presentation or a poster activity.

Guides:

There are a number of guides to aquatic insects that could be used. The Internet is also a good source although care should be taken to develop an ID key that is appropriate to the location being studied.