

# Grade 4 Science

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Grade 4

## **Cluster 1: Habitats and Communities**

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### **Overview**

As students in Grade 4 are familiar with the basic needs of plants and animals (see *Grade 2, Cluster 1: Growth and Changes in Animals*, and *Grade 3, Cluster 1: Growth and Changes in Plants*), they can begin to explore and compare ways in which plant and animal communities satisfy their needs in particular habitats. They begin to recognize the complex interactions that take place between plant and animal populations within a community. Through investigations, students study influences, both naturally occurring and human-caused, that can alter habitats and affect plant and animal populations. The cluster also addresses the roles traditional knowledge and technology play in learning more about and caring for plant and animal populations.

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
<p><i>Students will...</i></p>	
<p><b>4-1-01</b> Use appropriate vocabulary related to their investigations of habitats and communities.</p> <p>Include: habitat, physical adaptation, behavioural adaptation, traditional knowledge, technological development, population, community, food chain, food web, organism, producer, consumer, herbivore, omnivore, carnivore, predator, prey, scavenger, endangerment, extinction, conservation.</p> <p>GLO: C6, D2</p>	<ul style="list-style-type: none"> <li>➤ Introduce, explain, use, and reinforce vocabulary throughout this cluster.</li> <li>➤ <b>Word Wall</b> Develop a Science Word Wall (Cunningham, 1991) with key vocabulary as the study ensues. Place the Word Wall where students will readily view it and use it as a reference. (See <i>ELA, Strategies</i>, p. 199.)</li> </ul>
<p><b>4-1-02</b> Recognize that each plant and animal depends on a specific habitat to meet its needs.</p> <p>GLO: D2</p> <p><b>4-1-03</b> Identify the components of an animal habitat.</p> <p>Include: food, water, living space, cover/shelter.</p> <p>GLO: D2, E2</p>	<ul style="list-style-type: none"> <li>➤ <b>Meeting Needs</b> Use Think-Pair-Share (McTighe and Lyman, 1992) to answer these discussion questions. (See <i>ELA, Strategies</i>, p. 15.) What does an animal need to survive? What does a plant need to survive? How do plants and animals meet their needs (link to Cluster 1, Grades 2 and 3)?</li> <li>➤ <b>Oh Deer!*</b> Divide students into two groups (three quarters of the students in one group, and one quarter in the other). Mark two parallel lines on the ground or floor 9-18 metres apart. Have each group line up behind one line. The smaller group become “deer” and the larger group “habitat.” For each round, each “deer” decides which component of habitat it will require (except space) and it makes the appropriate sign. Once the sign for a round has been decided it can’t be changed until the next round. Signs include: <ul style="list-style-type: none"> <li>• food: clamp hands over the stomach</li> <li>• water: put hands over mouth</li> <li>• shelter: hold hands together over head</li> </ul> </li> </ul>
<p><b>4-0-6a.</b> Construct bar graphs and pictographs using many-to-one correspondence, and interpret these as well as graphs from other sources. (Math SP-III.2.4) GLO: C2, C6</p> <p><b>4-0-6b.</b> Identify and suggest explanations for patterns and discrepancies in data. GLO: A1, A2, C2, C5</p>	
	<p>Each student in the “habitat” group also decides on a component for the round using the same signs as the “deer.” Each round starts with the “deer” facing away from the “habitat” group. Everyone decides on his or her sign. On a signal from the teacher, each “deer” student turns to face the “habitat” group and runs over to take the hand of a student with the matching habitat component sign. The “deer” bring the “habitat” students back to the deer line, indicating they successfully obtained what they needed. Any deer who cannot acquire the habitat component they need die and join the habitat group.</p> <p>Repeat for 10-15 rounds, keeping track of the deer population numbers. Have students graph the results from the game with each round representing one year, and suggest explanations for patterns in data.</p>

## TEACHER NOTES

## SUGGESTIONS FOR ASSESSMENT

**Cluster Note:** Many of the learning experiences in this cluster are based in the outdoors. Students should be provided with field trip opportunities, including trips to the schoolyard. More extended trips to local parks and camping trips would also provide excellent hands-on ways to address a number of learning outcomes within this cluster.

**Habitat** is where the animal or plant lives and is able to meet its basic needs. Habitat components include **food, water, space, cover/shelter**. A habitat can be as small as a puddle, or as large as a forest.

\* Source for **Oh Deer!:** *Project Wild Activity Guide*, 1998. Adapted with the permission of the Canadian Wildlife Federation. Project Wild Training is available from Manitoba Natural Resources, Wildlife Branch, telephone: 204-945-7469. Participants are provided with the Project Wild Activity Guide.

**Science Journal Entry: Oh Deer!**

Student directions: Answer the following questions in your science journal:

1. What does an animal need in its habitat in order to survive?
2. What did you learn from the “Oh Deer!” activity? Give at least two answers.

Look for identification of the components of an animal habitat

- food                       water  
 living space             cover or shelter

The student

- discusses what happens when there is a shortage or absence of one of the components  
 refers to the fact that the population is always changing

PRESCRIBED LEARNING OUTCOMES
<i>Students will...</i>
<p><b>4-1-04</b> Identify physical and behavioural adaptations of animals and plants, and infer how these adaptations help them to survive in a specific habitat.</p> <p><i>Examples: ducks' webbed feet and waterproof feathers help them dive for food in the marsh...</i></p> <p>GLO: D1, D2</p>
<p><b>4-0-2a.</b> Access information using a variety of sources. <i>Examples: school libraries, videos, traditional knowledge, CD-ROMs, Internet...</i> (ELA 3.2.2, 3.2.4, TFS 2.1.1) GLO: C6</p> <p><b>4-0-2b.</b> Review information to determine its usefulness to inquiry or research needs. (ELA 3.2.3, 3.3.3) GLO: C6, C8</p> <p><b>4-0-5a.</b> Select and use tools to observe, measure, and construct. <i>Examples: tuning fork, prism, binoculars, measuring tape...</i> GLO: C2, C3, C5</p> <p><b>4-0-7e.</b> Communicate results and conclusions in a variety of ways. <i>Examples: point-form lists, sentences, graphs, labelled diagrams, charts...</i> (ELA 2.3.5, 4.2.5; Math SP-III.1.4, SP-III.2.4; TFS 2.1.4) GLO: C6</p>

SUGGESTIONS FOR INSTRUCTION

➤ **It's for the Birds**

Have students complete small-group inquiries into the physical and behavioural adaptations of birds.

**1. PHYSICAL ADAPTATIONS**

Provide the class with common beak shapes (see teachers notes) and feet types of birds and have students complete the information on the charts. Students should be expected to find out through their research the information included in parentheses.

**Beaks**

<u>Beak Shape</u>	<u>Type of Food</u>	<u>Birds with this Beak</u>
long narrow	(flower nectar)	(hummingbird)
hooked	(flesh-eating)	(hawk)
chisel	(tree insects)	(woodpecker)
strainer	(pond plants, insects)	(duck)
stout	(hard seeds)	(blue jay)

**Feet**

<u>Feet Types</u>	<u>Birds with these Feet</u>
grasping feet	(hawk)
perching claws	(sparrow)
tree-climbing	(woodpecker)
webbed	(duck)

**2. BEHAVIOURAL ADAPTATIONS**

**Name of bird: robin**

<u>Seasonal Behaviour</u>	<u>Obtains Food by</u>	<u>Avoids Enemies by</u>
migrates in winter	searching ground for worms	flying away

Students should present the findings of their inquiries to the class, highlighting how particular adaptations are linked to particular habitats and behaviours.

(continued)

**TEACHER NOTES**

**SUGGESTIONS FOR ASSESSMENT**

These learning experiences focus on birds. Plant adaptations can be addressed in learning experiences suggested for student learning outcome 4-1-07.



long and narrow



hooked



chisel



strainer



stout

(continued)

**B  
E  
A  
K  
T  
Y  
P  
E  
S**

**Self-Assessment: It's for the Birds**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Adaptation Research Project**

**What Did I Learn?**

I chose to research a \_\_\_\_\_(bird).

1. One problem I had was \_\_\_\_\_

\_\_\_\_\_.

2. One thing I did well was \_\_\_\_\_

\_\_\_\_\_.

3. If I did this project again I would \_\_\_\_\_

\_\_\_\_\_.

4. I would like to learn more about \_\_\_\_\_

\_\_\_\_\_.

5. I think my project \_\_\_\_\_

\_\_\_\_\_.

**PRESCRIBED LEARNING OUTCOMES**

**SUGGESTIONS FOR INSTRUCTION**

*Students will...*

➤ **Bird Observations**

Have students use the categories below to record information about birds they observe. The information can be recorded in the form of words, sketches, or whatever is most meaningful in describing the bird and its behaviour. Initially, students can observe birds in the schoolyard or a local wooded area. Once students are comfortable with the process, they can observe birds on their own. Example:

<u>Size</u>	<u>Colour Markings</u>	<u>Beak Shape</u>	
sparrow, robin, or crow-sized	throat, belly, wings, tail	_____	
<u>Tail Shape</u>	<u>Surroundings</u>	<u>Flight</u>	<u>Song</u>
_____	_____	_____	_____

Provide resources to help students identify common local birds based on the charted information. Keep a class list of birds observed.

**4-1-05** Investigate alternate explanations of plant or animal adaptations based on traditional knowledge from a variety of cultures.

GLO: A1, A4, C8

**4-1-06** Investigate how technological developments often mirror physical adaptations.

*Examples: fishnet — spider web, diving fins — webbed feet...*

GLO: A5, E1

➤ **Traditional Perspectives**

Have students read stories which provide explanations for plant and animal adaptations from a traditional cultural perspective. Encourage students to select stories about the plants or animals they researched. Have students share these traditional stories with their research presentations. (See *ELA, Grade 4*, pp. 80-83.)

➤ **Using Animal Adaptations**

As a class, brainstorm and list technological devices that resemble physical adaptations for animals. Record the information on a chart.

<u>Animal's Adaptation</u>	<u>Technological Artefact</u>
webbed feet	swimming fins
thorns	barbed wire
fish's body	canoe

**4-0-7d.** Construct meaning in different contexts by connecting new experiences and information to prior experiences and knowledge. (ELA 1.2.1, 2.1.2) GLO: A2, C6

**4-0-7e.** Communicate results and conclusions in a variety of ways. *Examples: point-form lists, sentences, graphs, labelled diagrams, charts...* (ELA 2.3.5, 4.2.5; Math SP-III.1.4, SP-III.2.4; TFS 2.1.4) GLO: C6

**4-0-9a.** Respect alternative views of the world. (ELA 5.1.1) GLO: C5, C7

TEACHER NOTES

SUGGESTIONS FOR ASSESSMENT

**Physical adaptations** refer to the physical characteristics of a plant or animal that enable it to survive in the environment in which it lives.

**Behavioural adaptations** are the ways the animal acts or behaves in order to survive.

**Paper and Pencil Task: Traditional Perspectives**

Student directions: Choose a plant or animal. Look at the adaptations that help it survive in its habitat. Make up your own “traditional” story to explain how one or more of these adaptations came to be.

Look for

- adaptation(s) identified
- explanation is clear and creative



PRESCRIBED LEARNING OUTCOMES
<i>Students will...</i>
<p><b>4-1-07</b> Investigate and describe a variety of local and regional habitats and their associated populations of plants and animals.</p> <p>GLO: D2, E2</p>
<p><b>4-0-5a.</b> Select and use tools to observe, measure, and construct. <i>Examples: tuning fork, prism, binoculars, measuring tape...</i> GLO: C2, C3, C5</p> <p><b>4-0-5c.</b> Record observations in a variety of ways. <i>Examples: point-form notes, sentences, labelled diagrams, charts...</i> (ELA 2.1.1, 3.3.1, 4.1.1, 4.1.2; Math SP-1.2.4, SP-II.2.4) GLO: C2, C6</p> <p><b>4-0-6c.</b> Choose and identify relevant attributes for use in a classification system, and create a chart or diagram that shows the method of classifying. (Math PR-II.2.4) GLO: C2, C3, C5</p> <p><b>4-0-7a.</b> Draw a conclusion based on evidence gathered through research and observation. GLO: A1, A2, C2</p> <p><b>4-0-7b.</b> Identify new questions that arise from what was learned. (ELA 3.3.4) GLO: A1, C2, C3</p>
<p><b>4-1-08</b> Predict and test to determine an appropriate method for measuring a plant population within a given habitat.</p> <p>GLO: A2, C2, C3, C5</p>
<p><b>4-0-5b.</b> Estimate and measure mass/weight, length, volume, area, and temperature using standard units. (Math SS-IV.1.4, SS-I.1.4, SS-III.1.4, SS-II.1.4) GLO: C2, C3, C5</p> <p><b>4-0-3a.</b> Brainstorm, in small groups, one or more methods of finding the answer to a given question, and reach consensus on which method to implement. GLO: C2, C7</p> <p><b>4-0-3c.</b> Create, in small groups, a plan to answer a given question. (ELA 3.1.4; Math SP-V.2.4) GLO: C2</p> <p><b>4-0-4a.</b> Carry out a plan, and describe the purpose of the steps followed. (Math SP-V.2.4) GLO: C2</p> <p><b>4-0-6e.</b> Evaluate, with guidance, the methods used to answer a question or solve a problem. GLO: C2, C3</p>

SUGGESTIONS FOR INSTRUCTION

- **Observing the Environment: Habitats Are Everywhere**

Make several successive visits to a local habitat to observe and identify plants and animals. Students will need to look for signs that animals live there. Local habitats may include the schoolyard, a local park, or a property adjacent to the schoolyard. Have students record animals and plants that live in that habitat. Use the following discussion questions:

  - What populations did you observe?
  - How were their needs met in that habitat?
  
- **Habitat Sort**

Have students bring in pictures representing different Manitoba habitats such as prairie, desert, boreal forest, marsh, tundra, and the Canadian Shield. Students should sort their pictures and share their decisions about their groupings. As a class, identify and list the main characteristics of each group. Use this opportunity to discuss the adaptations of plants in diverse habitats e.g., desert or marsh. (Link to 4-1-04.)
  
- **Populations Field Study**

Tell students that they need to find out the number of each kind of plant within a given habitat. Begin by identifying a habitat such as a portion of the schoolyard, a park, etc. and the common plants (e.g., dandelions) found there. Ask students to predict the number of each type of plant that will be found in the area and then decide on a way to check their predictions.

Have students work in small groups to decide on a procedure to find the plant populations and carry out their plan.

Make a variety of tools such as skipping ropes, metre sticks, and string available for measuring and delimiting areas. Students will naturally think they need to count every individual plant within the study area. Make sure that you choose a large enough area so that counting each plant would be very time-consuming. Challenge students to think of other quicker ways to determine a “ball-park” population figure through sampling.

Following the population study, have students evaluate and report on the methods used. Have a biologist visit the class to discuss how scientists determine plant and animal population numbers in the wild.

**TEACHER NOTES**

Students will need more than one visit to a local habitat in order to observe things they may have missed during previous visits.

It is recommended that classrooms have at least one habitat for students to observe and care for. Consider a terrarium, aquarium, vermiculture, or mealworm box. Another suggested habitat is a “Pond in a Bottle,” which uses a two-litre pop bottle, mud, pond water, and pond plants and organisms.

The concept of a ratio and proportion is not a Grade 4 topic in mathematics. Formal calculations, formulas, etc., are not intended to be given to students. Student-developed strategies are to be encouraged and valued.

**SUGGESTIONS FOR ASSESSMENT**

**Performance Task: Habitats** (Outcomes 4-1-04 and 4-1-07)

Student directions: Use your imagination to create a new habitat. Describe your habitat. Design an animal for your habitat. Explain how this animal is adapted to its habitat by describing how it meets its needs. Include a labelled diagram.

**Scoring Rubric:**

Scale	Habitat	Adaptations	Communication
4	imaginative, application of prior knowledge related to habitats evident	at least four adaptations given suitable for created habitat, enable animal to meet its needs	explanation clear and detailed, labelled diagram included
3	original, description given, application of prior knowledge related to habitats evident	three adaptations given suitable for created habitat, enable animal to meet its needs	explanation clear and detailed, labelled diagram included
2	original, brief description given, limited evidence of prior knowledge related to habitats	two adaptations given, suitable for created habitat, little or no explanation of how animal meets needs	explanation incomplete or unclear, labelled diagram may be included
1	limited description given, habitat not original	one adaptation given, suitable for habitat, no explanation of how animal meets its needs	explanation incomplete or unclear, labelled diagram may be included

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
<p><i>Students will...</i></p>	
<p><b>4-1-09</b> Recognize that plant and animal populations interact within a community. GLO: D2</p> <p><b>4-1-10</b> Recognize that the food chain is a system in which some of the energy from the Sun is transferred eventually to animals. GLO: D2, D4, E2</p> <p><b>4-1-11</b> Construct food chains and food webs, and classify organisms according to their roles. Include: producer, consumer, herbivore, omnivore, carnivore, predator, prey, scavenger. GLO: D2, E2</p>	<p>➤ <b>Classifying and Sorting Animals</b></p> <p>Provide a list (or pictures) of animals and have students work in small groups to place animals into categories according to what they eat. Have students share their categories and discuss discrepancies (see <i>Success for All Learners</i>, 6:33-35). Provide students with the scientific terminology for their classifications. Have students re-write the list of animals for use in a Venn diagram using the labels herbivores, carnivores, and omnivores (overlapping area). Have students add other animals to the list. Use the original list of animals to construct food chains, which show simple linear relationships based on who eats whom or what. Students can develop more complex food webs, e.g., seeds, mouse, fox, as they gain experience with food chains.</p> <p>➤ <b>Game — Food Web</b></p> <p>Assign each student a name of a population; include <b>producers</b> (grass, seeds), <b>herbivores</b> (deer, rabbits), <b>omnivores</b> (bears, raccoons), <b>carnivores</b> (wolves), <b>scavengers</b> (ravens), and the <b>Sun</b>. The ratio of the species should be approximately: 7 grass, 4 seeds, 4 rabbits, 3 deer, 1 bear, 2 raccoons, 4 wolves, 3 raven, and 1 Sun. There should be more producers and herbivores than carnivores and scavengers. Students sit in a circle and pass a ball of yarn at random from person to person. Each person must hold tightly to the yarn.</p> <p>Describe a scenario such as: “There was a bad drought this year and the grass was stunted.” Students assigned the word “grass” must drop the yarn. As soon as other students feel one of their ends loosen, they must drop the yarn as well. Describe other scenarios. Include the removal of the Sun.</p> <p>Use the following questions to focus discussion after the game:</p> <ul style="list-style-type: none"> <li>• What happened to our food chains when the Sun was removed?</li> <li>• Why were the plants affected?</li> <li>• How did this affect the other animals?</li> <li>• Where does the Sun’s energy go?</li> </ul>
<p><b>4-0-4f.</b> Assume roles, and share responsibilities as group members. (ELA 5.2.2) GLO: C7</p> <p><b>4-0-6c.</b> Choose and identify relevant attributes for use in a classification system, and create a chart or diagram that shows the method of classifying. (Math PR-II.2.4) GLO: C2, C3, C5</p> <p><b>4-0-6d.</b> Sort and classify according to an established classification system. (Math PR-II.2.4) GLO: C2, C3</p> <p><b>4-0-7d.</b> Construct meaning in different contexts by connecting new experiences and information to prior experiences and knowledge. (ELA 1.2.1, 2.1.2) GLO: A2, C6</p>	<p>➤ <b>Journal Reflection</b></p> <p>Have students use their science journals to reflect on the differences in how plants and animals obtain their food (energy) for survival.</p>

## TEACHER NOTES

Animals can be classified as producers or consumers based on how they obtain their food.

**Producers** (plants) make their own food using energy from the Sun.

**Consumers** need to eat plants or animals for their food. Other terms are used to describe the different types of consumers:

**herbivore** - plant eater

**carnivore** - flesh eater

**omnivore** - eats both plants and flesh

Other terms are used to describe an animal's role. Carnivores can be **predators** (hunters) or **scavengers** (eating the remains of other animals). **Prey** refers to the animals that are eaten by other animals.

The Manitoba Fisheries Sustainable Development website provides teacher background information and instructional suggestions related to food chains for Manitoba fish species. The website is located at <[www.gov.mb.ca/natres/sustain/index.html](http://www.gov.mb.ca/natres/sustain/index.html)>

## SUGGESTIONS FOR ASSESSMENT

**Student Interview: Food Chains**

Before the interview, gather pictures of various components of different food chains.

Student directions:

1. Use some of the pictures to make a food chain.
2. Tell something about each part of your food chain.

The student identifies

- |                                    |                                    |                                    |
|------------------------------------|------------------------------------|------------------------------------|
| <input type="checkbox"/> producer  | <input type="checkbox"/> predator  | <input type="checkbox"/> omnivore  |
| <input type="checkbox"/> carnivore | <input type="checkbox"/> herbivore | <input type="checkbox"/> scavenger |
| <input type="checkbox"/> consumer  | <input type="checkbox"/> prey      |                                    |

(If students don't use the terms, ask them directly: Where is the predator, prey, producer, etc., in your food chain?)

3. Keep the same food chain. Add other pictures to make a food web.
4. Where does the energy for a food chain come from? (The Sun)

Record responses. Note any misconceptions or gaps in student's learning.

PRESCRIBED LEARNING OUTCOMES
<i>Students will...</i>
<p><b>4-1-12</b> Use the design process to construct a model of a local or regional habitat and its associated populations of plants and animals. GLO: C3, D4</p>
<p><b>4-0-3d.</b> Brainstorm possible solutions to a practical problem, and identify and justify which solution to implement. (ELA 1.2.3) GLO: C3</p> <p><b>4-0-3e.</b> Create a written plan to solve a problem or meet a need. Include: identify steps to follow, prepare a labelled diagram. GLO: C3</p> <p><b>4-0-3f.</b> Develop criteria to evaluate an object, device, or system based on its function, aesthetics, and other considerations such as materials, and cost. GLO: C3</p> <p><b>4-0-4b.</b> Construct an object, device, or system to solve a problem or meet a need. GLO: C3</p> <p><b>4-0-4c.</b> Test an object, device, or system with respect to pre-determined criteria. GLO: C3, C5</p> <p><b>4-0-4h.</b> Use tools and apparatus in a manner that ensures personal safety and the safety of others. GLO: C1</p> <p><b>4-0-7e.</b> Communicate results and conclusions in a variety of ways. <i>Examples: point-form lists, sentences, graphs, labelled diagrams, charts...</i> (ELA 2.3.5, 4.2.5; Math SP-III.1.4, SP-III.2.4; TFS 2.1.4) GLO: C6</p>

**SUGGESTIONS FOR INSTRUCTION**

➤ **Design Project**

Have students work in groups to construct a model representing a local or regional habitat of their choice. Remind students to ensure that their models are realistic, including representative populations and the components necessary for the populations to live. The models must also strive to demonstrate the balance in nature. Have students present their model to the class.

**TEACHER NOTES**

**SUGGESTIONS FOR ASSESSMENT**

Part of the challenge for this learning experience is for students to determine what materials they will use to construct their model or diorama. In earlier grades, materials were usually determined by the teacher. This is a good opportunity to leave the determination of materials up to the students as an important component of the design process.

Have student use Blackline Master 4: Design Process Recording Sheet: Grades 3 and 4

**Observation Checklist: Design Process**

The student

- actively participates in brainstorming solutions
- creates a written plan or a labelled diagram
- assists in development of criteria
- constructs a habitat model
- tests the model with respect to evaluation criteria
- makes improvements
- communicates results

**Peer Assessment: Design Presentation**

**Rate each of the following:**

The speaker spoke so everyone could hear.

The speaker explained how the design was constructed.

The speaker explained how the design met the criteria.

The speaker kept the interest of the group.

	Yes	No	Comments
The speaker spoke so everyone could hear.			
The speaker explained how the design was constructed.			
The speaker explained how the design met the criteria.			
The speaker kept the interest of the group.			

<b>PRESCRIBED LEARNING OUTCOMES</b>
<i>Students will...</i>
<p><b>4-1-13</b> Predict, based on their investigations, how the removal of a plant or animal population may affect the rest of the community.</p> <p><i>Examples: if the wolves were removed from a community, the deer population may increase rapidly...</i></p> <p>GLO: D2, E2, E3</p>
<p><b>4-0-1b.</b> Make and justify predictions based on observed patterns, collected data, or data provided from other sources. <i>Examples: graph, chart...</i> (ELA 1.1.1, 1.2.1; Math PR-III.1.4) GLO: A1, C2</p> <p><b>4-0-4g.</b> Communicate questions, ideas and intentions, and listen effectively to others during classroom-learning experiences. GLO: C6</p>
<p><b>4-1-14</b> Investigate natural and human-caused changes to habitats, and identify resulting effects on plant and animal populations.</p> <p>Include: endangerment, extinction.</p> <p>GLO: B1, B5, D2, E3</p> <p><b>4-1-15</b> Describe how their actions can help conserve plant and animal populations and their habitats.</p> <p><i>Examples: clean up a local stream to improve fish and bird habitat...</i></p> <p>GLO: B5</p>
<p><b>4-0-4e.</b> Identify problems as they arise, and work with others to find solutions. GLO: C3, C7</p>
(continued)

**SUGGESTIONS FOR INSTRUCTION**

➤ **Food Web Game**

Have students take part in this variation of the Food Web Game (see p. 4.10). In this game students create food webs by combining several food chains. One student starts with the string and names a producer. The student then passes the string to someone else who names a consumer that would “eat” the first student. Students continue to pass the string to other consumers, keeping it taut, until the food chain is completed. The same process begins again with another student and another string. As more food chains are added, the already identified producers and consumers can also take the string as part of another food chain. Several food chains should be completed with students taking part in more than one to show the interrelationships in a food web.

Use the following questions to focus discussion after the game:

- What will happen if one of the components of a food chain is removed?
- What will happen if two components of the food chain are removed?
- Can you remove any of the components without altering the food chain?

**Game Variations**

Based on the discussion questions, investigate what would happen if one component was removed. Have one student release the taut string and observe students to find out which scenario would have the most dramatic effect (producers).

➤ **Natural and Human-Caused Changes**

Have students create a list of natural agents of changes and human agents of change on the environment. The list may include examples such as the following.

<u>Natural Agents of Change</u>	<u>Human Agents of Change</u>
Insect infestations- tent caterpillars	Logging
Dutch Elm Disease	Mosquito fogging
Purple loosestrife (Lithrium)	Use of pesticides
Damming by beavers	Draining wetlands
Fire	Industrial waste
Drought	Zebra mussels importation
Flood	Oil spills

Have students work with partners to research impacts of these changes on animal and plant populations. Post and discuss.

(continued)

TEACHER NOTES

SUGGESTIONS FOR ASSESSMENT

**Paper and Pencil Task: Disappearing Animal Population**

Present students with the following scenario: In Evergreen National Park scientists have noticed a gradual decline in the number of wolves sighted. You are a research scientist and have been asked to investigate what effect the disappearance of wolves has had on other populations within the park and to summarize your findings in an article for the local newspaper. Write the article.

Look for

- increase in the population(s) of animals that wolves prey on (deer, rabbit, mouse, etc.)
- decrease in the amount of food available for the wolves' prey
- clearly written article covering who, what, when, where, why



PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
<p><i>Students will...</i></p> <p><b>4-0-4f.</b> Assume roles, and share responsibilities as group members. (ELA 5.2.2) GLO: C7</p> <p><b>4-0-4g.</b> Communicate questions, ideas and intentions, and listen effectively to others during classroom-learning experiences. GLO: C6</p>	<p>➤ <b>Green School: Habitat Protection</b></p> <p>Identify and become aware of examples of programs designed to protect habitats, such as Ducks Unlimited, Habitat Trust, Save our Seine, Manitoba Wildlife Federation, and designated parkland and conservation areas.</p> <p>Have students plan a school-based activity that aids in conservation of animals, plants, or habitats.</p> <p>Have students create a multimedia advertisement and/or presentation (including a jingle, rap, commercial) on their conservation/protection plan.</p>
<p><b>4-1-16</b> Describe how specific technological developments have enabled humans to increase their knowledge about plant and animal populations.</p> <p><i>Examples: radio collar tracking, time-lapse photography...</i></p> <p>GLO: A2, A3, A5</p> <p><b>4-1-17</b> Recognize and appreciate how traditional knowledge contributes to our understanding of plant and animal populations and interactions.</p> <p>GLO: A1, A2, A4, C8</p>	<p>➤ <b>Guest Presenters</b></p> <p>Invite wildlife experts, conservation officers, and local elders to share their knowledge of plants and animals (link to 4-1-17). Have students use their science journals to reflect on how both technology and traditional knowledge can help us better understand plant and animal populations.</p> <p>➤ <b>Technological Developments</b></p> <p>Have students collect current articles from the Internet, newspapers, and magazines about how technology is used for the preservation and conservation of wildlife. Examples may include: medicine, embedded microchips for pet and farm animal identification, radio collar tracking, Global Positioning Systems, satellite imaging, environmental impact studies, etc. Use a Jigsaw strategy (Aronson et. al.) to facilitate students’ understanding. (Note: Jigsaw is discussed in <i>Success for All Learners</i>, 5.9.)</p>
<p><b>4-0-2a.</b> Access information using a variety of sources. <i>Examples: school libraries, videos, traditional knowledge, CD-ROMs, Internet...</i> (ELA 3.2.2, 3.2.4, TFS 2.1.1) GLO: C6</p> <p><b>4-0-9a.</b> Respect alternative views of the world. (ELA 5.1.1) GLO: C5, C7</p>	<p>➤ <b>Field Trip: Traditional Cultures</b></p> <p>Visit locations such as the Fort Whyte Centre, Spirit Sands, Living Prairie Museum, Sandilands, Manitoba Museum of Man and Nature or any other museum that provides information about traditional cultures and the balance of nature. Have students view displays, record observations, and discuss how traditional knowledge helps us understand how plant and animal populations interact. Examples might include some of the following:</p> <ul style="list-style-type: none"> <li>• using caribou migration routes to help plan where to find caribou to hunt</li> <li>• knowing when fish are spawning in the water in order to catch fish and hunt bears</li> <li>• observing animal and plant patterns to judge seasonal changes</li> </ul>



**NOTES**