

UNIT

Sustainable Ecosystems

1



BIG IDEAS

- People have the responsibility to regulate their impact on the sustainability of ecosystems in order to preserve them for future generations.
- Ecosystems are dynamic and have the ability to respond to change, within limits, while maintaining their ecological balance.

Roads provide pathways for many human journeys. Roads also divide habitats, forcing animals to face dangers from fast-moving vehicles when the animals migrate or travel within their habitat. Posting warning signs to remind drivers to slow down and watch for animals is one way to reduce collisions and wildlife deaths on our roads.

A road dividing a habitat is an example of human activity that has disturbed an ecosystem. An ecosystem can respond to disturbances—but only within limits. Beyond those limits, the ecosystem cannot recover its ecological balance.

In this unit, you will learn about why sustainable ecosystems are crucial to life on Earth and what people can do to help protect them.

Why does it matter if an animal's habitat is divided?

Chapter 1
Nutrient Cycles and
Energy Flow



Chapter 2
Populations and
Sustainable Ecosystems



Chapter 3
Biodiversity



Get Ready for Unit 1

Concept Check

- Examine the forest ecosystem shown in the illustration below. Make a table with the headings “Biotic” and “Abiotic”. Give your table a title. Under each heading, list the components of the forest ecosystem that belong to that category.

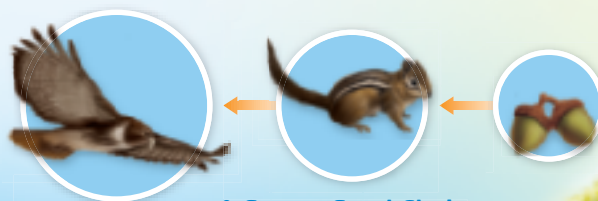
Biotic	Abiotic

- Complete each of the following sentences, using one of the organisms from the forest ecosystem shown below to fill in the blanks. (Do not write in this textbook.) The first sentence is completed for you.
 - A **puffball mushroom** is a decomposer because it breaks down the remains of dead animals and plants.
 - A _____ is a *scavenger* because...
 - A _____ is a *producer* because...
 - A _____ is a *consumer* because...
 - A _____ is a *herbivore* because...
 - A _____ is a *carnivore* because...
 - A _____ is an *omnivore* because...

- The food chain shown below is just one of many food chains in a forest ecosystem. Using the organisms shown in the forest ecosystem illustration, draw a different food chain.
- Use the words below to write a brief explanation of why trees are important to forest ecosystems.

producers	food	shade
oxygen	leaves	plants
habitat	decompose	photosynthesis

- Choose one of the following events. Make a flowchart to show how the event might affect a forest ecosystem.
 - A forest fire rages through the forest.
 - A logging company clear-cuts the trees in the forest.
 - A beaver builds a dam in a nearby pond that results in the stream drying up.
 - Hunters kill all of the wolves in the area.
 - An invasive species of beetle kills all of the pine trees in the area.



A Forest Food Chain

A Forest Ecosystem

Inquiry Check

The Ontario Ministry of Transport has taken several steps to try to prevent vehicle collisions with deer, moose, and bears. Researchers found out that most of these collisions happened in May, June, October, November, and December.

- 6. Analyze** In which two seasons do most collisions with deer, moose, and bears occur? Why do you think this is the case? Explain your answer.
- 7. Predict** Which of the government strategies for reducing collisions listed below might be the most effective? Explain your answer.
 - a. Installing fencing along major highways
 - b. Draining salty ponds near highways
 - c. Posting warning signs
 - d. Adding highway lighting to improve night visibility
 - e. Removing roadside brush so drivers can see the road better
- 8. Plan** You are a scientist hired by the ministry to investigate its anti-collision strategies. Choose one of the five strategies above. Outline a procedure to test how well the strategy works.

Numeracy and Literacy Check

The five areas of Ontario with the highest number of reported vehicle collisions with wildlife are shown below. They are listed in alphabetical order.

Ontario's Highest Number of Reported Wildlife Collisions

Area	Human population	Number of incidents per year in 1997
Kenora	15 177	521
Lanark County	62 495	481
Ottawa	774 072	886
Simcoe County	266 100	656
Thunder Bay	109 140	463

- 9. Ranking** List the areas in order from highest to lowest number of incidents.
- 10. Graphing** Choose an appropriate style of graph and construct a graph to display the information shown in the table. Include a title and labels.
- 11. Writing** Suppose you are a speechwriter for the Mayor of Simcoe County. Write a brief radio message aimed at informing people about the dangers of collisions with wildlife on the roads and suggesting ways to avoid them.

Looking Ahead to the Unit 1 Projects

At the end of this unit, you will have an opportunity to apply what you have learned in an inquiry or research project. Read the Unit 1 Projects on pages 126-127. Start a project folder now (either paper or electronic). Store ideas, notes, news clippings, websites, and lists of materials that might help you to complete your project.

Inquiry Project

Investigate how common substances affect the sustainability of aquatic ecosystems.



An Issue to Analyze

Identify and reduce threats to a local ecosystem.

