

Chapter 3

Biodiversity

What You Will Learn

In this chapter, you will learn how to...

- **discover** that Earth's biodiversity includes millions of species
- **explain** the role of certain species within a community or ecosystem
- **describe** how human activities can affect biodiversity

Why It Matters

The biosphere is made up of many species, each with a special role. Energy flows and nutrients cycle through millions of species. Understanding the roles of different species and ensuring that they continue to exist and provide ecosystem services will allow the biosphere to remain sustainable for all life.

Skills You Will Use

In this chapter, you will learn how to...

- **interpret** qualitative data
- **communicate** results graphically
- **assess** how invasive species affect an ecosystem
- **explain** why biodiversity is important for the sustainability of ecosystems

As scientists realize how important wetlands are to the sustainability of ecosystems and to maintaining high species diversity, more work is being done to protect them. At 4200 ha (hectares) in size, the Alfred Bog, a type of wetland, is the largest bog in southern Ontario. Rare species, such as the bog elfin butterfly shown on the next page and the white fringed orchid, call this bog home. For over 20 years, environmental groups have worked with the Canadian government to protect the bog from being drained and being mined for peat. Today, over 70 percent of the bog area is protected and managed as a nature reserve.



Activity 3-1

Biodiversity in Canada

The groups involved in protecting the Alfred Bog encourage people to be aware of the variety of plants and animals found there, and the importance of the ecosystem. Suppose that you have been hired to educate people about protecting the diversity of plants and animals across Canada. How could you help them appreciate the number of living things in our country?



The bog elfin butterfly can be found in the Alfred Bog.

Materials

- readily available classroom materials

Procedure

1. Suppose that you are a park naturalist. You have a group of Grade 6 students coming for a lecture. You want to present the data in this table to help them understand more about species diversity in Canada. Spend about 10 min brainstorming a creative way to represent the data.
2. Your model should accurately reflect the proportions of different species in relation to one another. Your model could be two-dimensional or three-dimensional.
3. Spend about 10 min creating your model.

Species Diversity in Canada

Group of Organisms	Number of Known Species
Amphibians	42
Arachnids	3 275
Birds	426
Crustaceans	3 139
Fish	1 100
Fungi	11 800
Insects	18 530
Mammals	194
Molluscs	1 500
Plants	4 934
Reptiles	42

Questions

1. Did any of the numbers of known species surprise you? Explain.
2. Compare your model with another group's model.
 - a. Describe any similarities and differences between the two models.
 - b. Describe the best features of each model.
3. If you were to redesign your model, how would you change it and why?

Study Toolkit

These strategies will help you use this textbook to develop your understanding of science concepts and skills. To find out more about these and other strategies, refer to the Study Toolkit Overview, which begins on page 561.

Reading Effectively

Identifying the Main Idea and Details

The *main* idea of a text is the *most important* idea. Details in the text help support this idea. Here are some strategies for identifying the main idea of a chapter, section, or paragraph.

- Pay attention to titles, headings, and subheadings. Note how type size helps you differentiate among them.
- Skim the text and glance at the visuals to get a general sense of the content.
- Note any terms that are boldfaced or differentiated in another special way.

Use the Strategy

Examine page 93. Apply the strategies above to identify the main idea of the page. Compare your main idea with a classmate's main idea, and discuss how you made your decision.

Word Study

Word Origins

One strategy for learning a new word is to study its origins, or where it came from. For example, to understand the meaning of *entomology*, find this word in a dictionary and look at the entries before and after it. You will probably see an entry like the one below.

entomo- *pref.* Insect: *entomology*.
[Fr. < Gk. *entomon* < neut. of *entomos*, cut (< its segmented body) < *entemnein*, to cut up : *en-*, in; see EN-² + *temnein*, to cut; see **tem-***.]

This entry tells you that the prefix *entomo-* means insect and comes from the Greek *entomon*, meaning cut or segmented. This might help you remember that *entomology* means "the study of insects."

Use the Strategy

Look up the word *diversity*, and search the entries before and after it until you find its Latin origin. Explain how the Latin root helps you understand the current meaning of the word.

Reading Graphic Text

Interpreting Tables

A table consists of *cells* that are organized in rows and columns. Each cell contains data. Each column and row has a heading to help you interpret each cell. To read a table or to find patterns in a table, move your eyes left and right across the rows, and up and down along the columns. In the table on the right, the number 500 is found in the column labelled "Number of Zebra Mussels (per m²)" and in the row labelled "1992." This number can be interpreted as "500 zebra mussels per m² were found in Lake Ontario in 1992."

Use the Strategy

Turn to the table in Activity 3-3 on page 104.

1. Cover the table, and read only the title. Based on the title, explain what kind of information you expect to see in the cells.
2. Read the column and row headings carefully. Explain what they mean.
3. Pick any cell in the table, and interpret its contents by writing a complete sentence.

Zebra Mussels and Chlorophyll a in Lake Ontario

Year	Number of Zebra Mussels (per m ²)	Chlorophyll a (µg/L)
1990	0	4.4
1991	230	3.3
1992	500	3.4