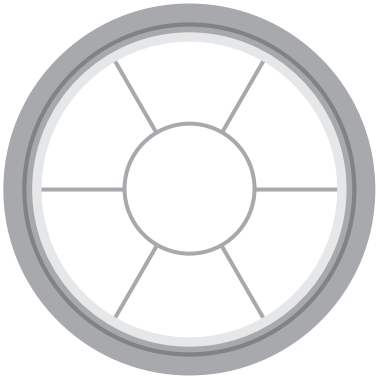
Unit 1 Review

Connect to the BIG IDEAS

Use this bicycle wheel graphic organizer to connect what you have learned in this unit to the Big Ideas, found on page 1. Draw one bicycle wheel for each Big Idea and write the Big Idea in the centre. Between the spokes of the wheel, briefly describe six examples of that Big Idea.



Knowledge and Understanding K/U

For questions 1 through 5, select the best answer.

1. The lithosphere is

a. the water in oceans on Earth

b. the non-living components of an ecosystem

c. the layer of air above Earth's surface

d. the hard part of Earth's surface

2. Trophic efficiency is a measure of how much energy in organisms can be _____ from one trophic level to another.

a. lost **c.** spent

b. saved **d.** transferred

3. The size of a population that can be supported indefinitely by the resources and services of an ecosystem is known as its

a. carrying capacity

b. ecological footprint

c. exponential limit

d. niche

4. Which situation is an example of biomagnification?

a. A bear eats a large meal and stores the nutrients as fat.

b. A frog is poisoned by the nearby use of pesticides and dies soon after.

c. A hawk eats a fish that has eaten many smaller aquatic animals, which all had toxins in their bodies.

d. A caterpillar feeds on leaves that contain toxins, and the toxins are stored faster than they are eliminated.

5. A low dose of insecticide is sprayed up, into the top of a tree. The insects that fall out as a result are collected, counted, and analyzed. This method of measuring biodiversity is called

a. canopy fogging

b. netting

c. quadrat sampling

d. transect sampling

6. Nutrients were added at the Experimental Lakes Area to study eutrophication. Which nutrient had the greatest direct influence on eutrophication?

7. Why has the level of carbon dioxide in the atmosphere been steadily increasing since the mid-19th century?

8. The bird in the photograph below is called an oxpecker. The bird searches the hides of large mammals for parasites, which it harvests and eats. Identify whether the relationship between the bird and the mammal is an example of predation, competition, mutualism, or parasitism. Explain your answer.

9. In your own words, describe the concept of urban sprawl.

10. What are two factors that have made it difficult for scientists to determine the number of species on Earth?

11. Identify two biodiversity hotspots in Canada.

12. Draw a diagram that shows the relationship between the water cycle and the phosphorous cycle.

13. How are plants used for bioremediation?

14. Explain how driving a car in Ontario could affect ecosystems elsewhere in Canada?

15. What happens to the energy in tertiary consumers when they die?

Thinking and Investigation T/I

16. Use either the monarch butterfly or the ruby-throated hummingbird to explain how ecosystems are connected. Why is it important to maintain connectivity among ecosystems?

17. The graphs below represent the growth patterns of two different bacterial cultures over a period of time.

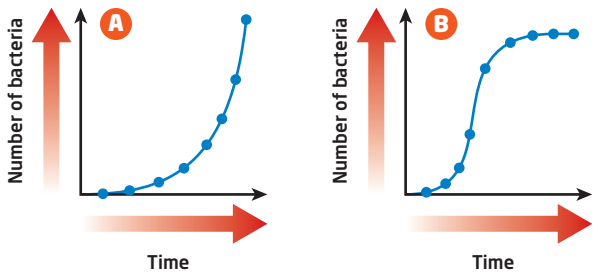
    a. Analyze each graph. Describe, in words, what is happening in each bacterial culture.

    b. Which graph shows only exponential growth?

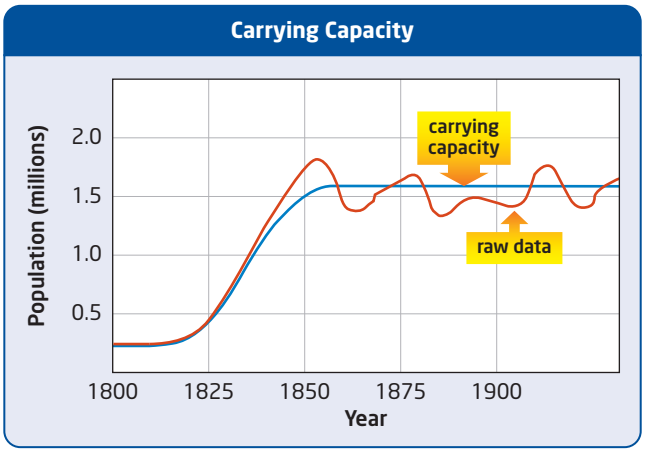
    c. Which graph shows a growth pattern that is exponential for part of the time?

    d. Has either of these populations reached its carrying capacity? Explain your answer.

Bacterial Growth over Time



18. Estimate the carrying capacity for the population shown in the graph below. Why do you think the carrying capacity in real-life situations is not a smooth, flat line?



19. Different species provide many different services for their ecosystems by occupying their ecological niches. The red squirrel is a familiar Ontario species. Brainstorm a number of "services" that a red squirrel provides for the ecosystems in which it lives.

20. Explain how acid precipitation could affect biodiversity.

21. Study the following table. Identify two factors that may help to explain why Canadians have a larger ecological footprint than people in Vietnam.

Resource Use in Canada and Vietnam

Country	Canada	Vietnam
Size (km^2)	9 985 000	330 000
Population (millions)	33	84
Population density (people/km^2)	3.2	251.5
Annual electricity use (billion KW•h)	487	32
Oil consumption (barrels per day)	2 200 000	185 000
Highways (km)	1 408 800	93 300
Wealth generated per person per year ($)	31 500	2 700

22. Imagine that you work as a lake ecologist at the Canadian Centre for Inland Waters. Create a questionnaire that a ship's captain, arriving at inland Canadian ports, would have to fill out.

Communication C

23. Prepare a short paragraph that promotes the virtues of the greenhouse effect and its contribution to the development of life on Earth.

24. The maple leaf is a familiar symbol of Canada. Using an outline of a maple leaf, draw symbols at the five tips to represent the richness of Canada's ecosystems.

25. The ecosystem that includes prairie dogs and black-footed ferrets is complex. Create a flowchart that you could use as a visual aid if you were giving an oral presentation about this ecosystem to a Grade 5 class.

Application A

26. Suppose that you are a science writer who is working on an article about the effects of the biomagnification of certain chemicals. What questions would you ask a group of scientists who recently created a new pesticide?

27. Many migratory birds travel great distances, living in ecosystems that are thousands of kilometres apart. The Canada warbler, a species in decline, breeds in Canada but spends the winter in several South American countries. Why is designing a plan to stabilize the Canada warbler population more challenging than designing a plan for a Canadian species that does not migrate?

28. Gulls and raccoons are organisms that have benefited from human development, particularly in urban areas. In Canada, black bears have benefited from the landfill sites created by humans.

Choose one of the following organisms, and propose a course of action to deal with their increased population growth. A few suggestions are given for each organism.

- Gulls: poison, disrupt nesting, post fines and prosecute for feeding, use birds of prey
- Raccoons: trap, sterilize, use raccoon-proof garbage containers
- Bears: educate the public, use better fencing, promote spring bear hunting, trap and relocate

29. Suppose that your community is looking for ideas to promote sustainable development. Describe an activity that is sustainable in your community. Contrast this activity with a non-sustainable activity to show how the sustainable activity uses resources more efficiently.

30. Many wetlands have been drained in southern Ontario, but some have been reclaimed through wetland restoration. Prepare a checklist that could be used to determine areas that are suitable for wetland restoration.

31. Both the eastern foxsnake and the queen snake have small Ontario ranges. Most of the world's eastern foxsnakes are found in Ontario, but the queen snake has a large range in the United States. How might this information influence your ideas for a conservation plan to protect snakes, if you have limited funds?

Literacy Test Prep

Read the selection below, and answer the questions that follow it.

People in North America use resources at a greater rate per person, compared with people in many other countries in the world. If everyone on Earth consumed as much as the average person in North America does, three more Earths would be needed to sustain the human population. The following table contains data about resource use.

Resource Use in Canada and the World

Category	Canadian Average	Global Average
CO_2 produced from the consumption of fossil fuels and farm products, and the clearing of land per person, per year	17.0 tonnes	4.1 tonnes
Vehicles driven per 100 people, per year	47	9
Paper used per person, per year	281 kg	52 kg
Gasoline used per person, per year	1389 L	174 L
Fresh water used per person, per year	1494 m^3	633 m^3

Multiple Choice

In your notebook, record the best or most correct answer.

32. The table above provides information about

- **a.** the amounts of resources used by the average person in North America, compared with the amounts used by the average person globally
- **b.** the amounts of resources used by the average Canadian, compared with the amounts used by the average person globally
- **c.** the amounts of resources used by people in different countries around the world
- **d.** the amounts of resources used by the average person in the United States

33. How much paper is used by the average Canadian?

- **a.** 17.0 tonnes per year
- **b.** 281 kg per year
- **c.** 1389 L per year
- **d.** 1494 m^3 per year

34. For which category is use by the average person in the world greater than use by the average Canadian?

- **a.** vehicles driven per 100 people, per year
- **b.** gasoline used per person, per year
- **c.** all of the categories
- **d.** none of the categories

35. How does the data in the table support this statement: "If everyone on Earth consumed as much as the average person in North America does, three more Earths would be needed to sustain the human population?"

- **a.** For every category, the global average consumption is two to eight times higher than the Canadian average.
- **b.** For every category, the Canadian average consumption is two to eight times higher than the global average.
- **c.** The average Canadian uses only 174 L of gasoline per year.
- **d.** The average person in the world uses 1494 m^3 of water per year.

Written Answer

36. Make a list of how each resource use in the table affects the sustainability of ecosystems. Then write a paragraph about sustainable practices that might reduce the impact of Canadians on ecosystems.