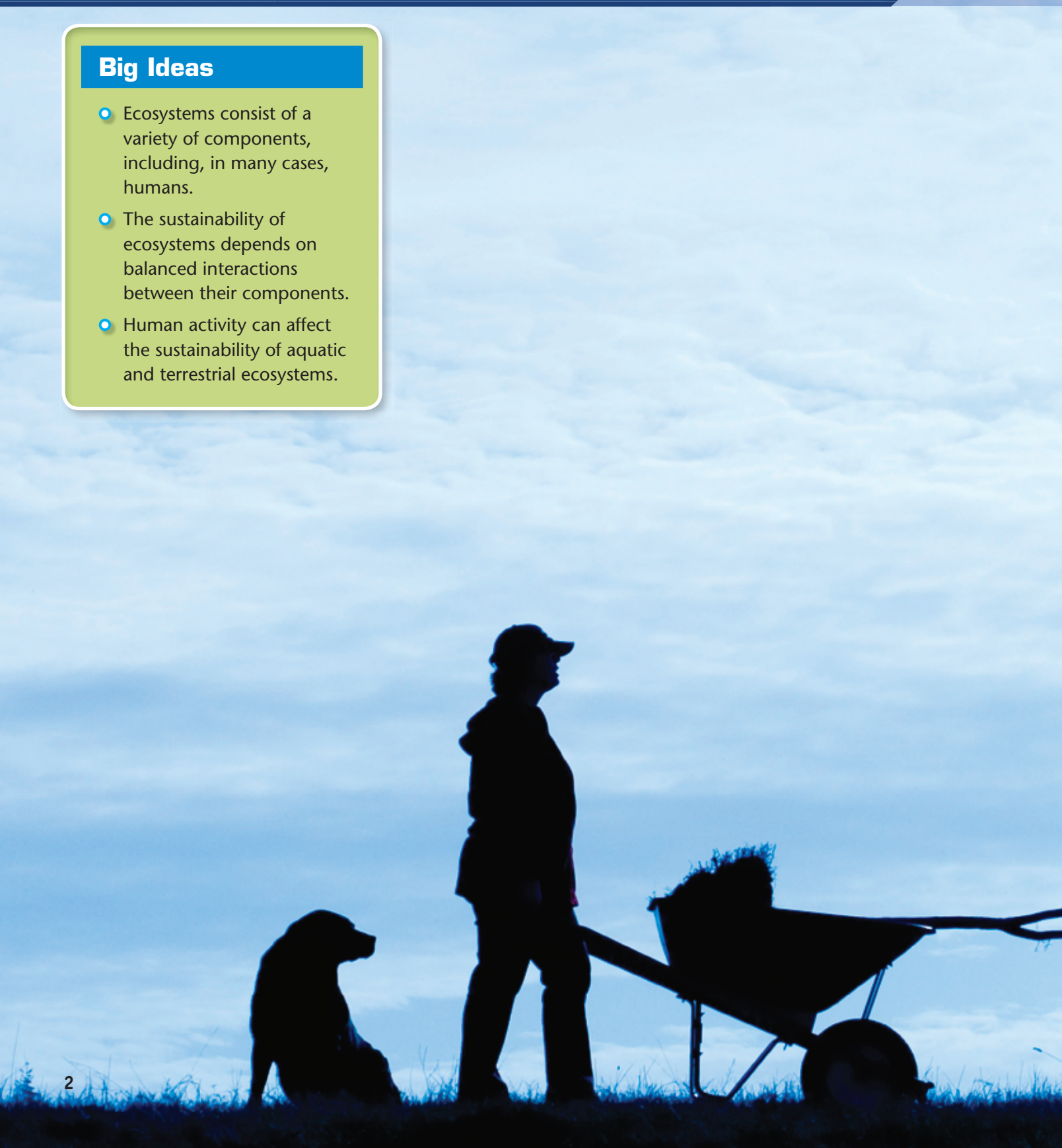
Unit 1 Sustainable Ecosystems and Human Activity

Big Ideas

- Ecosystems consist of a variety of components, including, in many cases, humans.
- The sustainability of ecosystems depends on balanced interactions between their components.
- Human activity can affect the sustainability of aquatic and terrestrial ecosystems.



From "Waiting On The World To Change" by John Mayer

Me and all my friends
We're all misunderstood
They say we stand for nothing and
There's no way we ever could

Now we see everything that's going wrong
With the world and those who lead it
We just feel like we don't have the means
To rise above and beat it

So we keep waiting
Waiting on the world to change
We keep on waiting
Waiting on the world to change

It's hard to beat the system
When we're standing at a distance
So we keep waiting
Waiting on the world to change

Instead of waiting for change that might never come, many people are choosing to be the change they are waiting for.

HOW is the person in the photo serving as an agent of change in the world?

Unit 1 At a Glance

In this unit you will learn about the characteristics of terrestrial and aquatic ecosystems. You will also learn about the interdependencies within and between these two types of ecosystems. You will analyze the impact of human activity on these ecosystems, and you will assess the effectiveness of selected initiatives on their sustainability.

***Think** about answers to each question as you work through the topic.*

Topic 1.1: What are ecosystems, and why do we care about them?

Key Concepts

- Ecosystems are about connections.
- Ecosystems are made up of biotic (alive) and abiotic (not alive) parts that interact.
- Interactions between terrestrial (land) ecosystems and aquatic (water) ecosystems keep all ecosystems healthy.

Sustainable Ecosystems and Human Activity

Topic 1.6: How can our actions promote sustainable ecosystems?

Key Concepts

- We must understand and commit to sustainability.
- We must understand the link between biodiversity and sustainability.
- Our actions can maintain or rebuild sustainable ecosystems.
- You can choose actions that benefit ecosystems now and for the future.

Topic 1.5: How do human activities affect ecosystems?

Key Concepts

- We cannot always accurately predict the consequences of our actions.
- Introduced species can affect the health of ecosystems.
- Pollutants from human activities can travel within and between ecosystems.

Topic 1.2: How do interactions supply energy to ecosystems?

Key Concepts

- Photosynthesis stores energy, and cellular respiration releases energy.
- Producers transfer energy to consumers through food chains and food webs.
- Interactions are needed to provide a constant flow of energy for living things.

Topic 1.3: How do interactions in ecosystems cycle matter?

Key Concepts

- Abiotic and biotic interactions cycle matter in terrestrial and aquatic ecosystems.
- Photosynthesis and cellular respiration cycle carbon and oxygen in ecosystems.
- Human activities can affect ecosystems by affecting nutrient cycles.

Topic 1.4: What natural factors limit the growth of ecosystems?

Key Concepts

- Ecosystem growth is limited by the availability of resources.
- Abiotic and biotic factors limit populations in ecosystems.

Looking Ahead to the Unit 1 Project

At the end of this unit, you will do a project. The **Inquiry Investigation** examines the effects of compost on the growth of plants in a terrestrial ecosystem. The **Issue to Analyze** challenges you to make some lifestyle changes to reduce your environmental impact. Read pages 82–83. With tips from your teacher, start your project planning folder now.

Get Ready for Unit 1

Concept Check

1. Examine the forest in the picture below. A forest is an example of an ecosystem that contains living (biotic) parts and non-living (abiotic) parts that interact. Make a table like the one below with the headings "Biotic Parts" and "Abiotic Parts." List parts of the forest ecosystem under the correct heading in the table.

Biotic	Abiotic

2. In your notebook, copy and complete each sentence below, based on what you learned about ecosystems in earlier grades. (Do not write in this textbook.)

a) A maple tree is a *producer* because...

b. A chipmunk is a *consumer* because...

3. Name two other producers and two other consumers shown in the picture of the forest ecosystem.

4. Use the five words in the box to state one reason why plants are important to all life on Earth.

oxygen	leaves	photosynthesis
food	plants	

5. Choose one of the following events. Create a concept map to show which parts of a forest ecosystem would be affected by the event.

a) A forest fire rages through the forest.

b) A logging company clear-cuts the trees in the forest.

c) A beaver builds a dam in a nearby pond.

d) Hunters kill all of the wolves in the area.

6. One forest ecosystem food chain is shown below. Use some of the plants and animals in the forest ecosystem picture to draw a different forest ecosystem food chain.

Inquiry Check

Highway 60 runs through the middle of Algonquin Park, which is a forest ecosystem like the one in the picture. The Ontario Ministry of Transport has found out that most of the vehicle collisions with deer and bears occur on this highway in the months of May, June, October, November, and December.

7. Analyze In which two seasons do most collisions with deer and bears occur? Why do you think this is the case? Explain your answer.

8. 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

9. 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

10. Ranking List the areas in order from highest to lowest number of incidents.

11. Graphing Construct a bar graph to display the information shown in the table. Include a title and labels for your graph.

12. Communicating a message Create a poster to inform people about the dangers of collisions with wildlife on the roads and suggest ways to avoid them.