

## KEY CONCEPTS SUMMARY



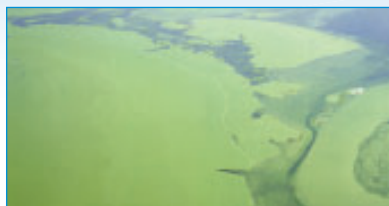
Life on Earth exists in the atmosphere, lithosphere, and hydrosphere.

- Earth's atmosphere is made up of nitrogen gas (78 %), oxygen gas (21 %), and other gases. (2.1)
- The atmosphere acts like a blanket keeping Earth warm and blocking harmful radiation. (2.1)
- The biosphere is the region on Earth where life can exist within the lithosphere, atmosphere, and hydrosphere. (2.1)



Human activities influence biogeochemical cycles such as the water and carbon cycles.

- In biogeochemical cycles, matter is continuously consumed, rearranged, stored, and used while moving between the biotic and the abiotic environment. (2.6)
- Carbon is stored for long periods of time in carbon sinks and deposits. (2.6)
- Burning fossil fuels and deforestation release carbon dioxide into the atmosphere. (2.6)
- Humans influence the water cycle when they construct dams and use irrigation systems. (2.7)



Photosynthesis and cellular respiration are complementary processes in an ecosystem.

- During photosynthesis, green plants convert carbon dioxide and water into sugar (with stored chemical energy) and oxygen. (2.4)
- During cellular respiration, sugar and oxygen are converted into carbon dioxide, water, and energy. (2.4)
- Producers and consumers undergo cellular respiration. Only producers photosynthesize. (2.4)



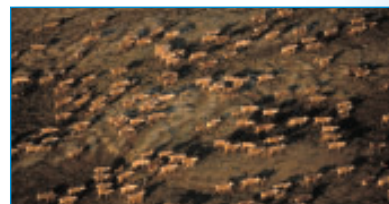
Ecosystems are composed of biotic and abiotic components.

- Ecosystems are characterized by their biotic and abiotic features. (2.2, 2.7)
- Natural ecosystems are generally sustainable, maintaining a relatively constant set of biotic and abiotic characteristics. (2.2)
- Artificially created ecosystems are not usually sustainable. (2.2)
- Species interactions include the following: competition, predation, mutualism, parasitism, and commensalism. (2.7)
- The carrying capacity is the maximum number of individuals of a species that an ecosystem can support. (2.7)



Energy passes through ecosystems, whereas matter cycles within ecosystems.

- Energy passes through ecosystems by means of food webs. (2.5)
- Energy is continuously being lost to the environment resulting in less available energy from one trophic level to the next. (2.5)
- Food webs and ecological pyramids display how energy flows through ecosystems from one trophic level to the next. (2.5)



Terrestrial biomes and aquatic ecosystems are largely determined by their abiotic characteristics.

- Terrestrial biomes are largely determined by temperature and precipitation patterns. (2.8)
- Canada's major biomes are tundra, boreal forest, grassland, and temperate deciduous forest, and mountain forest. (2.8)
- Aquatic ecosystems are determined by factors such as salt content, light, nutrient and oxygen availability, and the movement of water. (2.9)

## WHAT DO YOU THINK NOW?

You thought about the following statements at the beginning of the chapter. You may have encountered these ideas in school, at home, or in the world around you. Consider them again and decide whether you agree or disagree with each one.



- 1** Oceans make up the majority of Earth's mass.  
**Agree/disagree?**



- 4** All organisms are helpful in the environment.  
**Agree/disagree?**



- 2** All the particles that make up your body are being continuously replaced by new ones.  
**Agree/disagree?**



- 5** Humans are one of the few species that do not compete with other species.  
**Agree/disagree?**



- 3** Animals need plants for food, but plants do not need animals.  
**Agree/disagree?**



- 6** Humans have been successful because they are able to change the natural environment.  
**Agree/disagree?**

**How have your answers changed since then?  
What new understanding do you have?**

## Vocabulary

atmosphere (p. 29)  
lithosphere (p. 30)  
hydrosphere (p. 30)  
biosphere (p. 30)  
ecosystem (p. 32)  
biotic factors (p. 32)  
abiotic factors (p. 32)  
sustainable ecosystem (p. 34)  
sustainability (p. 35)  
radiant energy (p. 38)  
light energy (p. 38)  
thermal energy (p. 38)  
photosynthesis (p. 38)  
producer (p. 38)  
cellular respiration (p. 40)  
consumer (p. 41)  
ecological niche (p. 42)  
food chain (p. 43)  
trophic level (p. 43)  
food web (p. 43)  
ecological pyramid (p. 45)  
biomass (p. 46)  
biogeochemical cycle (p. 48)  
water cycle (p. 48)  
carbon cycle (p. 49)  
nitrogen cycle (p. 50)  
limiting factor (p. 52)  
tolerance range (p. 52)  
carrying capacity (p. 55)  
biome (p. 56)  
oligotrophic (p. 60)  
eutrophic (p. 60)  
watershed (p. 60)

## BIG Ideas

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