

Connecting the Abiotic and Biotic Parts of the Environment

Use with textbook pages 286-287.

1. For each scenario in the table below, identify the abiotic part(s) and the biotic part(s).

Scenario	Abiotic Part(s)	Biotic Part(s)
A moose drinks water from a river.	water	moose
Heavy rains and landslides cause plants to be uprooted.	rain, rock	plants
Strong winds break branches off trees.	wind	trees
A lack of nutrients in soil results in tomato plants not producing tomatoes.	nutrients, soil	tomato plant
Plants that need shade are planted in an area that gets lots of sunlight. The leaves turn brown and the plants do not produce flowers.	sunlight	flowering plants
The pH of the water in an aquarium is too high and several fish die.	pH, water	fish
Runoff from a heavy snowmelt reduces the salinity of the water in an estuary. Some of the reeds die and some of the fish leave the estuary for an area of higher salinity in the ocean.	salinity + snowfall	reeds + fish

2. Give two new examples (not already given in your textbook) of how two of Earth's spheres interact.

a) The two spheres that interact are the geosphere and the biosphere.

b) They interact in the following way:

answers will vary

c) The two spheres that interact are the hydrosphere and the atmosphere.

d) They interact in the following way:

answers will vary.

4.1 Assessment

Match each description on the left with the part of the environment on the right. Each part of the environment may be used more than once.

Description	Part of the Environment
1. <u>A</u> A bird builds a <u>nest</u> in the tree.	A. abiotic
2. <u>A</u> Increased <u>carbon dioxide</u> in the atmosphere causes the <u>pH</u> of ocean water to decrease.	B. biotic
3. <u>B</u> A <u>caterpillar</u> eats the <u>leaves</u> of a plant.	
4. <u>A</u> It <u>rained</u> four out of seven days last week.	
5. <u>A</u> In Location A, it is <u>sunny and hot</u> in the summer and <u>cold with lots of snow</u> in the winter.	
6. <u>B</u> A mushroom decomposes a fallen tree branch.	

Match each description on the left with the ecosystem service on the right. Each ecosystem service may be used only once.

Description	Ecosystem Service
7. <u>E</u> carbon, nitrogen, and other cycles	A. atmospheric gas supply
8. <u>A</u> regulation of carbon dioxide and oxygen	B. climate regulation
9. <u>D</u> homes for migratory species and nurseries	C. food production
10. <u>B</u> regulation of greenhouse gases	D. habitat (living space)
11. <u>F</u> fossil fuels, timber, minerals	E. nutrient recycling
12. <u>C</u> crops, livestock, fish	F. raw materials (natural resources)
13. <u>I</u> preventing the loss of topsoil	G. cultural benefits
14. <u>G</u> learning from and enjoying nature	H. water supply
15. <u>H</u> having sufficient drinking water	I. soil erosion control

Circle the letter of the best answer for questions 16 to 26.

16. The solid, mainly rocky part of Earth is the

- A. atmosphere.
- B. biosphere.
- C. geosphere.
- D. hydrosphere.

Global Winds and Ocean Currents

Use with textbook pages 301-302.

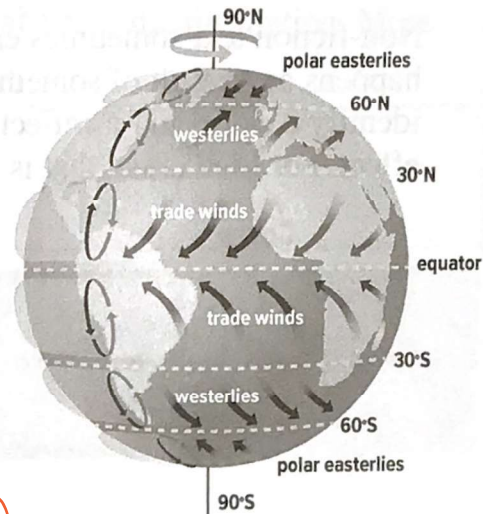
Use the diagram of Earth's wind systems to answer questions 1 to 4.

1. In which direction do the trade winds move?

east to west

2. What happens to air as it approaches the equator?

air warms and rises
and travels to north or
south to 30° latitude. Cools,
sinks & moves WESTWARD
back to the EQUATOR (cycle)



3. Which winds affect weather in much of North America? westerlies
4. Which winds are responsible for moving cold air from the poles toward the equator?
polar easterlies
5. Use the terms in the box to fill in the blanks in the paragraph below. Some terms may be used more than once.

cold
warm

cool
westerly

landmass
winds

Ocean surface currents are created by winds. In all ocean basins, warm water currents near the equator flow in a westerly direction. When these currents reach a landmass, they turn toward the poles. These poleward-flowing waters carry warm, tropical water into high colder latitudes. After these warm waters enter polar regions, they gradually cool. Eventually, they reach a pole and begin flowing toward the equator. The resulting currents bring cold water from higher latitudes to tropical regions.

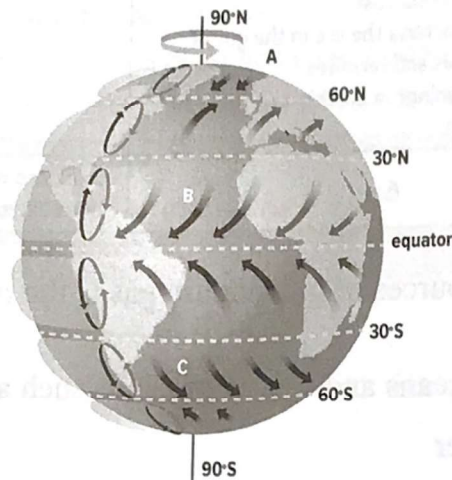
Name _____

Date _____

13. Which of the following statements is true?

- A. The curved surface of Earth results in unequal heating of the surface, which causes wind.
- B. Wind creates thermal energy.
- C. Cool air is less dense than warm air so it sinks, creating wind.
- D. Cool air near Earth's surface rises and warms before sinking back down.

Use the diagram below to answer questions 14 to 16.



14. Which section of the globe represents the trade winds?

- A. A
- B. B
- C. C
- D. None of the above.

15. Which section of the globe represents the westerlies?

- A. A
- B. B
- C. C
- D. None of the above.

16. Which section of the globe represents the polar easterlies?

- A. A
- B. B
- C. C
- D. None of the above.

17. Which statement about wind is false?

- A. Wind is moving air.
- B. Wind results from an unequal heating of Earth's surface.
- C. Wind does not play an important role in redistributing thermal energy around Earth.
- D. Earth's major wind systems result from a combination of convection currents and the Coriolis effect.

Name _____

Date _____

4.3 Assessment

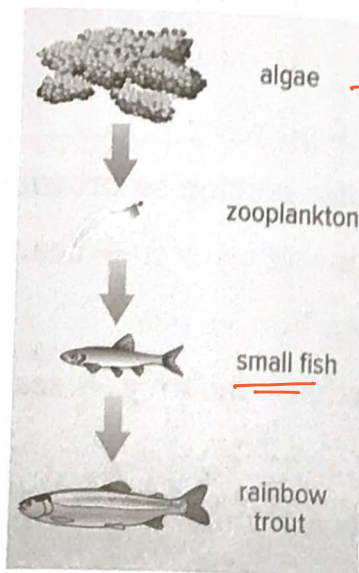
Match each description on the left with the term on the right. Each term may be used more than once.

Description	Term
1. <u>E</u> organism that makes its <u>own food</u> to get the energy it needs to live	A. consumer
2. <u>C</u> model that describes how the stored energy in food is passed on from <u>one living thing to another</u>	B. decomposer
3. <u>A</u> golden eagle that preys on a marmot	C. food chain
4. <u>B</u> organism that breaks down dead organic material to obtain the energy it needs to live	D. food web
5. <u>D</u> model of feeding relationships that shows a network of interacting and overlapping food chains	E. producer
6. <u>A</u> organism that consumes other organisms to get the energy it needs to live	
7. <u>E</u> grasses that carry out photosynthesis	

Circle the letter of the best answer for questions 8 to 17.

8. In a food chain, each time energy is transferred to the next level some of the energy is lost as unusable
- A. heat. C. waste.
 B. food. D. water.
9. Which is **not** a reason why only a small percent of food energy is available at the next level of an energy pyramid?
- A. Some of the original food energy has been used already to support life functions, such as growth and cellular respiration.
- B. Some energy is changed into heat that is given off into the environment. This energy cannot be used by other living things.
- C. Some energy is stored in wastes (urine and feces) that are excreted into the environment.
- D. There is a constant flow of energy needed to sustain living things in terrestrial and aquatic ecosystems.
10. In an energy pyramid, how much energy is lost with each step up?
- A. 10% C. 50%
 B. 25% D. 90%

11. If the algae in the food chain shown produce 10 000 energy units, how many energy units are available for the small fish?



algae → primary producer (100%)

zooplankton → (10%)

small fish → 1% → $0.01 \times 10\,000 = 100$

rainbow trout → 0.1%

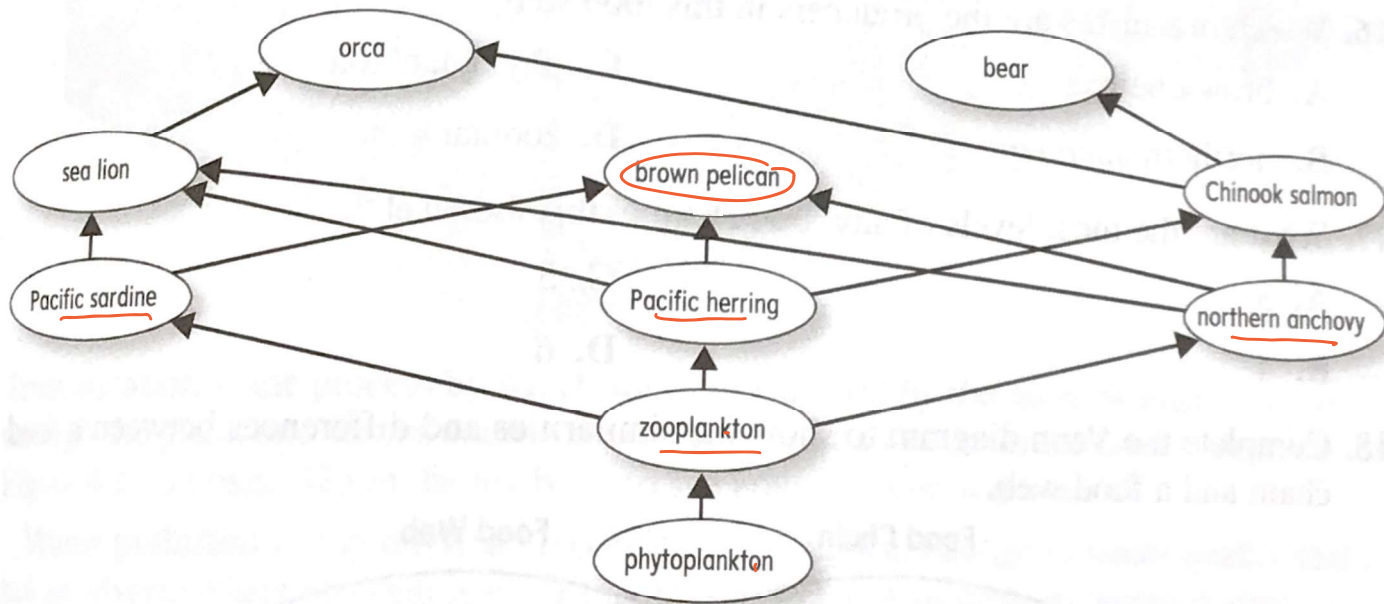
A. 10

B. 100

C. 1 000

D. 10 000

Use the diagram of the food web to answer questions 12 to 17.



12. Which organisms are preyed on by brown pelicans?

A. orcas, zooplankton, Pacific herring

B. Pacific sardine, Chinook salmon, bear

C. northern anchovy, Pacific herring, Pacific sardine

D. sea lion, phytoplankton, northern anchovy

Name _____

Date _____

13. Which of the following organisms has no predators in this food web?

A. Chinook salmon

C. Pacific herring

B. orca

D. sea lion

14. Which represents a food chain within the food web?

A. phytoplankton → zooplankton → Pacific herring → brown pelican

B. zooplankton → Pacific herring → Chinook salmon → bear

C. phytoplankton → Pacific sardine → sea lion → bear

D. zooplankton → Pacific herring → northern anchovy → sea lion

15. Which organisms consume zooplankton?

A. sea lion, brown pelican, northern anchovy

B. phytoplankton, Chinook salmon, orca

C. Pacific sardine, Pacific herring, northern anchovy

D. bear, orca, sea lion

16. Which organisms are the producers in this food web?

A. brown pelican

C. phytoplankton

B. northern anchovy

D. zooplankton

17. What are the most levels of any food chain in this food web?

A. 3

C. 5

B. 4

D. 6

18. Complete the Venn diagram to show the similarities and differences between a food chain and a food web.

