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12-1 What are producers and consumers?

Lesson Review

Match each term in **Column B** with its description in **Column A**. Write the letter of the correct term in the space provided.

Column A

- _____ 1. organism that makes its own food
- _____ 2. animal that eats dead organisms
- _____ 3. animal that eats plant-eating animals
- _____ 4. organism that breaks down the wastes or remains of other organisms
- _____ 5. animal that eats meat-eating animals
- _____ 6. main producers in lakes and oceans
- _____ 7. consumer that eats only plants
- _____ 8. consumer that eats only animals
- _____ 9. consumer that eats both plants and animals

Column B

- a. producer
- b. secondary consumer
- c. decomposer
- d. tertiary consumer
- e. scavenger
- f. algae and phytoplankton
- g. omnivore
- h. herbivore
- i. carnivore

Skill Challenge

Skills: *classifying, applying concepts*

Classify each organism listed in the table as a producer, consumer, scavenger, or decomposer. Place a check mark in the correct column.

CLASSIFYING ORGANISMS				
Organism	Producer	Consumer	Scavenger	Decomposer
1. Seaweed				
2. Duck				
3. Hawk				
4. Hyena				
5. Bacteria				
6. Vulture				
7. Rabbit				
8. Grass				
9. Apple tree				
10. Fungus				

12-2 What are food chains and food webs?

Lesson Review

PART A Answer the following questions about the diagram.

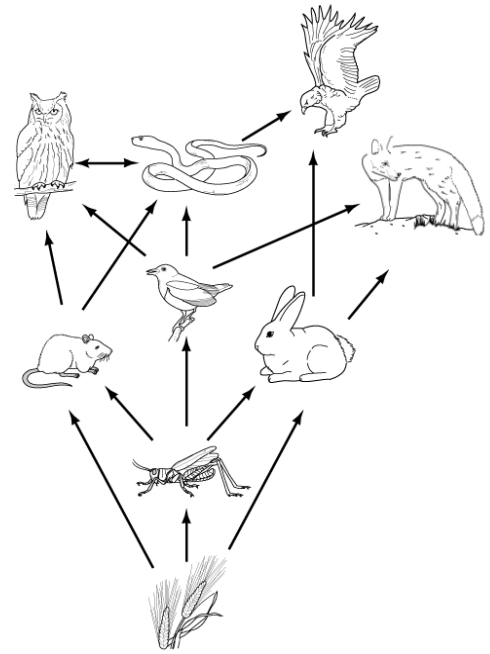
1. What is the diagram called? _____

2. What does the diagram show? _____

3. Which organisms in the diagram are primary consumers?

4. Which organisms in the diagram are tertiary consumers?

5. Which organism is the producer? _____



PART B Complete the following.

1. What is always the first link in a food chain? _____
2. What is the limit of links that most food chains have? _____
3. Why is there less energy available at the last link than at the first link in a food chain? _____

4. What do the arrows in a food chain show? _____

Skill Challenge

Skills: *diagramming, applying concepts, classifying*

In the space provided, draw a food web containing at least four organisms.

Animals in a Food Web

Enrichment Activity for Lessons 12-1 and 12-2

Skills: *classifying, researching*

PART A Classify each organism as *herbivore*, *carnivore*, or *omnivore* in the table below. List some examples of the food that each organism eats. Use reference materials if necessary.

ORGANISMS		
Organism	Type of Consumer	Examples of Food
1. Lion		
2. Deer		
3. Wolf		
4. Rabbit		
5. Human		
6. Tree frog		
7. Bear		
8. Trout		

PART B Study the ecosystem shown below. Then, answer the questions that follow.

- List eight biotic factors and four abiotic factors in the ecosystem.

Biotic factors: _____

Abiotic factors: _____



- Draw arrows on the diagram showing the many food chains in the ecosystem.

12-3 What are energy pyramids?

Lesson Review

Write the term that best completes each statement in the space provided.

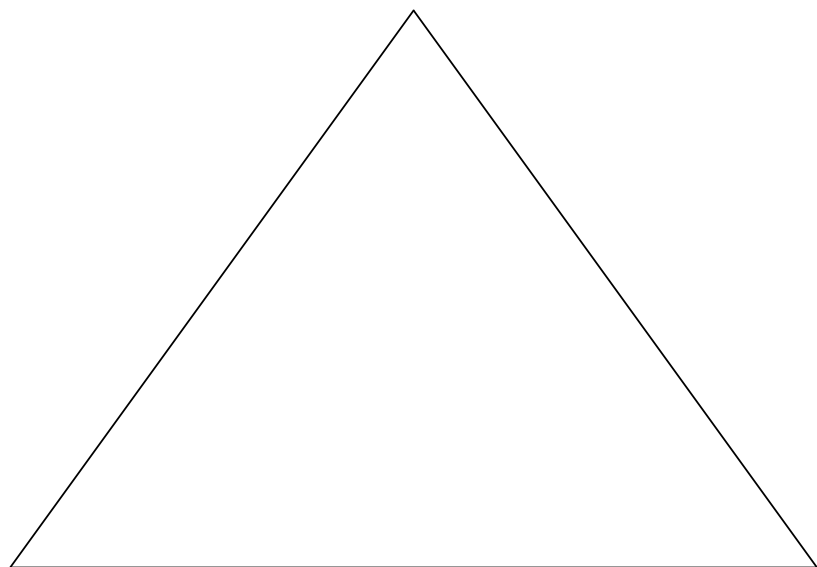
1. In each link of a food chain, approximately _____ of the energy in the food chain is transferred to the next level.
2. Organisms store some of the energy from their food in their _____.
3. A large amount of energy in a food chain is lost into the atmosphere as _____.
4. A diagram that shows how energy moves through a food chain is called an _____.
5. All of the energy in an energy pyramid comes from the _____.
6. In an ecosystem, there are far more producers than there are _____.
7. At the top of the energy pyramid, the consumers are called _____.
8. In an energy pyramid, the producer layer always has the _____.
9. Fewer organisms can be supported at each level because there is less _____.
10. Loss of energy in a food chain limits the amount of _____.
11. Once energy is lost in a food chain, it can never be _____.
12. All life processes require _____.

Skill Challenge

Skill: *diagramming, applying concepts, classifying*

In the space provided, draw an energy pyramid that includes the organisms listed in the box. Identify each kind of organism as a *producer*, a *primary consumer*, a *secondary consumer*, or a *tertiary consumer*.

ORGANISMS
algae
seagull
clam
fish



12-4 How do living things interact?

Lesson Review

Skills: *researching, using resources*

Circle the term that best completes each statement.

1. Resources in an ecosystem are (abundant / limited).
2. (Predation / Competition) is the struggle among organisms for resources in an ecosystem.
3. In competition, animals that are better adapted to conditions in the habitat are (more / less) likely to survive and reproduce.
4. Competition among plants is (less / more) active than competition among animals.
5. A relationship in which an organism kills and eats another organism is called (competition / predation).
6. An organism that kills and eats another organism is called (a predator / prey).
7. (Symbiosis / Competition) is a close relationship between two organisms from different species that may help or harm one of the organisms.
8. Prey species (can / cannot) benefit from predation.
9. Predators are (less / more) likely to catch, kill, and eat weak or unhealthy animals than strong, healthy ones.
10. An organism that is killed and eaten by another organism is called (a predator / prey).

Skill Challenge

Skills: *applying concepts, inferring*

Explain how each of the following interactions can help a species to maintain a strong, healthy population. You may use reference materials if necessary.

Interaction	How the Interaction Helps Species
Competition	
Predation	
Symbiosis	

12-5 What are symbiotic relationships?

Lesson Review

Write *true* if the statement is true. If the statement is false, change the underlined term to make the statement true.

- _____ 1. Mutualism is a close relationship between two organisms that may help or harm them.
- _____ 2. There are three types of symbiotic relationships.
- _____ 3. Commensalism is a relationship between two different kinds of organisms that benefits both of them.
- _____ 4. The desert yucca plant depends on the yucca moth for food.
- _____ 5. A lichen is an example of mutualism.
- _____ 6. Barnacles on a whale is an example of commensalism.
- _____ 7. Parasitism is a relationship between two different kinds of organisms in which one benefits and the other is unaffected.
- _____ 8. By attaching themselves to the body of a whale, yucca moths can feed while moving through nutrient-rich water.
- _____ 9. Parasitism is a relationship between two different kinds of organism in which one lives in or on the other and causes it harm.
- _____ 10. The organism that a parasite feeds on is called a host.
- _____ 11. Ticks, fleas, and leeches are examples of hosts.
- _____ 12. Parasites capture and kill their prey before eating it.

Skill Challenge

Skills: *classifying, defining*

Define the following terms. Write your answer in the space provided.

1. **mutualism:** _____

2. **commensalism:** _____

3. **predation:** _____

4. **parasitism:** _____

Relationships in an Ecosystem

Enrichment Activity for Lesson 12-5

Skills: *identifying, classifying*

PART A Complete the table by placing a check mark in the column that shows which type of relationship each of the following pairs of organisms have. Use reference materials if necessary.

Organism Pair	Mutualism	Commensalism	Parasitism
1. Shark and remora fish			
2. Clownfish and sea anemone			
3. Ticks and dog			
4. Spanish moss and tree			
5. Bee and flower			
6. Tapeworm and human			

PART B Classify each description as an example of mutualism, commensalism, predation, or parasitism by writing its letter in the correct column in the table below.

- | | |
|---|---|
| a. One organism kills and eats the other. | g. Both organisms benefit. |
| b. Organisms weaken or kill their hosts. | h. One organism lives on or in another organism causing harm. |
| c. Bees pollinate flowers as they collect nectar. | i. Wolves feed on caribou. |
| d. Orchids attach themselves to and grow on trees. | j. One organism benefits and the other is not affected. |
| e. Diseased or less fit members of a herd are caught and eaten. | k. Fleas feed on the blood of a pet dog. |
| f. Barnacles on a mussel shell | l. Lichen |

RELATIONSHIPS IN AN ECOSYSTEM			
1. Mutualism	2. Commensalism	3. Predation	4. Parasitism

PART C Answer the questions in the space provided.

- Which relationship makes survival of both organisms easier? _____
- In which relationship does one kind of organism feed on another? _____

12-6 What are adaptations?

Lesson Review

Complete the following.

1. What is an adaptation? _____

2. Why is your thumb considered an adaptation? _____

3. How is blubber an adaptation of a whale? _____

4. How are thick, leathery stems and spines adaptations of a cactus? _____

5. What is camouflage? _____

6. What is protective covering? _____

7. What is warning coloration? _____

8. What is mimicry? _____

Skill Challenge

Skills: applying definitions, classifying

Complete the table below by finding three examples of each kind of adaptation. You may use reference materials if necessary.

EXAMPLES OF ADAPTATIONS	
Adaptation	Examples
1. Camouflage	
2. Protective covering	
3. Warning coloration	
4. Mimicry	

12-7 What is the water cycle?

Lesson Review

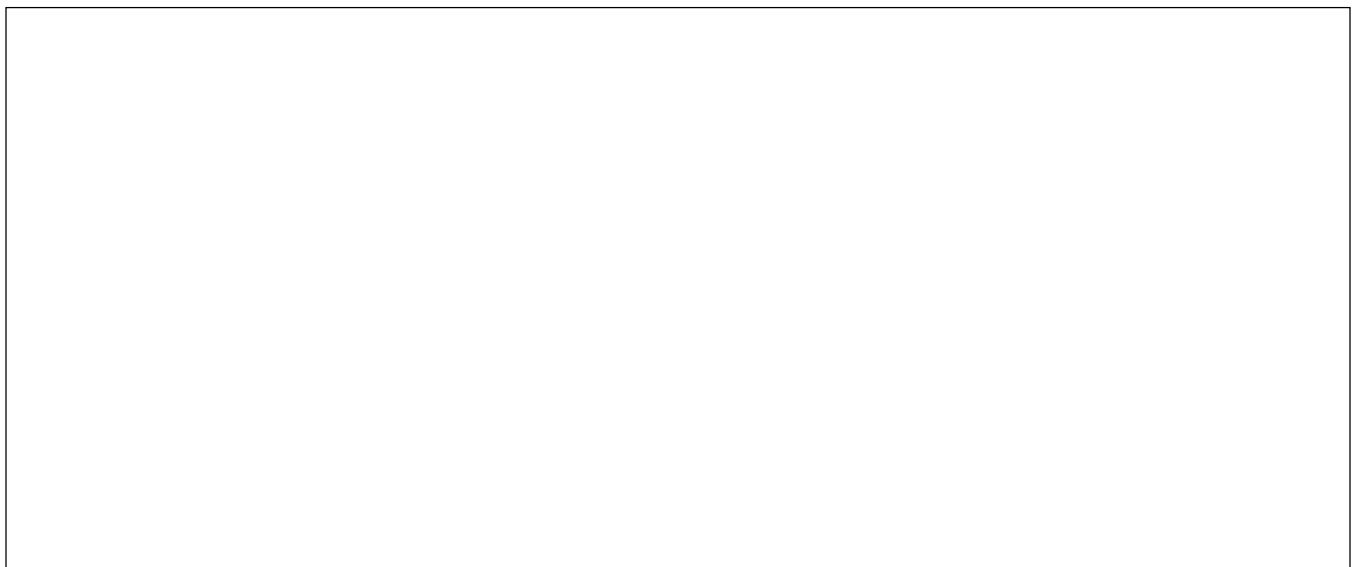
Circle the term that best completes each statement.

1. A (life / cycle) is something that happens over and over in the same way.
2. (Evaporation / The water cycle) is the repeated movement of water between Earth's surface and the atmosphere.
3. Evaporation, condensation, transpiration, and precipitation make up the (carbon cycle / water cycle).
4. A liquid changes to a gas in a process called (condensation / evaporation).
5. When liquid water from oceans, lakes, and other bodies of water absorbs heat energy from the Sun, it changes into (water vapor / oxygen).
6. Plants lose water through the stomata in their leaves in a process called (transpiration / condensation).
7. A gas changes to a liquid in a process called (evaporation / condensation).
8. When air containing water vapor rises, it (cools / freezes).
9. If water vapor loses enough heat, it changes back to a (gas / liquid).
10. Water that falls to Earth from the atmosphere is called (precipitation / evaporation).

Skill Challenge

Skills: *diagramming, applying definitions*

Draw and label the water cycle in the box below. Label each of the following parts of the cycle: *evaporation, runoff, condensation, precipitation, and groundwater*. Be sure to include arrows to show the flow of water through the cycle.



The Water Cycle

Enrichment Activity for Lesson 12-7

Skills: *identifying, relating, researching*

PART A List 5–7 activities you do daily that require water. Then, use reference materials to find the average amount of water in gallons that these activities use. Complete the table to show approximately how much water is used by your class, school, and city for each activity.

Activity Using Water	Water used in activity (gal)	Water used by class (gal)	Water used by school (gal)	Water used by city (gal)
1.				
2.				
3.				
4.				
5.				
6.				
7.				

PART B Complete the following.

1. Why is it important to conserve water? _____

2.
 - a. List some ways in which you could reduce the amount of water used in taking a shower. _____

 - b. List some ways in which you could reduce the amount of water used in brushing your teeth. _____

 - c. List some ways in which you could reduce the amount of water used in washing dishes by hand. _____

12-8 What is the carbon cycle?

Lesson Review

Complete the following.

1. What is the carbon cycle? _____

2. How do producers use carbon dioxide? _____
3. How is carbon dioxide released into the air by consumers? _____
4. What are fossil fuels? _____

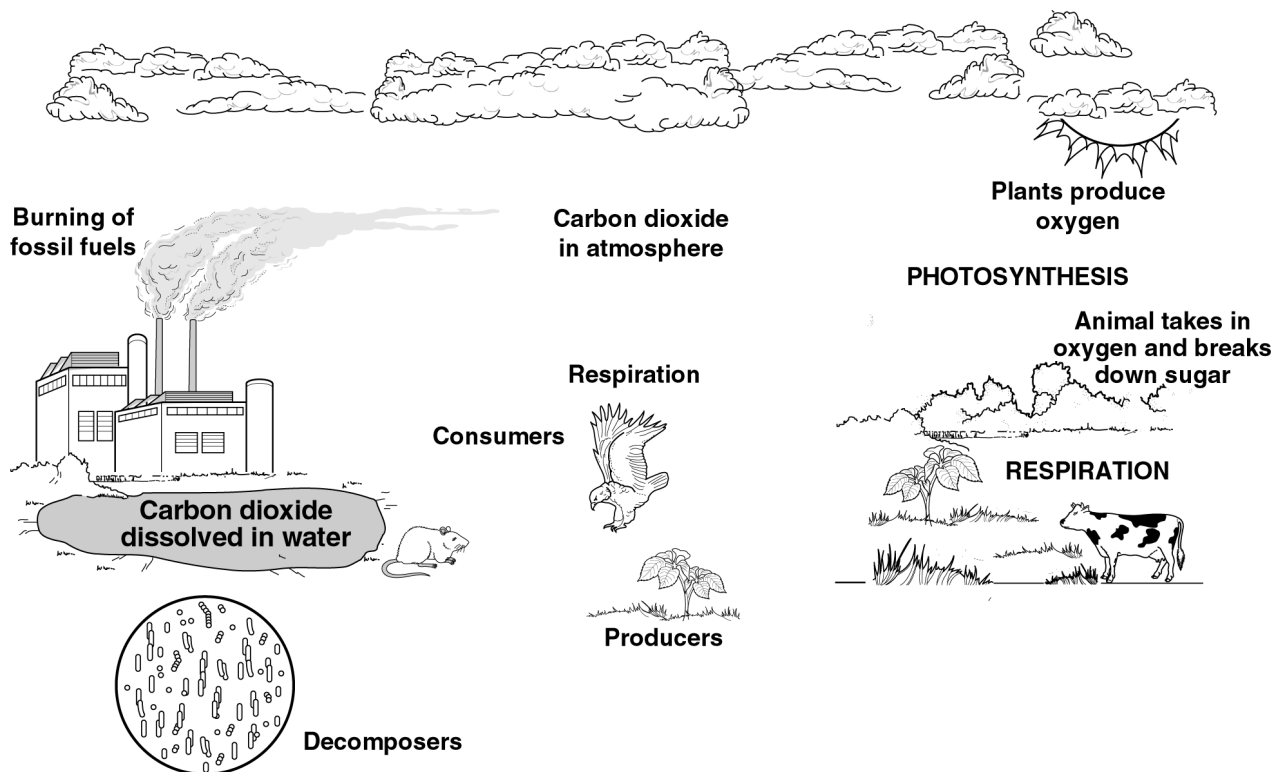
5. How do fossil fuels release carbon dioxide into the atmosphere? _____
6. Name three types of fossil fuels. _____
7. What led humans to burn more fossil fuels? _____
8. What is deforestation? _____

Skill Challenge

Skills: identifying, classifying, modeling

Draw arrows to show the direction of energy throughout the carbon cycle.

You may use your text if necessary.



12-9 What is the nitrogen cycle?

Lesson Review

Write *true* if the statement is true. If the statement is false, change the underlined term to make the statement true.

- _____ 1. About 87% of the atmosphere is made up of nitrogen gas.
- _____ 2. The process of combining nitrogen with other elements in order to make usable compounds is called the nitrogen cycle.
- _____ 3. Most nitrogen is transformed into usable compounds by nitrogen-fixing bacteria.
- _____ 4. In the nitrogen cycle, nitrogen gas is changed into a usable compound called lightning.
- _____ 5. Plants and animals use nitrogen compounds to build proteins and other complex substances.
- _____ 6. Animals get nitrogen by eating decomposers.
- _____ 7. Bacteria break down the nitrates and release oxygen.
- _____ 8. The nitrogen cycle is the using and reusing of nitrogen in an ecosystem.

Skill Challenge

Skills: *interpreting, classifying*

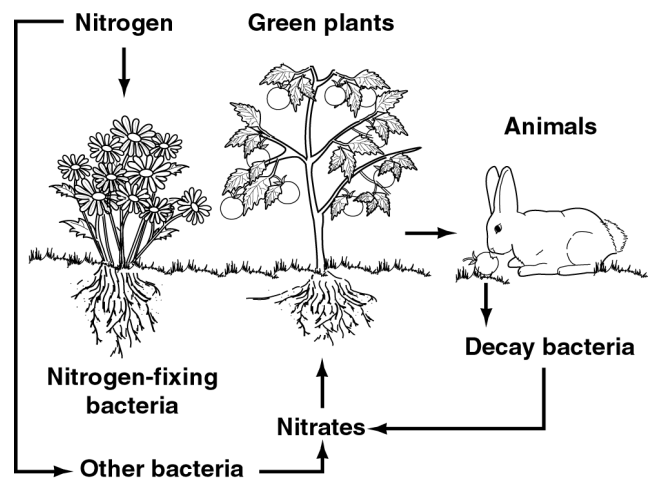
Study the diagrams. Then, answer the questions that follow.

1. What cycle is shown in the diagram? _____

2. Why do plants and animals need nitrogen?

3. What organisms change nitrogen into a form that can be used by plants? _____

4. How do animals get the nitrogen they need to make proteins? _____



12-10 What is balance in an ecosystem?

Lesson Review

Write the term that best completes each statement in the space provided.

- In a balanced environment, the _____ size of the populations remains the same over time.
- A change in only one population in an ecosystem can be _____ to the balance of the ecosystem.
- Harmful substances released into the environment are called _____.
- Harmful gases released from factories can pollute the _____.
- Living things that are in danger of becoming extinct are classified as _____.
- Volcanoes and forest fires are examples of _____ causes that can upset the balance in an environment.
- When people cut down forests and dig mines, they destroy the _____ of other organisms.

Skill Challenge

Skills: *classifying, researching*

Use reference materials to identify which organisms listed in the table are classified as endangered species. Write *yes* or *no* in the right-hand column to indicate whether the animal is considered endangered. Then, answer the questions that follow.

RECOGNIZING ENDANGERED SPECIES	
Organism	Endangered?
1. Gorilla	
2. Domestic cat	
3. Giant panda	
4. Black rhinoceros	
5. African elephant	
6. Bengal tiger	
7. Robin	
8. Whooping crane	
9. Cardinal	
10. Black bear	

- Why are some of the species listed in the table endangered? _____

- What can be done to help some of these endangered species? _____

THE **Big** IDEA

Integrating Earth Science

Chapter 12 How does Earth support life?

Lesson Review

Refer to the article, call outs, and Figure 12-29 on pages 300 and 301 of your text to complete the sentences below.

1. Water, carbon dioxide, and _____ move through nature in cycles.
2. _____ change nitrogen and turn it into usable compounds.
3. The _____ is a layer of gases that surround Earth.
4. The most common gas in the atmosphere is _____ .
5. All ecosystems together make up Earth's _____ .
6. The ground you walk on is part of Earth's _____ .

Skill Challenge

Skills: *inferring, analyzing*

Complete the following.

1. The oceans make up the largest component of the hydrosphere. How do the oceans help nourish life on Earth? _____

2. According to the Gaia hypothesis, Earth is a self-regulating superorganism. Describe one way in which Earth regulates itself. _____

3. What might happen if plants did not take in carbon dioxide and give off oxygen? _____

Science Log Writing Activity

Complete the Science Log on a separate sheet of paper. To complete the Big Idea Online, go to www.conceptsandchallenges.com. Follow the online instructions.