Name _____ Date _____ Class _____

CHAPTER 17 DIRECTED READING

# Ecosystems

## ▶ Section 17-1: What Is an Ecosystem?

### Organisms Interact with Each Other and Their Environment

*In the space provided, write the letter of the description that best matches the term or phrase.*

| | | |
|---|---|---|
| _____ | 1. ecology | a. the place where a population of a species lives |
| _____ | 2. habitat | b. a community and all of the physical aspects of its habitat |
| _____ | 3. community | c. the organisms living in a habitat |
| _____ | 4. ecosystem | d. the physical aspects of a habitat |
| _____ | 5. abiotic factors | e. the different species that live in a habitat |
| _____ | 6. biotic factors | f. the study of the interactions of living organisms with one another and with their physical environment |

### Ecosystems Support Diverse Communities

*Mark each statement below* T *if it is true or* F *if it is false.*

_____ 7. An ecosystem is defined by the organisms living in a particular area.

_____ 8. Biodiversity is a measure of how many different species live in an ecosystem.

_____ 9. A typical forest, 1 $km^2$ in area, has about 10 different species of organisms.

_____ 10. A typical forest, 1 $km^2$ in area, has about 1,000 individual organisms.

_____ 11. An ecosystem does not include microscopic organisms.

_____ 12. An ecosystem is completely isolated from organisms living outside of the ecosystem.

_____ 13. A small patch of farmland cannot be considered an ecosystem.

### Ecosystems Change over Time

*Read each question, and write your answer in the space provided.*

14. What is meant by the term *pioneer species*?

_____

_____

15. Explain the differences between succession, primary succession, and secondary succession.

16. Why is Glacier Bay, Alaska, an example of how ecosystems change over time?

## ▶ Section 17-2: Energy Flow in Ecosystems

### How Energy Moves Through Ecosystems

*In the space provided, explain how the terms in each pair differ in meaning.*

1. producers, consumers

2. trophic level, food chain

3. herbivores, carnivores

4. detritivores, decomposers

*Mark each statement below* T *if it is true or* F *if it is false.*

_____ **5.** Only a few organisms can digest cellulose.

_____ **6.** Omnivores eat both plants and animals.

_____ **7.** There are three trophic levels in every ecosystem.

_____ **8.** A food web consists of all the plants in an ecosystem.

_____ **9.** Humans use bacteria and other microorganisms to digest cellulose.

_____ **10.** The lowest level in the food chain is detritivores.

_____ **11.** Cows are herbivores and consumers.

_____ **12.** Humans are producers.

_____ **13.** Grass is a producer.

### Energy Is Lost in a Food Chain

*Complete each statement by writing the correct term or phrase in the space provided.*

**14.** At each trophic level, the energy stored is about _____ percent of that stored by the organisms in the level below.

**15.** A(n) _____ _____ is a diagram in which each trophic level is represented by a block.

**16.** _____ is the dry weight of tissue and other organic matter found in a specific ecosystem.

## ▶ Section 17-3: Ecosystems Cycle Materials

### Materials Cycle Between Living and Nonliving Things

*Read each question, and write your answer in the space provided.*

**1.** What are biogeochemical cycles?

_____

_____

_____

**2.** What are living and nonliving reservoirs?

_____

_____

_____

**3.** What are the most important substances that pass through biogeochemical cycles?

_____

## The Water Cycle Is Driven by the Sun

***Complete each statement by underlining the correct term or phrase in the brackets.***

4. In a tropical rain forest, most of the water in the atmosphere comes from [evaporation / transpiration].
5. Water that falls to the earth as rain or snow and seeps into the soil becomes [soil / ground] water.
6. In the living portion of the water cycle, water is taken up by [animals drinking / the roots of plants].
7. The process by which water evaporates from the leaves of plants is called [respiration / transpiration].

## The Carbon Cycle Is Linked to Energy

***Read each question, and write your answer in the space provided.***

8. How does carbon become part of organic molecules?

_____

_____

_____

9. List three ways carbon atoms return to the nonliving reservoir.

_____

_____

_____

## Plants and Bacteria Take Part in the Phosphorus and Nitrogen Cycles

***Complete each statement by writing the correct term or phrase in the space provided.***

10. Organisms need nitrogen and phosphorus to build _____ and _____ _____ .
11. Phosphorus is usually present as _____ _____ in soil and rock.
12. The process of combining nitrogen gas with hydrogen to form ammonia is called _____ _____ .
13. Nitrogen-fixing bacteria use _____ to split molecules of nitrogen gas and combine the nitrogen atoms with hydrogen.

Name _____ Date _____ Class _____

CHAPTER 18 DIRECTED READING

# Biological Communities

## ▶ Section 18-1: How Organisms Interact in Communities

### Species Evolve in Response to One Another

*In the space provided, explain how the terms in each pair differ in meaning.*

1. coevolution, secondary compounds

_____

_____

2. predation, parasitism

_____

_____

### Symbiotic Species Are Shaped by Long-Term Relationships

*Complete each statement by writing the correct term or phrase in the space provided.*

3. The evolution of flowering plants and the insects that transport their male gametes is an example of _____ .
4. The interaction between mosquitoes and human beings is called _____ .
5. The relationship between small insects called aphids and ants is called _____ .
6. The relationship between certain small tropical fishes and sea anemones is an example of _____ .
7. _____ means that two or more species live together in a close, long-term relationship.
8. A symbiotic relationship in which both participating species benefit is called _____ .
9. A symbiotic relationship in which one species is neither harmed nor helped is called _____ .

## ▶ Section 18-2: How Competition Shapes Communities

### Common Use of Scarce Resources Leads to Competition

*In the space provided, write the letter of the description that best matches the term or phrase.*

_____ 1. competition

_____ 2. niche

_____ 3. fundamental niche

_____ 4. realized niche

**a.** the functional role of a particular species in an ecosystem

**b.** the entire range of conditions an organism is potentially able to occupy

**c.** biological interaction in which two species use the same resources

**d.** the part of a fundamental niche that a species actually occupies

*Mark each statement below* T *if it is true or* F *if it is false.*

_____ 5. When species compete, there are fierce battles or fights between the species.

_____ 6. The niches of two organisms can never overlap.

_____ 7. The fundamental niche is smaller than the realized niche.

_____ 8. Organisms have different niches in order to reduce competition.

_____ 9. The niche of an organism includes the season in which it mates.

### Competition Can Limit How Species Use Resources

*Read each question, and write your answer in the space provided.*

**10.** What are the different niches of *Chthamalus stellatus* and *Semibalanus balanoides*?

**11.** What happened in Connell's experiment with the above barnacles?

**12.** Why was *Chthamalus* unable to compete with *Semibalanus* at the lower depths?

**13.** Why was *Semibalanus* unable to survive in shallow water?

### Competition Without Division of Resources Leads to Extinction

***Complete each statement by underlining the correct term or phrase in the brackets.***

14. In the experiments by G. F. Gause, *Paramecium* fed on [bacteria / culture].
15. The smaller species of *Paramecium* in the first experiment was [more / less] resistant to bacterial waste products.
16. The process by which the smaller species of *Paramecium* drove the larger species to extinction is called [survival of the fittest / competitive exclusion].
17. In the second experiment, *Paramecium caudatum* [coexisted with / eliminated] *Paramecium bursaris*.
18. *P. caudatum* and *P. bursaris* had [different niches / the same niche].

***Read each question, and write your answer in the space provided.***

19. In the studies of Robert Paine, why did eliminating sea stars cause the number of species to decrease?

_____

_____

20. What two aspects of a community does biodiversity measure?

_____

_____

21. What is the relationship between biodiversity and productivity?

_____

_____

## ▶ Section 18-3: Major Biological Communities

### Climate Largely Determines Where Species Live

***Complete each statement by writing the correct term or phrase in the space provided.***

1. _____ refers to the prevailing weather conditions in any given area.
2. The growing season of plants is primarily influenced by _____ .
3. The moisture-holding ability of air _____ when it is warmed and _____ when it is cooled.
4. A major biological community that occurs over a large area of land is called a(n) _____ .
5. In general, temperature and moisture _____ as distance from the equator _____ .

## There Are Seven Major Biomes

***In the space provided, write the letter of the description that best matches the term or phrase.***

_____ **6.** tropical rain forests

_____ **7.** deserts

_____ **8.** savannas

_____ **9.** temperate deciduous forests

_____ **10.** temperate grasslands

_____ **11.** taiga

_____ **12.** tundra

**a.** water is unavailable for most of the year because it is frozen

**b.** northern forests of coniferous trees

**c.** warm summers, cold winters, and sufficient precipitation

**d.** another name for prairie; contains deep and fertile soil

**e.** has the greatest number of species; has a very thin layer of soil

**f.** landscape has widely spaced trees; seasonal drought

**g.** vegetation is very sparse

## Aquatic Communities Are Linked to Terrestrial Communities

***Complete each statement by writing the correct term or phrase in the space provided.***

**13.** The shallow area of ponds and lakes, near the shore, is called the

_____ _____ .

**14.** The _____ _____ of lakes and ponds is away from the shore but close to the surface.

**15.** The _____ _____ is a deep-water zone that is below the limits of effective light.

**16.** Nearly three-fourths of the Earth's surface is covered by _____ .

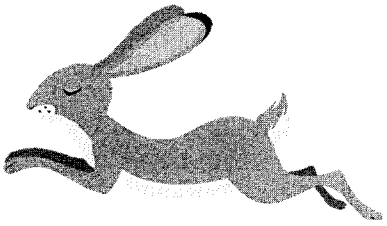
**17.** _____ are small organisms that drift in the upper waters of the ocean.

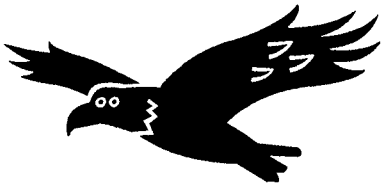
# Food Web Cut and Paste

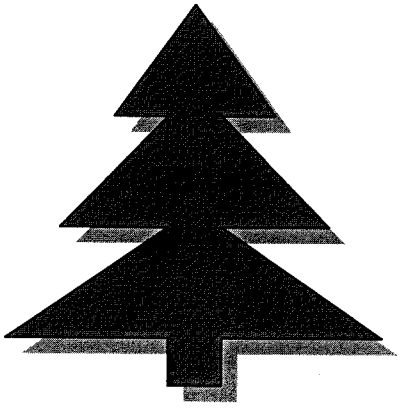
Make a food web on a separate piece of paper by cutting out each of the pictures below, gluing them onto a piece of paper, and drawing lines.

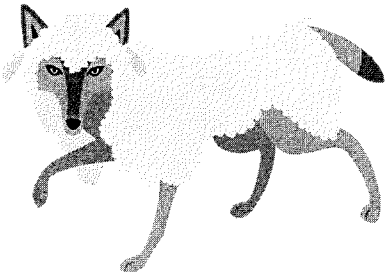
Use the following terms to label each of the pictures. Most pictures will be labeled with ***three*** terms.

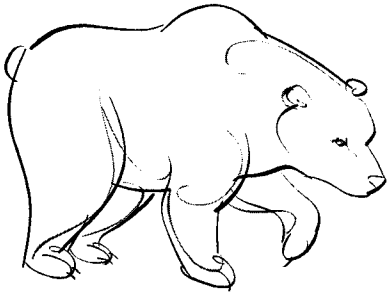
- ***Producer*** or ***consumer***
- ***Autotroph*** or ***heterotroph***
- ***Herbivore***, ***carnivore***, or ***omnivore***

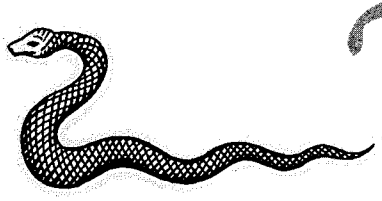


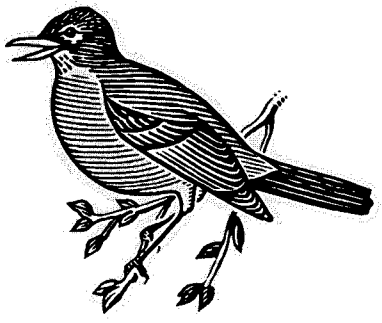


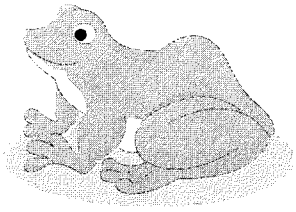




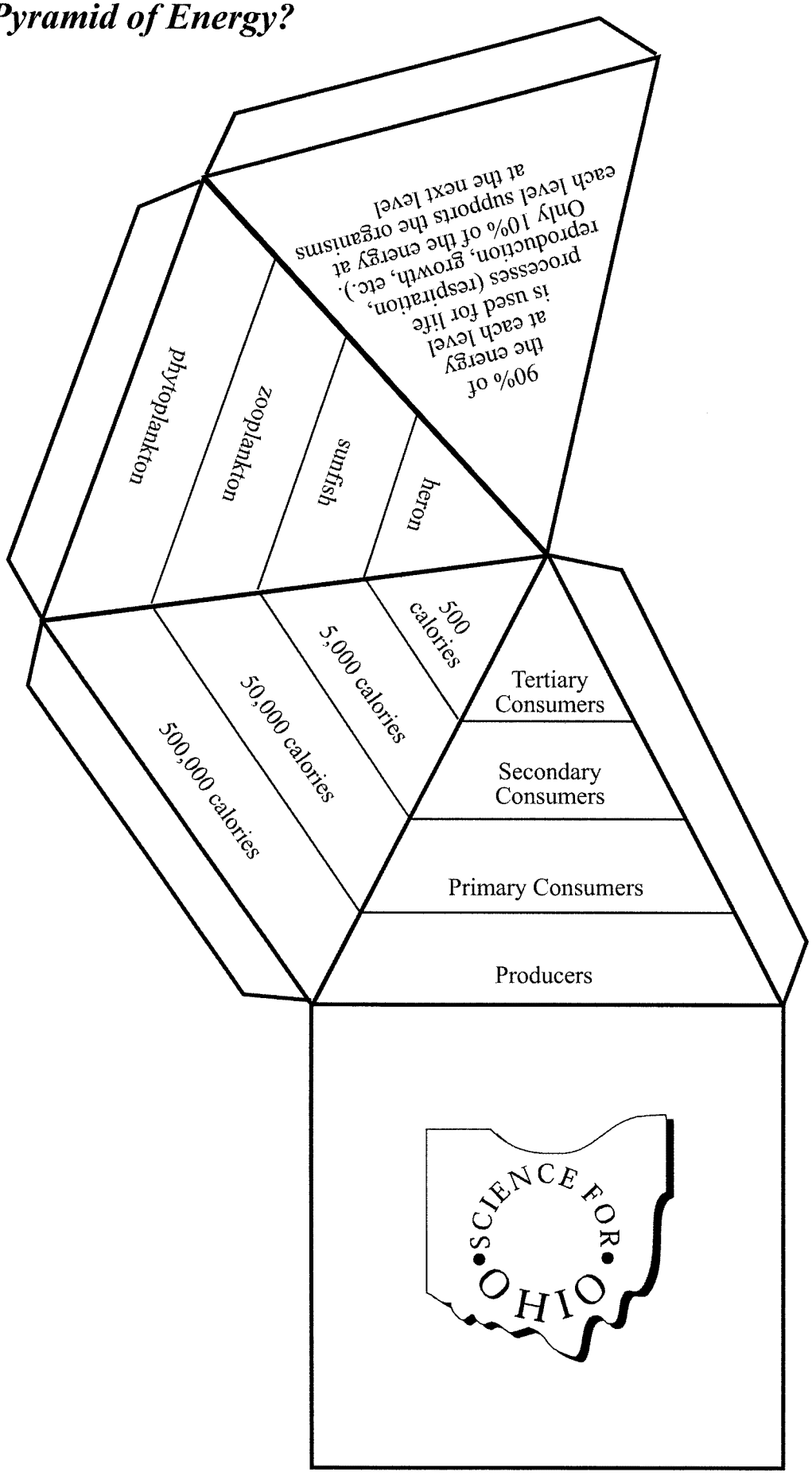








# *What is the Pyramid of Energy?*
# *3D Model*




Use this page with the ***Science for Ohio*** What is the Pyramid of Energy? Student Information Pages.