

# Lesson 8.4

# Cycling of Matter and Energy

Name \_\_\_\_\_

Date \_\_\_\_\_

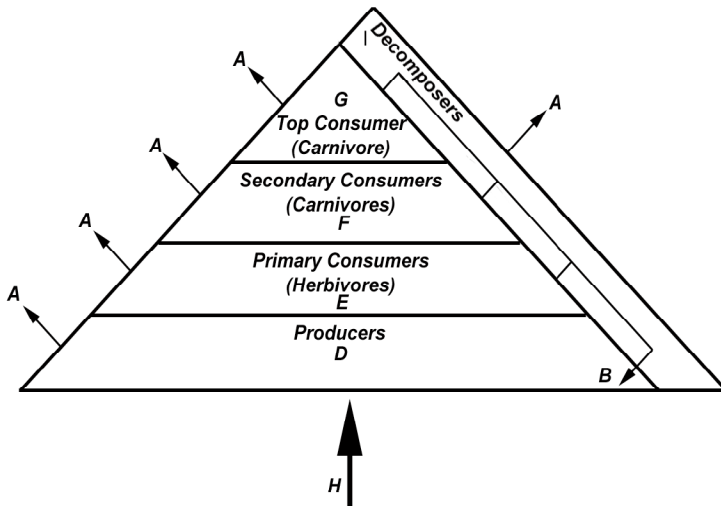
Period \_\_\_\_\_

### Key Terms










biomass

matter

### Engage



Match these items to their appropriate locations (A through I) on the diagram on the left.

Grass 	Mole 	Rabbit 	Mushroom 
1. _____	2. _____	3. _____	4. _____
Rattlesnake 	Red-Tailed Hawk 	Heat 	Matter (ex. Nitrogen)
5. _____	6. _____	7. _____	8. _____
Field Mouse 	Solar Energy 		
9. _____	10. _____		

11. Explain why this diagram is in the shape of a pyramid and not a series of stacked rectangles of equal size.

12. What happens to the matter obtained by the decomposers?

### Explore Text Essays

Respond to these questions. Use the indicated essays to support your responses.

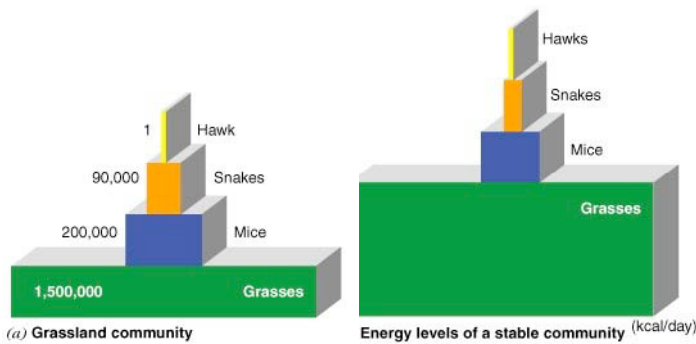
#### **Worms, Insects, Bacteria, and Fungi – Who needs them?**

13. How many bacteria can live in a single gram of soil?
14. How many earthworms can live in a 1.25 acre plot of topsoil?
15. What role do earthworms play in decomposition?
16. What are the two soil layers in a rainforest?
17. What happens to the rate of decomposition in colder environments?

#### **Losing Heat**

18. Each time an organism uses energy, it loses some of the energy in the form of \_\_\_\_\_.
19. What happens to the amount of energy available to higher trophic levels as organisms are consumed and digested?

20. What percent of the solar energy that falls on a community of producers is actually effectively trapped through photosynthesis?
21. If there are 8,000 kcals of stored biochemical energy in the producers of a community, what amount of energy would be stored in the top consumer in that community?
22. How many kilograms of plants are required to support 1kg of human biomass if the person eating is an herbivore?
23. How many kilograms of plants are required to support 1kg of human biomass if the person eating is a carnivore?



24. Use the diagrams to compare the amount of biomass (mass of organisms) at the bottom levels to higher levels.
25. Compare the amount of daily biochemical energy needed by all of the producers relative to all of the consumers.
26. If energy is transferred from one level of the diagram up to the next level through predation, why aren't the levels all of the same size?
27. Suppose an extremely dry season were to strike this grassland, eliminating 50% of the grass biomass. What affects would you predict would occur?



**Explain** Multiple Choice Practice

28. Which response best represents the biomass in a stable community?



**KEY:**  
**C** - carnivores  
**H** - herbivores  
**P** - producers

29. Which level of consumers contains the *largest percentage* of total stored energy?

- a) Algae
- b) Crustaceans
- c) Sunfish
- d) Great Blue Heron

30. Which level of the pyramid contains autotrophic organisms?

- a) Algae
- b) Crustaceans
- c) Sunfish
- d) Great Blue Heron

31. Which organism is a primary consumer?

- a) Algae
- b) Crustaceans
- c) Sunfish
- d) Great Blue Heron

32. If there is an increase in the number of Great Blue Herons, which other layer would experience a temporary increase in population?

- a) Algae
- b) Crustaceans
- c) Sunfish
- d) None of the above

