Name _____ Class _____ Date _____

4.2 Niches and Community Interactions

Lesson Objectives

- Define niche.
- Describe the role competition plays in shaping communities.
- Describe the role predation and herbivory play in shaping communities.
- Identify the three types of symbiotic relationships in nature.

Lesson Summary

The Niche Every species has its own tolerance, or range of conditions under which it can grow and reproduce. A species' tolerance determines its habitat, the place where it lives.

- A niche consists of all the physical and biological conditions in which a species lives and the way the species obtains what it needs to survive and reproduce.
- An organism's niche must contain all of the resources an organism needs to survive. A resource is any necessity of life, such as water, nutrients, light, food, or space.

Competition Competition occurs when organisms try to use the same limited resources.

- Direct competition between species often results in one species dying out. This is the basis of the competitive exclusion principle. This principle states that no two species can occupy exactly the same niche in exactly the same habitat at the same time.
- Competition helps to determine the number and type of species in a community.

Predation, Herbivory, and Keystone Species Predator-prey and herbivore-plant interactions help shape communities.

- Predation occurs when one organism (the predator) captures and eats another (the prey).
- Herbivory is an interaction that occurs when an animal (the herbivore) feeds on producers (such as plants).
- Sometimes changes in the population of a single species, often called a keystone species, can cause dramatic changes in the structure of a community.

Symbioses Symbiosis occurs when two species live closely together in one of three ways: mutualism, commensalism, or parasitism.

- In mutualism, both species benefit from the relationship.
- In parasitism, one species benefits by living in or on the other and the other is harmed.
- In commensalism, one species benefits and the other is neither helped nor harmed.

The Niche

1. What is a niche?

_____

_____

Name _____ Class _____ Date _____

2. Give an example of resources a squirrel might need.

_____

_____

3. Three different warbler species live in the same tree. One species feeds at the top of the tree, the second species feeds in the middle part of the tree, and the third species feeds at the bottom of the tree. Do all three species occupy the same niche? Explain.

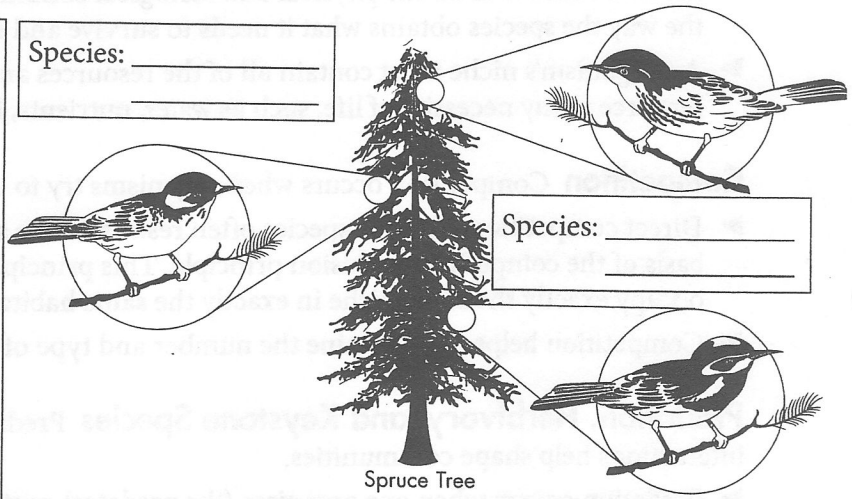
_____

_____

Competition

Use the information in the box about each warbler species to label the diagram below. Then, answer the questions that follow.

- The Cape May warbler feeds at the tips of branches near the top of a spruce tree.
- The bay-breasted warbler feeds in the middle part of a spruce tree.
- The yellow-rumped warbler feeds in the lower part of a spruce tree and at the bases of the middle branches.



4. Do these three species of warbler share the same niche? Explain.

_____

_____

_____

5. How does this diagram illustrate the principle of competitive exclusion?

_____

_____

_____

6. How might the Cape May warbler and the yellow-rumped warbler be affected if a disease struck the population of bay-breasted warblers and killed most of its individuals?

_____

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Name _____ Class _____ Date _____

7. For what abiotic resources might these three species compete? For what biotic resources might they compete?

_____

_____

_____

8. What might happen if a predator entered the community and began preying on the birds in the lowest branches?

_____

_____

_____

Predation, Herbivory, and Keystone Species

Write the letter of the correct answer on the line at the left.

_____ 9. A lion eating a zebra is an example of

A. herbivory.
C. predation.
B. habitat destruction.
D. a keystone species.

_____ 10. A cow eating grass is an example of

A. herbivory.
C. habitat destruction.
B. predation.
D. a keystone species.

_____ 11. A keystone species is one that

A. eats a mixture of plants and animals.
B. is introduced into a community after a major disturbance.
C. causes the amount of diversity in a community to decrease.
D. helps to stabilize the populations of other species in the community.

Symbioses

12. Complete the table about main classes of symbiotic relationships.

Main Classes of Symbiotic Relationships	
Class	**Description of Relationships**
Mutualism	
Commensalism	
Parasitism	

Name _____ Class _____ Date _____

Match the example with the type of relationship. A relationship type may be used more than once.

Example	Type of Relationship
_____ 13. a tick living on the body of a deer	A. mutualism
_____ 14. a bee eating a flower's nectar and picking up the flower's pollen	B. commensalism
_____ 15. a barnacle living on a whale's skin	C. parasitism
_____ 16. a tapeworm living in a person's intestines	
_____ 17. an aphid providing food to an ant in exchange for protection	

18. How do keystone species illustrate the interdependence of organisms living in a community? Give an example.