# 4.5 ECOSYSTEMS

The student will investigate and understand how plants and animals, including humans, in an ecosystem interact with one another and with the nonliving components in the ecosystem. Key concepts include

a. plant and animal adaptations;

b. organization of populations, communities, and ecosystems and how they interrelate;

c. flow of energy through food webs;

d. habitats and niches;

e. changes in an organism's niche at various stages in its life cycle; and

f. influences of human activity on ecosystems.

ADAPTATIONS

1. Which of these fish has a mouth shape that best allows it to find food hidden in the cracks of rocks and coral?
(2001 test – question 5)
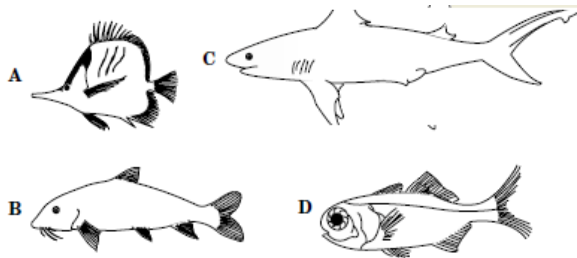
2. Bright and unusual fish markings can warn other fish to stay away. Which of these fish probably is the most dangerous to its predators?
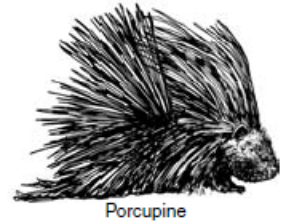(2002 test – question 33)
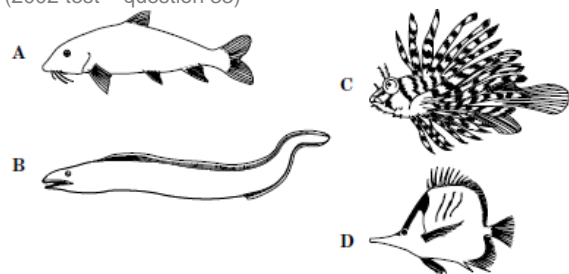
3. The picture shows some caddis fly larvae. These larvae cover themselves with small twigs and pebbles. What is the advantage of this behavior?
(2007 test – question 15)

a. They can eat the twigs.

b. They are hidden from predators.

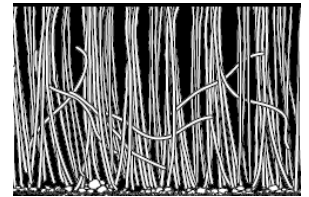c. They can crawl on the bottom of creeks.

d. They are able to keep warm.

4. A porcupine has sharp quills that protect it from predators. Which of these is a behavioral adaptation of porcupines that makes the quills more effective for protection?
(2006 test – question 1)

Porcupine

a. Using sharp teeth to cut twigs and leaves

b. Climbing to the very tops of trees to eat

c. Making an underground nest for young

d. Curling up into a ball when threatened

5. Blue whales have no teeth. Instead, they have rows of bristled strands that look like a broom, called baleen, which filters their food. Which sea creatures are their most common food?
(2006 test – question 30)

a. Seal and shark

b. Dolphin and porpoise

c. Turtle and penguin

d. Small fish and shrimp-sized krill

6. Barnacles and corals are two types of animals that live in the ocean. Both animals build a hard layer of calcium around their soft body parts. What is the most likely reason that they build these layers?
(2006 test – question 21)

a. Prepare them for reproduction

b. Protect them from predators

c. Help them capture food

d. Keep them from drying out

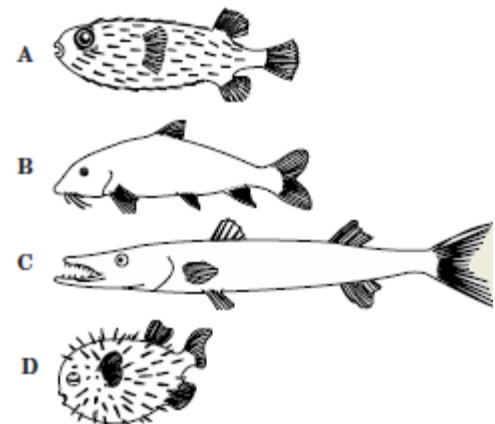7. The eyespots on this butterfly's wings allow it to —
(2003 test – question 34)

a. stay warm

b. locate nectar-filled flowers

c. fly away quickly

d. frighten or confuse enemies

8. Some fish have a streamlined body shape that allows them to move swiftly in the water. Which of these fish is probably the fastest?
(2004 test – question 35)

9. The great horned owl has a sharp beak and claws used for catching prey and tearing meat. It has good eyesight to see in low light. Which of these most likely describes the niche of the great horned owl?
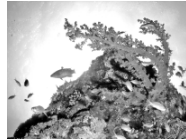(2011 test – question 7)

Great Horned Owl

   a. Hunts small animals at night
   b. Grazes on grass during the day
   c. Comes out at dusk to sweep the sky for insects
   d. Comes out at dawn to get worms from the ground

POPULATIONS, COMMUNITIES, ECOSYSTEMS-

10. Part of a coral reef is shown. A coral reef is —
(2010 test – question 19)

   a. a rock
   b. an ecosystem
   c. an ocean current
   d. an underwater cave

11. To a brook trout, a stream would be its —
(2005 test – question 21)

   a. niche
   b. habitat
   c. community
   d. population

12. To the blue crab, the open bay of the Chesapeake Bay region is its —
(2002 test – question 22)

   a. niche
   b. habitat
   c. community
   d. population

13. All of the populations of species in an area make up a —
(2011 test – question 25)

   a. region
   b. niche
   c. family
   d. community

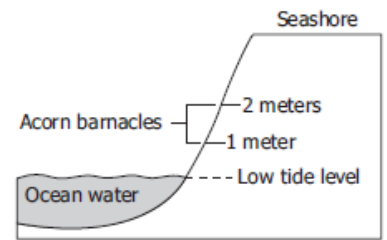14. A wild turkey's forest community includes —
(2009 test – question 40)

   a. insects
   b. rainfall
   c. soil
   d. wind

15. Acorn barnacles are seashore animals found on rocks. They live 1 to 2 meters above low-tide level. These rocks are the acorn barnacles' —
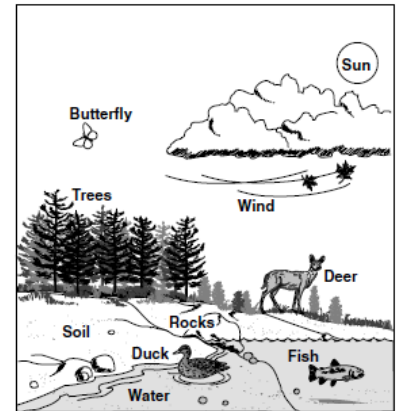(2011 test – question)

   a. ecosystem
   b. community
   c. food web
   d. habitat

16. Which of the following best describes the living and non-living parts of the diagram above?
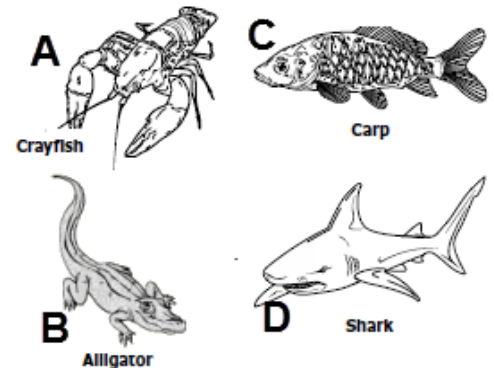(2001 test – question 10)

   a. A niche
   b. A community
   c. An ecosystem
   d. A biome

17. Which of these animals is least likely a member of the pond community?
(2010 test – question 7)

18. In a healthy ecosystem, many different species of animals may share the same habitat because they each have a different niche. An animal's niche is best described as —
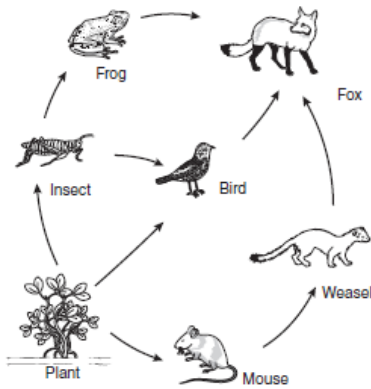(2006 test – question 17)

   a. the role it plays in its habitat
   b. where it is located
   c. its appearance
   d. its ability to reproduce

FOOD WEBS

19. Which of the following organisms provides energy for more than one organism in this food web?
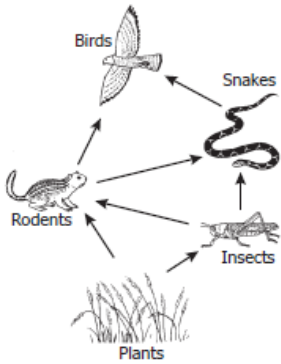(2007 test - question 33)

   a. Bird
   b. Plant
   c. Fox
   d. Mouse

20. Which shows one way that energy flows to birds in this food web?
(2008 test – question 32)

   a. Rodents → insects → birds
   b. Insects → plants → birds
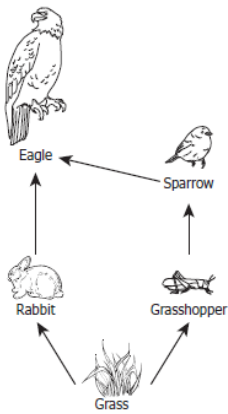   c. Snakes → rodents → birds
   d. Plants → rodents → birds

21. Based on the food web, which of these is a producer?
(2010 test – question 15)
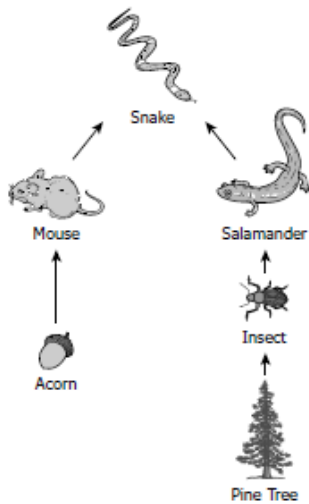

   e. Eagle
   f. Grass
   g. Rabbit
   h. Sparrow

22. Which describes energy through this food web?
(2010 test – question 14)


   a. Salamanders get energy from snakes and mice.
   b. Acorns get energy from insects and pine trees.
   c. Mice get energy from salamanders and insects.
   d. Snakes get energy from salamanders and mice.

23. In order for energy to flow through this food web from the sun to the yellow perch, the perch must —
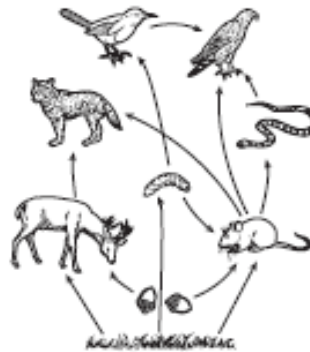(2004 test – question 27)

   a. live in warmer areas of its habitat
   b. eat pond grass and algae
   c. go through the process of photosynthesis
   d. eat the valve snail or the mosquito larva
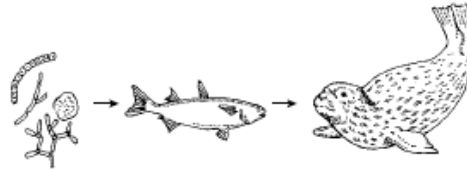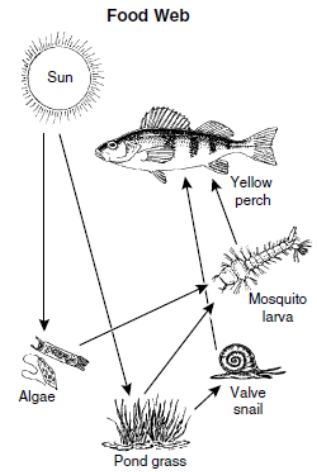
24. From where does the energy for this ocean food chain come?
(2002 test – question 15)

   a. Ocean waves
   b. The sun
   c. Whales
   d. Salt

25. In this food web, which two organisms could be harmed if the mouse population were to decline?
(2011 test – question 30)

   a. Deer and caterpillar
   b. Wolf and snake
   c. Oak and grass
   d. Hawk and songbird

26. All of these are consumers EXCEPT a —
(2005 test – question 6)

   a. butterfly
   b. wasp
   c. bullfrog
   d. tree

27. A bird that dies benefits a tree by providing it with —
(2005 test – question 22)

   a. minerals
   b. carbohydrates
   c. water
   d. oxygen

Characteristics of Types of Feeding

Carnivore	- Meat eaters - Live alone or in small groups - Preyed on only by other carnivores
Herbivore	- Strictly plant eaters - Can be large, hoofed mammals - Preyed on by carnivores
Omnivore	- Feed on both plants and animals - Can be both primary and secondary consumers in a food web

28. Based on this chart, which of these animals would be considered a herbivore?
(2006- question 14)
   a. Grizzly bear
   b. Deer
   c. Lion
   d. Human being

VIRGINIA RESOURCES

29. Which of these is an important natural resource of the Chesapeake Bay?
(2009 test – question 2)

A. Elk
B. Shellfish
C. Coal
D. Pine Trees

30. Which picture shows an animal that is most likely found in Virginia forests?
(2008 test - question 1)

31. Which of these animals is most likely to be found living and feeding on the forest floors of Virginia?
((2007 test - question 7)
   a. Bat
   b. Trout
   c. Deer mouse
   d. Golden eagle

HUMAN INFLUENCE

32. Today, which human activity is responsible for endangering the greatest number of land animal species?
(2001 test - question 30)
   a. Hunting for food and for sport
   b. Destruction of habitats
   c. Accidental starting of forest fires
   d. Cutting wildflowers in national parks

33. A strip of land is cleared of trees and bushes to make space for a power line. What impact might this have on bird living in the area?
(2003 test – question 12)
   a. The natural enemies of birds will be eliminated.
   b. Weather conditions may change.
   c. The rate of erosion will decrease.
   d. There will be less food and shelter.

34. Which of these is most likely harmful to an ecosystem?
(2009 test - question 21)
   a. Building new homes in a wetland
   b. Taking away airplanes from an airport
   c. Planting trees in an orchard
   d. Adding floors to an office building

35. Which of these natural resources is a source of lumber for home building?
(2003 test – question 40)
   a. Ores
   b. Coal
   c. Trees
   d. Grasses

36. Which of these is a way the people of Virginia can help restore a natural ecosystem?
(2010 test – question 24)
   a. Burn their trash
   b. Plant native plants
   c. Feed leftover meals to deer
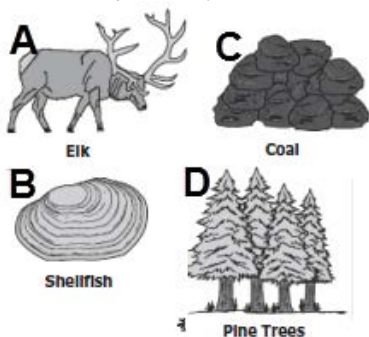   d. Drain automobile oil into the grass

37. Which of these human activities in a forest has a positive effect on the ecosystem?
(2011 test – question 23)
   a. Clearing the land to build new homes
   b. Planting new trees where old ones were cut down
   c. Building a new highway through the area
   d. Cutting down trees to make farmland