

Name _____

Date _____

Chapter 11-1: Ecological Communities

Ecology is the study of the relationships of organisms to their environment and each other. The term ecology is derived from the Greek word *oikos*, meaning "a house or place where one lives," and *logos*, meaning "study of."

Ecologists study assemblages of interacting organisms known as communities. They categorize organisms within communities according to their source of food. In this plate, we will examine two communities to identify their trophic levels and which organisms exist within them.

Looking over the plate you will notice that we are examining an aquatic (water) community as well as a terrestrial (land) community. We examine four trophic levels within each to show the various organisms that make up this ecological assemblage. Examine the first trophic level, at the top of the plate.

A community is the set of all populations inhabiting a certain area. The area a community encompasses can be very small, such as a small puddle of water, or it may be very large, encompassing hundreds of square miles.

The first trophic level in the community is made up of organisms known as **producers (A)**. Producers obtain their food by synthesizing it from inorganic matter through photosynthesis. In the aquatic community you see in the plate, the producers are microscopic marine organisms known as **phytoplankton (A₁)**. The group of phytoplankton includes diatoms, dinoflagellates, and cyanobacteria (blue-green algae). Living in enormous numbers in ocean communities, phytoplankton trap sunlight and produce carbohydrates for food.

In the terrestrial community, the producers are **grass plants (A₂)**. Grasses of all types and climates engage in photosynthesis. The number of organisms is the highest at the producer's trophic level; for instance, if the biomasses (the entire mass of biological material) of each of the trophic levels were graphed with producers at the bottom, the resulting structure would be pyramidal in shape.

We have examined the producers in aquatic and terrestrial communities, and we now move to the trophic level of consumers. Photosynthesis does not occur in these organisms, and so they consume producers to obtain energy. Continue your coloring as you read the paragraphs below.

The next level in the aquatic and terrestrial communities includes the **primary consumers (B)**, which use the producers as food. In the plate, we show **zooplankton (B₁)** in the aquatic community. Zooplankton are tiny, microscopic animals and animal-like organisms that use phytoplankton as food. In the terrestrial community, primary consumers are represented by an **insect (B₂)**. This organism consumes grasses and other green plants. The biomass of primary consumers in a community is less than the biomass of producers.

The next trophic level is made up of **secondary consumers (C)**. An example of a secondary consumer is a small fish, a **perch (C₁)**. This fish eats zooplankton and invertebrates such as worms and tiny insects. In the terrestrial environment, the insect is consumed by a **small bird (C₂)**. By consuming the insect, this secondary consumer obtains proteins, carbohydrates, and fats to fulfill its nutritional needs. The biomass of secondary consumers is generally smaller than that of the primary consumers.

We conclude our examination of the trophic levels in a community by examining the final trophic level, the **tertiary consumer**. You should note that the animals have become larger and less numerous at each trophic level.

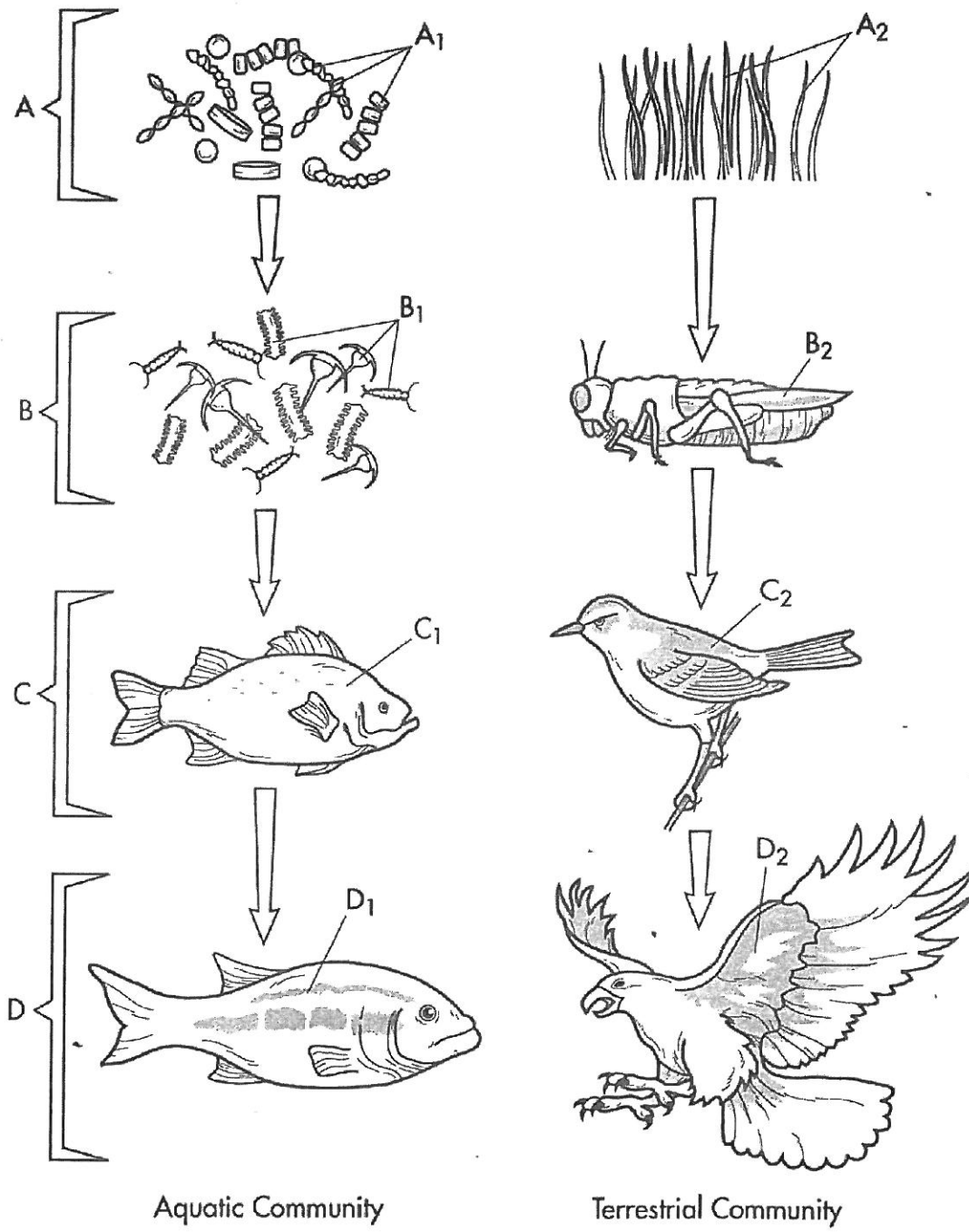
The highest trophic level is occupied by the **tertiary consumer (D)**. In the aquatic environment, one tertiary consumer is a large fish such as the **bas (D₁)**. It consumes the perch and other small fish to fulfill its nutritional needs. In the terrestrial community, the **hawk (D₂)** preys on small birds to obtain its nourishment. The number of tertiary consumers is lowest of all trophic levels. Humans are an example of other tertiary consumers in the terrestrial environment.

Consumers that feed only on green plants are herbivores, while those that feed on other animals are called carnivores; secondary and tertiary consumers are usually carnivores. Omnivores eat both plants and animals.

One type of consumer that was not considered here is the decomposer. Decomposers such as bacteria and fungi process and consume the remains of animals and plants and are critical to elemental cycles in the soil.

Name _____

Ecological Communities

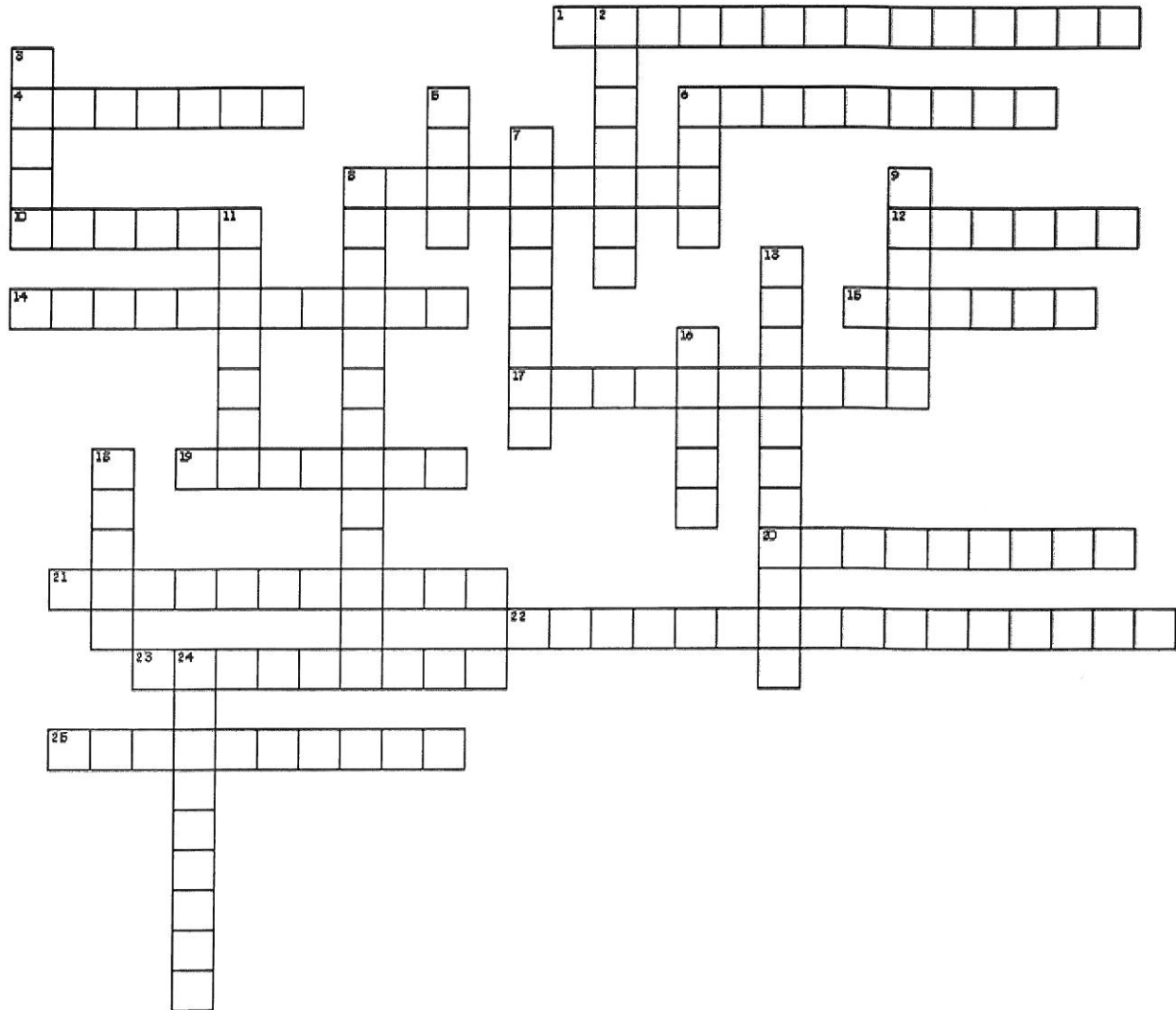


- | Ecological Communities | | |
|---|---|---|
| <input type="radio"/> Producers.....A | <input type="radio"/> ZooplanktonB ₁ | <input type="radio"/> Small Bird.....C ₂ |
| <input type="radio"/> PhytoplanktonA ₁ | <input type="radio"/> Insect.....B ₂ | <input type="radio"/> Tertiary ConsumersD |
| <input type="radio"/> Grass PlantsA ₂ | <input type="radio"/> Secondary Consumers....C | <input type="radio"/> BassD ₁ |
| <input type="radio"/> Primary Consumers.....B | <input type="radio"/> PerchC ₁ | <input type="radio"/> HawkD ₂ |

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Read chapter 11-1 Ecologic Communities then answer the puzzle below.



Across

1. Producers obtain their food by synthesizing it from inorganic matter through this process
4. The study of the relationships of organisms to their environment and each other.
6. The entire mass of biological material
8. The first trophic level in the community
10. An example of other tertiary consumers in the terrestrial environment.
12. The number of tertiary consumers is _____ of all trophic levels.
14. These are tiny, microscopic animals and animal-like organisms that use phytoplankton as food.
15. In the terrestrial community, primary consumers are represented by an _____(B2).
17. Consumers that feed only on green plants are herbivores
19. The _____ consumers are the next level in the aquatic and terrestrial communities. They use the producers as food.
20. In the terrestrial environment, the insect is consumed by a _____.
21. Assemblages of interacting organisms
22. The highest trophic level
23. The set of all populations inhabiting a certain area

25. Consumers that feed on other animals

Down

2. The number of organisms is the _____ at the producer's trophic level.
3. An example of a secondary consumer is a small fish which eats zooplankton and invertebrates such as worms and tiny insects.
5. Scientists categorize organisms within communities according to their source of _____.
6. A tertiary consumer in the aquatic environment (D1)
7. Phytoplankton trap this to produce carbohydrates for food.
8. Microscopic marine organisms
9. Major producers in the terrestrial community
11. The biomass of secondary consumers is generally _____ than that of the primary consumers.
13. These consume the remains of animals and plants and are critical to elemental cycles in the soil.
16. The Greek word which means "a house or place where one lives,"
18. The Greek word which means "study of."
24. Consumers that eat both plants and animals