

THE ANSWERS

Checking Concepts

1. The relationship between the biosphere, a biome, and an ecosystem is that ecosystems make up biomes and biomes make up the biosphere.
2. (a) Three factors that influence the characteristics of biomes are temperature, precipitation, and elevation. Students may also list latitude, ocean currents, and soil.
(b) Warmer temperatures and more rainfall exist closer to the equator. Temperature drops with increasing elevation. There is more precipitation on the windward side of mountains. Accept all reasonable answers.
3. The two factors that are the most important for determining a region's climate are temperature and precipitation.
4. A climatograph is a graph of climate data for a specific region based on data for many years and includes precipitation and temperature data.
5. Adaptations are characteristics that enable organisms to better survive and reproduce.
6. The difference between a structural adaptation and a behavioural adaptation is that a structural adaptation is a physical feature of the organism that contributes to the survival of the organism. For example, the Arctic fox has thick fur. A behavioural adaptation is what the organism does to survive unique conditions. For example, bears hibernate in winter to withstand the cold.
7. Temperate rainforest biomes are usually found along the coasts of continents because mountain ranges are often found near coastlines and the ocean winds drop moisture on the windward sides of mountains.
8. There are few trees in the grassland biome because fire and grazing kill seedlings and rainfall is limited.
9. Temperature decreases with elevation, and precipitation is higher on the windward side of the mountain. The leeward side receives much less precipitation.
10. At the top of a mountain, you may find a polar ice, tundra, or boreal forest biome depending on the elevation.
11. Three abiotic components of an ecosystem are light availability, water availability, and nutrient availability. Light and water are required for photosynthesis. Water is required for chemical reactions to occur in plants and animals and to transport nutrients. Nutrients are required for plant growth.
12. Ecological hierarchy is the order of biotic interactions from organism to population to community to ecosystem.
13. In mutualism, both organisms benefit from the interaction. In commensalism, one organism benefits while the other organism does not benefit nor is it harmed.
14. In parasitism, one species benefits and the other is harmed but usually not killed. In predation, one organism benefits and the other organism is often killed as the predator eats all or part of the organism.
15. Prey animals have adaptations such as spines, hard shells, and camouflage or look like other harmful organisms to avoid being eaten.

Understanding Key Ideas

16. If a plant were moved from a wetland to a desert, it would probably not survive because it would not have the right type of root system to absorb limited amounts of water. Also, the leaves would not be adapted for dry conditions and too much water would be lost through the leaves.
17. Biomes are often classified according to their plant species rather than by the animals that live in the biome because plants are established before the animals. Certain animals depend on particular plant species for their survival (food and habitat), so it is the plants that determine the animal life.
18. Hot desert ecosystems can exist on every continent on Earth except Antarctica because high temperatures and little rainfall exist at latitudes around 30° north and south.
19. Symbiotic relationships are part of an organism's niche because these relationships describe the interactions with other plant and animal species in the ecosystem.
20. If the host is killed in a parasitic relationship, the parasite would die because it depends on the host as an energy and nutrient source.
21. Competition can affect the health of an organism and its ability to reproduce because energy is used to compete against other organisms.
22. The size of the prey population will grow when there are few predators and shrink when the predator population becomes higher.
23. 1-C boreal forest
2-A tropical rainforest
3-F grassland
4-G desert
5-D temperate deciduous forest
6-B temperate rainforest
7-E tundra
8-H permanent (polar) ice

Applying Your Understanding

24. (a) The symbiotic relationship between a marmot and raccoon is an example of commensalism.
(b) The marmot is primarily a herbivore but since it occasionally eats insects it would be considered an omnivore.