**Section 1: What Is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?**

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**Key Ideas**

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| http://my.hrw.com/sh2/sh07_10/student/images/common/chevron_bio.gif | What are the parts of an ecosystem? |
| http://my.hrw.com/sh2/sh07_10/student/images/common/chevron_bio.gif | How does an ecosystem \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to change? |
| http://my.hrw.com/sh2/sh07_10/student/images/common/chevron_bio.gif | What two key factors of climate determine a biome? |
| http://my.hrw.com/sh2/sh07_10/student/images/common/chevron_bio.gif | What are the three major groups of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_biomes? |
| http://my.hrw.com/sh2/sh07_10/student/images/common/chevron_bio.gif | What are the four kinds of aquatic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_? |

**Why It Matters**

Ecosystems are important units of the natural world. Humans are part of ecosystems and depend on ecosystems for food and many products. Without healthy ecosystems, humans would be in trouble!

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When you walk through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, you see many different organisms. There are trees, birds, ants, mushrooms, and much more. You may not see many of these organisms interact. But all organisms, including humans, that live together are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Ecosystems**

A species never lives alone. A group of various species that live in the same place and interact with one another is called a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****.** The group, along with the living and nonliving environment, make up an **ecosystem****.**  **An ecosystem includes a community of organisms and** **their physical environment.**

**Community of** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_A community of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a web of relationships. One relationship is that of a predator eating its prey. For example, some fish eat spiders, as **Figure 1** shows. Some \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_help each other. For example, some bacteria fix nitrogen into a form that plants can use to grow. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_between organisms are examples of biotic factors that affect an ecosystem. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_describes living factors in an ecosystem. Biotic factors also include once-living things, such as dead organisms and the waste of organisms.

**Physical Factors** The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_or nonliving factors of an environment are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*factors*. Examples of abiotic factors are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, water, rocks, sand, sunlight, temperature, and climate. These physical factors shape organisms. For example, plants and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in deserts are small because deserts do not have enough water to support large organisms. Water supply also affects the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of individuals and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of species that an ecosystem can support. A crop of corn will have a higher yield in a wetter habitat than in a drier habitat. A **habitat** is the place where an organism lives.

**Biodiversity** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_you counted the various species in a pine forest. Then, you counted the number of species in a tropical rain forest. Do you think the number of species in each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_would be the same? No, a tropical rain forest has many more species than a pine forest does. The variety of organisms in a given area is called **biodiversity****.**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_factors can have a big influence on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. In places that have very high or very low temperatures, biodiversity is often lower. Limited water and food also cause lower biodiversity. The biodiversity of habitats and ecosystems varies greatly. The vast expanse of the open ocean has very low biodiversity. In contrast, rain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and coral reefs have very high \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When ecosystems have high biodiversity, they are often more able to resist damage. Damage to ecosystems can be caused by severe weather events or human activities. Systems with low biodiversity can be severely damaged easily. When biodiversity \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in any ecosystem, that ecosystem is not as healthy as it could be.

**Succession**

When we observe an ecosystem, it may look like an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_feature of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. However, all ecosystems change. As an ecosystem changes, the kinds of species that the ecosystem supports change. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of one community by another at a single place over a period of time is called **succession****.**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**in an Ecosystem** When a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_forms a new island or a fire burns the vegetation of an area, new opportunities are made for organisms. The first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to appear in a newly made habitat are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*species*. Pioneer species are often small, fast-growing plants that reproduce quickly. They change the habitat in such a way that other species can live in the ecosystem. For example, pioneer species such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and mosses will break \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_volcanic rock on a new island to help form soil. Other species can then grow on the soil. For example, after lichens and mosses have formed soil, grasses and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_may then cover a volcanic island. Even later, shrubs and trees often outcompete and replace the grass. Then, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_turns into a forest. **Figure 2** shows an example of succession in response to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of a glacier.

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| succession |

**Figure 2** At Glacier Bay in Alaska, a receding glacier makes succession possible.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_If a major disruption strikes a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, many of the organisms may be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_out. But the ecosystem reacts to the change.   **An ecosystem responds to change in such a way that the** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**is restored to equilibrium.** When a tree falls down in a rain forest, for example, the newly vacant patch proceeds through succession until the patch returns to its original state. Sometimes, the ecosystem will find an equilibrium in which different species dominate after a change. In the grasslands of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, for example, weather conditions can lead to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When there is a lot of rain in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, one species of grass dominates the savanna. But when conditions are drier, a drought-resistant species of grass will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Major Biological Communities**

If you drive across the United \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, you notice a change in the kinds of plants and animals. The kinds of species that live in a particular place are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_partly by climate. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is the average weather conditions in an area over a long period of time. At places near the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Pole, you may see polar bears. Polar bears have thick, white fur and insulating fat that keep them warm on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_tundra. The same adaptations that help polar bears in the tundra would hurt polar bears in a tropical forest. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_bears must live in a biome to which they are adapted. A **biome** is a large region characterized by a specific kind of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and certain kinds of plant and animal communities.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**key factors of climate that determine biomes are temperature and** **precipitation.** Most organisms are adapted to live within a particular range of temperatures and cannot survive at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_too far above or below that range. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_also determines the kinds of species that are found in a biome. In biomes where precipitation is low, for example, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is made up mostly of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_that need little water, such as cactuses.

**Terrestrial** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

There are many different biomes on land.  **Earth’s major terrestrial** **biomes can be grouped by latitude into** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, temperate, and** **high-latitude biomes.** As **Figure 3** shows, tropical biomes are generally near the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. For the most part, temperate biomes are between 30º and 60º latitude. High-latitude biomes are at latitudes 60º and higher. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_affects the amount of solar energy that a biome receives and thus affects a biome’s temperature range.

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| Major biological communities |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**Biomes** Because they are located at low \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_near the equator, all tropical biomes are warm. However, each tropical biome receives a different amount of rain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*rain forests* receive large amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and are warm all year. They have the greatest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of any land biome. At least half of Earth’s species of land organisms live in tropical rain forests. *Savannas* are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_grasslands. They get less rain than tropical rain forests do. Savannas also have long dry seasons and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_wet seasons. The most wellknown savannas are in eastern Africa, where zebras, giraffes, lions, and elephants roam the grasslands. *Tropical deserts* get very little rain. Because the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_have less water, they have fewer plants and animals than other biomes do.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**Biomes** Biomes at mid-latitudes have a wide range of temperatures throughout the year. *Temperate grasslands* have moderate precipitation and cooler temperatures than savannas do. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_grasslands are often highly productive when used for agriculture. Herds of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_animals, like bison, used to live on the temperate grasslands of North America. *Temperate forests* grow in mild \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_that receive plenty of rain. Trees of the temperate deciduous forests shed their leaves in the fall because of the cold winters. Trees of temperate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_forests do not lose their leaves or needles during the winter. Temperate forests are home to deer, bears, beavers, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Like tropical deserts, *temperate deserts* receive little precipitation. However, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_tropical deserts, temperate deserts have a wide temperature range throughout the year.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Biomes** Biomes at high latitudes have cold \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Coniferous forests in cold, wet climates are called *taiga*. Winters are long and cold. Most of the precipitation falls in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Moose, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and bears live in the taiga. The *tundra* gets very little rain, so plants are short. Much of the water in the soil is not available because the water is frozen for most of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Foxes, lemmings, owls, and caribous live in the tundra.

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**Aquatic Ecosystems**

The diverse regions in the world’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of water are not usually called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. They are often called *aquatic ecosystems*.  **Aquaticecosystems are organized into freshwater** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, wetlands, estuaries,** **and marine ecosystems.**

*Freshwater* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_are located in bodies of fresh water, such as lakes, ponds, and rivers. These ecosystems have a variety of plants, fish, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, mollusks, and other invertebrates.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_provide a link between the land and fully aquatic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Water-loving plants dominate wetlands. This ecosystem supports many species of birds, fishes, and plants, as shown in **Figure 4.** Wetlands are important because they moderate flooding and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the water that flows through them.

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| Bayou and coral reef |