

Biomes: What and Who Lives Where?

Essential Question;

What are some animal and plant species that live in each biome?

At a Glance: Learners discover facts about different biomes by matching organisms with their biome.

Background Information:

Biomes are defined as a large geographical area with distinctive plant and animal groups that are adapted to that biome-habitat. Climate and geography determines what type of biome exists in each part of the world. The major biomes include: Rainforest, Tundra, Taiga, Deciduous Temperate forest, Desert, Chaparral, Grassland, Freshwater, and Marine.

The plant and animal species that live in each biome have special adaptations that help them survive the conditions of that biome. Many species are endemic to certain biomes, meaning they only exist in that biome and nowhere else. Some species are able to adapt to a wider variety of climatic and geographic influences.

Many of the species in the biomes depend upon each other; therefore protection of global biodiversity is very important. The variety of habitats provided by each biome supports the biodiversity of animal and plant species. One biome that is threatened is the Grassland biome. This ecosystem is threatened mainly by urbanization, but also from lack of fire. Fire control has become a problem in many ecosystems, as many plant species require fire to set seed and fire helps to keep other unwanted plant species from taking over. Buffalo have been affected by the loss of the Grassland ecosystem. Though other factors have impacted buffalo populations, conserving habitat is an integral part of protecting biodiversity.

Getting Ready: Print cards for the Biome Game in color on cardstock . They will last longer if laminated.

Procedure:

1. Pass out a card to each learner. Each card has a biome, animal or plant on it. There are 27 cards total. Have learners pair up, if your club has more than 27 learners.
2. Ask the learners with a card with a biome on it to come to the front of the classroom or outdoor area. The cards with biomes include: Tundra, Taiga, Rainforest, Grasslands, Deciduous Temperate forest, Desert, Chaparral, Freshwater, and Marine Biomes.
3. Have everyone read their card to themselves, silently.
4. Have the learners with biome cards read their descriptions aloud for everyone to hear.
5. The learners with animal and plant cards should try to match their species to a biome using the description. They may go to the learner with the biome card and ask to look at it again, if they need help.

Location: classroom or outdoors

Objectives: *Learners will*

- 1) identify Earth's major biomes.
- 2) name animal and plant species that live in each biome.

Skills: communication, matching, teamwork

Supplies:

- Biome cards
- Animal cards
- Plant cards
- World map (optional)

Subjects: science

Time: 10 minutes

6. Once learners have decided which biome their plant or animal species belongs to, they are to stand behind the person representing that biome.
7. Have each learner read their card aloud and state which biome they think it belongs to. Ask the class if they agree.

Discussion/Assessment:

What adaptations does each species need to survive in its biome-habitat?

What are some other animals that you think may live in each biome?

Why is it important to protect biodiversity in each biome?

How does the biodiversity and the interdependence of species impact biome/ecosystem health?

Rainforest: There are two types of rainforests, Tropical and Temperate, both having high amounts of rainfall. Tropical rainforests have the highest biodiversity in the world. This means that there are many different types of plants and animals in the same area. Tropical rainforests are located around the equator in places such as Brazil and Cameroon. Temperate rainforests have high rainfall like tropical rainforests, but temperate rainforests have cooler temperatures. They are found in the mountains along coasts such as in the Pacific Northwest and areas of the Appalachian forests of the United States.

Tundra: The tundra biome is found around the Arctic Circle in the northern hemisphere and on the tops of very high mountains. It is also found in the southern hemisphere in Antarctica. The tundra is the coldest and driest of Earth's biomes. This ecosystem is special because the ground is permanently frozen. This is called permafrost. Plants and microorganisms grow and reproduce during the short summers when the soil thaws for a brief time. The types of plants that can survive here include shrubs, sedges, mosses, lichens, grasses, and some flowering or herbaceous plants. There are only 48 known species of land mammals that live in the tundra biome.

Taiga: This biome is made up of coniferous forests and is the largest of all the land biomes. These forests contain evergreen trees that have needles, such as hemlock, firs or spruces. The taiga is located in the northern part of the world throughout Canada, Asia, and parts of Europe. The winters are very cold here. The summers are very sunny, but temperatures rarely climb above 50°F.

Desert: The desert biome is extremely dry and extremely hot. Only plants and animals that can adapt to these conditions will survive in this environment. Deserts can be found all over the world - in Asia, Africa, the Middle East and North America. The Chihuahuan and Sonoran Deserts cover parts of the southwestern U.S. and Mexico.

Temperate Deciduous Forest: The southeastern United States is part of the temperate deciduous forest biome. The climate in this area has four distinct seasons. The trees living in this biome are adapted to these changing seasons. In autumn, the leaves of some trees change colors and then fall off. This helps the trees survive through winter. In the spring, new leaves and flowers grow.

Grasslands: This biome is found on every continent except Antarctica. There is enough rainfall to support grasses and non-woody plants (flowers and herbs), but drought and fire prevent large forests from growing. Grasses can survive fire because they grow from the base of the plant and can regrow after the tops have been burned off. In the past, the central part of North America was covered in grasslands, providing good habitat for animals like bison. Unfortunately, both the bison and grasslands have been almost wiped out.

Chaparral (Shrubland): This biome is usually found surrounding deserts and grasslands, such as in southern California, Chile, Mexico, areas surrounding the Mediterranean Sea, and southwest parts of Africa and Australia. Shrublands receive more rain than deserts and grasslands, but less than forest biomes. Short trees and shrubs thrive in the drought-like conditions by having small, needle-like leaves that conserve water or a waxy coating that reflects the sunlight. Fire is frequent and helps to renew this biome's plant diversity.

Freshwater Ecosystems: This biome includes rivers and streams, lakes and ponds, and wetlands. They are found all over the world and provide habitat for many different plants and animals. This biome is important to us because our drinking water comes from these ecosystems.

Marine Ecosystems: Oceans, coral reefs, and shorelines are all different types of marine ecosystems. Many animals are specially adapted to these ecosystems and cannot live anywhere else. People and animals around the world share the oceans. The Atlantic Ocean that we know in the U.S. is the same ocean for people in Mexico, Ireland, and Senegal.



Parrot: The majority of all birds in the world, including parrots, live in this biome. Parrots are known for their brightly colored feathers and loud calls. They eat fruits, grasses, leaves, and plant shoots. They are particularly important to their biome for their role in spreading seeds, therefore aiding in plant reproduction. They are threatened due to habitat loss and over-collecting for the pet trade.



Epiphytes: These plants grow on a host plant, like a tree, but are not parasitic (taking nutrients from the host plant). Epiphytes take their nutrients from the air, rain, or compost on their host tree rather than growing in the poor soil of their biome. Their habitat provides a lot of its needs. They tend to live high up in the tree, so they are able to catch the sunlight, easy access for pollinators, and disperse their seeds on the wind. Some common epiphytes include ferns, lichens, mosses, cacti, bromeliads, and orchids. Epiphytes, particularly bromeliads, provide mini-pool habitats for insects and even tadpoles of the poison-arrow frog.



Caribou: The caribou is a member of the deer family, but unlike most deer, both male and female have antlers. Beyond having thick fur, caribou have other adaptations for living in their biome-habitat. They have large, spreading hooves that help support them in the snow and marsh. Caribou are very good swimmers, using their feet as paddles. In harsh weather conditions, their metabolism slows, putting them in a semi-hibernation state. Food for an herbivore seems scarce in this biome; however caribou are good at finding plants and fungi hidden beneath the snow.



Dwarf Willow: Although many willows are trees, the dwarf willow is more like a creeping shrub, only growing 6-10 inches in height. It is adapted to very cold climates. The roots are shallow because of the permafrost below. Dwarf willow leaves have long fuzzy hairs that protect them from the cold. In the summer, the leaves turn red to more efficiently absorb different wavelengths of sunlight.



Canadian Lynx: The lynx is larger than a house cat, but otherwise is almost identical. Its collar of fur around its face and fur-covered pads on its feet help keep it warm in the colder climate of this coniferous biome. The soft feet pads also are silent in the snow so it can stalk small prey. Lynx populations have been greatly reduced due to habitat destruction. They also are hunted for fur and meat and killed because they can threaten livestock.



Siberian Spruce: The Siberian spruce is a coniferous tree, having needles that remain year round instead of leaves that fall in autumn. This tree has many adaptations to protect it from the very cold winters and hot summers in its biome-habitat. The overall conical shape of the tree allows snow to shed easily, protecting its branches from breaking under the weight of snow. Narrow needles lose less water to the air. The needles also have a waxy coating that is waterproof, protecting them from drying winds. Photosynthesis and heat absorption is maximized through the dark green color of the needles.



Kangaroo Rat: This small mammal is adapted to the heat and dryness of its biome-habitat. The kangaroo rat stays in its burrow during the heat of the day and is active at night or early morning. It absorbs water from the food it eats such as seeds, leaves, stems and insects. It can store food in its cheek pouches for weeks while searching for shelter. The kangaroo rat does not sweat or pant to cool itself and its waste material contains little water. These adaptations help conserve the little available water in its habitat.



Saguaro Cactus: This cactus has many adaptations to surviving in this hot and dry biome habitat. Its upright branches soak up water and store it in its expandable ribs. Downward pointing spines direct water into the depressions on the surface of the cactus and help to keep the outer layer of the cactus cool. The creamy white flowers open at night to prevent the loss of too much moisture during the hot days. Many animals use the Saguaro cactus for food and habitat.



Black Bear: The Black bear is one of the largest animals in its biome-habitat in North America. They feed on insects, fruit, rodents and other small mammals, fish, and carrion. The Black bear's claws are short and sharp, which helps them to climb the many trees in their biome. They have thick, shaggy fur that helps protect them from the cold winters. Black bears will eat large amount of food to build up their fat store before hibernating in the winter. This prevents them from having to find food when it is in short supply.



Tawny Milkcap Mushroom: This fungus is both adapted and very beneficial to its biome-habitat. The Tawny Milkcap mushrooms, like most fungi, are decomposers of dead organisms and leaves. They help break down the large amounts of leaf litter in their heavily forested biome. They are able to survive on the forest floor with little sunlight. Unlike plants, which need sunlight to photosynthesize, mushrooms get their nutrients from other sources. Mushrooms produce spores that are released and germinate in moist areas. Tawny Milkcap mushrooms and other mushroom species are great reproducers even when animals eat the spores and poop them out!



Prairie Dog: This mammal lives in family groups in a 'town' of burrows in their biome-habitat. Prairie dogs like to be able to see predators, so they chew through tall weeds in their habitat. This helps keep the ecosystem in balance by preventing trees from taking over this biome. Prairie dogs provide both a food source for predators and habitat for owls, lizards, ferrets, and rabbits in their abandoned burrows. Examples of animals that live in this biome on other continents include giraffes, lions, zebras, and wildebeests.



Buffalo Grass: This hardy grass grows in the biome with dry summers and cold, windy winters. Its adaptations to this climate include being drought resistant and the ability to go dormant during times of extreme drought, heat, or cold. Buffalo grass is very important as food and habitat for many animal species in this biome. The grass is adapted to fire and even sometimes benefits, with new shoots emerging after the disturbance.



Jackrabbit: This mammal is adapted to the hot and dry climate of both the desert and this biome. It has large ears that help it regulate its body heat. They live in open-shrubby areas where they can see their predators. They eat grasses, leaves, twigs, and sagebrush. Jackrabbits come out to feed at night, when it is cooler. They conserve water by eating their food twice. How? By eating their poop! They absorb as much water as they can from their food, therefore rarely have to drink water.



Manzanita: This drought-tolerant shrub is native to California. Its biome is dry and sunny, with well-drained soils. The berry-like fruits are often eaten and dispersed by coyotes, foxes, and many bird species. The seeds need to be burned by fire to germinate. Fire used to be common in this biome-ecosystem, but has been suppressed as more humans have moved in. The prevention of fire, however, increases the risk of more fire damage because there is more fuel for the fires to burn out of control. Land managers are learning that prescribed burns are important to help restore natural ecosystems and protect plant life, including that of the Manzanita.



Grebe: This swimming and diving bird spends most of its life in the water of lakes and ponds. Although they have wings, they rarely fly. In fact, two species are completely flightless. Adaptations to their aquatic habitat include a special webbed foot with lobes that work like a boat propeller. Grebes' feathers are dense and waterproof. They also can adjust their buoyancy by pulling their feathers against their body. Sometimes they swim almost submerged, with just their head and neck above water. Grebes eat fish, freshwater insects, and crustaceans.



Cattail: This aquatic plant is recognized by its long green leaves and hot-dog shaped brown flower spikes. It is usually found growing along the edges of shallow water or in areas of seasonal flooding in its biome ecosystem. Cattails play an important role in keeping their water-ecosystem healthy. They filter runoff, which reduces pollutants and prevents mud from entering. They also prevent shoreline erosion. Stands of cattails provide habitat for many species of insects, birds, and amphibians.



Green Turtle: The Green Turtle is a large turtle that lives in this biome-habitat. They feed on sea grasses and seaweed. This gives their fat a greenish color, hence their name—Green Turtle. Their habitat range is very large. They nest on beaches, feed in low-water coastal areas, and travel in the open ocean.



Kelp: This aquatic plant is a type of seaweed that makes a 'forest' in its underwater biome-habitat. It is important food and shelter for many aquatic creatures, including barnacles, sea-anemones, starfish, sponges, muscles, and clams. Kelp reduces erosion by slowing down the water before it hits tshorelines.