Biomes and Ecosystems

By Trista L. Pollard

1 Did you know that there are communities right in your backyard? Do you know that some communities don't have houses, but trees, plants, and shrubs? Well, these communities are part of ecosystems . They are also part of biomes.

2 Biomes are large areas that have similar plants, animals, and other organisms . Organisms are living things that can work independently. Some of these organisms we cannot see with our eyes. However, they are there. Ecosystems are smaller than biomes. They are a community of plants and animals that live in an environment.

3 There are many biomes on Earth. However, we will only talk about four. They are forests, grasslands, deserts, and tundras. The animals and plants in these biomes need to adapt to the environment. Each biome has different types of water, soil, and climate.

4 Forests are trees and other plants that cover a large area. These trees and plants grow in groups that are very dense. Depending on the climate, different types of trees and plants grow in the forest. There are tropical rainforests, tropical dry forests, cold climate forests, and temperate forests. Temperate forests are found in the eastern United States. These forests have cold winters and warm summers. You can tell you are in a temperate forest if the leaves change colors in the fall. Cold climate forests have trees that have cones. You would find pine, fir, and spruce trees in these areas. These forests are found in the mountains.

5 Tropical forests are found in different areas of the world. Tropical dry forests are found in parts of Australia and Central America. They have high temperatures. They also have very little rainfall. Tropical rainforests are the opposite. They have a lot of rain. Some of these forests are found in Africa, South America, and Asia.

6 Grasslands are areas that are covered with grass and very few trees. You know them as prairies in the United States. There are very hot summers and very cold winters in grassland areas. Grasslands have some rain. However, the rain is not enough for trees to grow there.

7 Deserts are the driest places on Earth. They have very little rain during the year. The plants that are in the desert have to survive the low amount of rain. You may see cacti in deserts. The U.S. has a desert in California. It is called the Mojave Desert (Mo-ha-vee). The Sahara Desert in Africa is the largest desert on Earth.

8 The last biome is tundra. A tundra is a frozen prairie. If you were to visit Antarctica or Alaska, you would be visiting a tundra. Tundras have summers that are not very hot. The winters are extremely cold. There are plants that grow in the tundra. However, there are not any trees.

9 Animals that live in these different biomes need to adapt to the climate. Their feeding habits may depend on the climate. They may have layers of fur that help to keep them warm. They may also have very thin fur or covering for hot weather.

10 Ecosystems can be very small or very large. They can be as large as the Amazon Rainforest. They can also be the small log in your backyard. The ants in your backyard are part of an ecosystem. They depend on the water from the rain. They use the soil to make their homes. If we drop food in the backyard, it becomes their food. They live together with the other insects and animals.

11 So take a trip into your backyard or to the park in your neighborhood. There is an ecosystem waiting for you to explore.

BIOMES AND ECOSYSTEMS

Name _____

1. What are biomes?

2. What are ecosystems?

3. _____ have trees with cones.
A.Tropical rainforests B. Tropical dry forests C. Cold climate forests D.Temperate forests

4. Plants in deserts have to survive large amounts of rain each year. False True

5. Complete the sentence: Grasslands are areas _____.

6. Describe tundras.

7. Where are some tropical rainforests found on Earth?

8. What are grasslands called in the United States?

9. What biome are we located in here in Crooksville? Detail how you can to this conclusion.

The Ecosystem of the Forest

Even if it doesn't look like it, all living things constantly interact with their environment. For instance, every time you take a breath, you get oxygen from the air, and every time you breathe back out, you release carbon dioxide into the world around you. Both oxygen and carbon dioxide are vital gases that different organisms can use. You, a human, need the oxygen for energy and need to get rid of the carbon dioxide, because it's a waste matter. Just like us, all other organisms take something from their environment while putting waste back into it. When several kinds of organisms interact with each other in one particular area, it's called an ecosystem. In the forest, living beings (plants, animals, insects, fungi and bacteria) all interact with each other and with the soil and water to form the forest's specific kind of ecosystem. So, how does it work? Every organism in the forest can be put in one of three categories. Depending on which category they're in, they'll interact with each other and the forest's resources in a different way. The categories are producer, decomposer and consumer. Let's look at each one.

Producers are living things that can make their own energy out of non□living resources all around them like, oxygen and water. They're also known as autotrophs. Autotrophs do not need to kill anything in order to eat. Plants and algae, for example, are producers. In the forest's ecosystem, the trees, shrubs and moss are all producers. They turn water and sunlight into the energy they need to live and grow, through a process called photosynthesis. And remember that carbon dioxide you expelled as waste matter? Well, for plants, carbon dioxide is a vital gas. It is used to help aid with the process of photosynthesis. The Ecosystem of the Forest

Like producers, decomposers don't need to kill another living being to obtain food. However, they differ from producers because they still need to get their nutrients from other organisms or from waste matter expelled by other organisms. Usually they eat dead animals and plants. Bacteria and certain kinds of fungi are examples of decomposers. They're very important because by helping break down dead organisms, they actually provide energy to living ones. Consumers are the living beings that need to eat other organisms to survive. You may have heard about this group as being "at the top of the food chain."They're also known as heterotrophs. Humans are heterotrophs who eat both plants and animals to live. In the forest, a deer eating plants, a wolf hunting deer, a hawk eating rodents, and rodents eating both bugs and plants, are all examples of the ecosystem's consumers.

As you can see, carnivores, omnivores and herbivores are all different kinds of heterotrophs. It doesn't matter which kind of organism they eat; as long as they eat other organisms to survive, they're consumers/heterotrophs. So, now that you know each type of player, how does the ecosystem's cycle work? Well, when an organism dies and its body decomposes, bacteria go to work. Let's imagine the dead organism is a deer. Bacteria obtain energy from the deer's body, while helping it decompose efficiently. When the deer's body breaks down, because of the work done by the bacteria, it returns to the soil. This is important for the earth, because the carcass actually gives vital energy

back to the environment. It makes the soil rich in nutrients for plants to grow there. Grasses, flowers and trees then grow in that soil and get the energy they need, along with energy from the sun and water. The water also filters through the soil, which is necessary for the forest's flowers and trees to be able to take it up through their roots. Heterotrophs, like deer, eat those plants to get their energy, and other heterotrophs, like wolves, eat the deer for their energy. As you can see, in a forest ecosystem or any kind of ecosystem, every being interacts with other beings. What's important to remember is that each part of the ecosystem is as important as another. Without soil, there'd be no plants. With no plants, there'd be no deer, rodents or certain kinds of insects. And without tiny microbes (remember, the decomposers), animals and plants would die without their bodies being returned to the earth. Because forests cover about a quarter of the total land surface of the world, keeping their ecology balanced is important for the entire earth.

QUESTIONS

1. What is an ecosystem?

2. What does this passage explain?

3. Based on the information in the passage, what do all ecosystems have in common?

4. What is a decomposer?

5. How do decomposers interact with their ecosystem? Be sure to name one example of them taking from the ecosystem and one example of them giving to the ecosystem.

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.

Living Things

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 ds, fruits, grasses, leaves, and plant shoots. They are particularortant to their biome for their role in spreading seeds, therefore aiding in plant reproduction. They are threatened due to habitat Parrot: The majority of the bird scpeloss 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 dear, 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 biomehabitat 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.