APES- Introduction to the World’s Biomes

Objective: Understand the plants, animals and climate that characterize each biome of the world. Site: <http://mbgnet.mobot.org>/ Missouri Botanical Gardens

Browse each biome and fill out the chart below and answer the questions below about each individual biome

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| --- | --- | --- | --- |
| Terrestrial Biome | Common Plants/ Animals | Interesting  Features | Weather/Climate |
| Rainforest | * 100’s of trees * Shrews * Gorillas * Cobras | * The decomposition rate of tropical rainforests is very fast | Tropical: Warm  Temperate: Cool |
| Tundra | * Fast growing pioneers (lichen, dark leaves) * Cushion plants * Complex bird species * Large animals (bear, caribou, fox) | * Below the soil lies permafrost, permanently frozen ground | Invariably cold |
| Taiga | * Conifers * Needles * Large birds (hawk owl, loon) * Lynx * Moose * Herbivores (beavers, rabbit) | * Scarcity of food make life more difficult | Cold winters, warm summers (highly variable) |
| Desert | * Hundreds of Cacti (Old Man, Prickly Pear) * Aloe Vera * Dragon Trees * Small animals and birds (Wren, lark) * Large Addax * Large Vultures | * High diversity of life-forms * Second to rainforests in terms of number of life-forms held | Invariably hot during the day, very cold at night |
| Temperate | * Large animals (Bear, Deer, Boar) * Birds (Cardinals, turkeys, sapsucker) * Several tree species (Sassafras, Burning Bush, Oak) * Bushes | * Second to rainforests in terms of annual rain | Changes with the seasons  (Heavy rainfall) |
| Grasslands | * Grasses * Herbivores (Bison, Rhinoceros, Pronghorn) * Carnivores (Lion) * Complex insect species | * With more rain, they’d become forests * Converted into agricultural lands | Rainfall is 10-30in/year  Generally shift with seasons (0C Winter to25C Summer) |
| Aquatic Biomes | Common Plants/ Animals | Interesting  Features | Weather/Climate |
| Rivers & Streams | * Large Fish (Boutu, otter, ) * Small fish (Piranha, Pufferfish) * Gavial * Turtle * Birds | * Transport water across the world * Used for hydroelectric power | Highly Variable |
| Ponds & Lakes | * Frogs * Fish (Carp, Trout, Bass) * Platypus * Caiman * Reptile * Algae * Rooted plants | * Support rooted plants | Highly Variable |
| Wetlands | * Alligator * Frog (Gold-spiny reed, ) * Fish (Catfish, Lungfish, Lightningfish) | * Some are underwater * Release vegetative matter into rivers | Highly Variable |
| Shorelines | * Birds (Avocet, Gulls, Crab plover) * Conger Eel * Reptiles * Mammals (Sea Lion, Seal) | * Where oceans and seas meet land | Highly Variable |
| Temperate Oceans | * Fish (Salmon, Lanternfish, Eel, Hagfish) * Birds (Penquin, Kittiwake) * Mammals (Whale) * Invertebrates (Sponge Bob, Patrick, just kidding, it’s late, I need sleep ☺) | * Cover ¾ of Earth’s surface * Little understood | Highly Variable |
| Tropical Oceans | * Fish (Marlin, Barracuda, Tuna, Hammerhead) * Birds * Reptiles * Mammals * Invertebrates | * Home to coral reefs * Very diverse | Highly Variable |

# Rainforests

1: What are the two types of rainforests? In the United States, where are our rainforests located? (Be specific). What percentage of our original rainforests does this represent?

The two types of rainforest include tropical and temperate. Tropical rainforests receive massive amounts of rain each year, are home to hundreds of diverse species, and are typically warm. Temperate rainforests, however, are typically colder, and house less species. In the United States, our temperate rainforests are located on the northern west coast, reaching south-western Canada. This represents only three percent of our original rainforests.

# Tundra

2: Where is the Tundra Biome located? What is permafrost? What percentage of the Earth’s surface is covered by Tundra?

The tundra’s occupy the northern edge of the world, near the north-pole, and are covered with permafrost (permanently frozen ground) below loose soil. Tundra’s represent 20 percent of the Earth’s surface.

Taiga

3: Where is the Taiga Biome located? What is the soil like in the Taiga- why?

The taiga biome is located below the tundra, in northern Eurasia and Canada. The cold temperature of the taiga slows the rate of decomposition, making the soil spongey, thin, and lacking in nutrients.

# Desert

4: How much rainfall is characteristic of deserts? Explain where most deserts are located and the RAINSHADOW Effect.

Deserts typically get about ten inches of rainfall per year. Most deserts are located along 30 degrees north and 30 degrees south, and on the windward of mountain ranges. As winds cool in the mountains, they precipitate, losing their stored water before heading into the deserts, where they heat up and absorb the water vapor, known as the rainshadow effect.

# Temperate Deciduous Forest

5: What is special about this biome? Deciduous trees have special leaves that are adapted to the biome- explain.

Unlike the trees of the tundra and taiga, the deciduous trees have adapted with the changing seasons to change the color of their leaves. During shorter days, green chlorophyll decomposes, yielding yellow, orange, and red leaves. To prevent the leaves from freezing during the winter, the leaves detach of the trees themselves, preventing fungi and bacteria from growing and damaging the tree.

# Grasslands

6: Grasslands are found on every continent except for one- which? How much rainfall do grasslands get- why is this important? What are the 3 types of grasslands that are found in North America? What are grasslands called in other places in the world?

Grasslands have been found on every continent except Antarctica. Annually, this biome receives 10-30 inches of rainfall, preventing the grass from growing into trees. There are many types of prairies, assorted by grass-length. The United States is home to all three, tall, mixed, and short grass prairies. In other places around the world, the prairies are assorted into either the tropical or temperate categories.

# Rivers & Streams

7: How much water on Earth does running water represent? What is a watershed? What are the two main processes that happen to surface water? What is the longest river in the world? What is the longest river in the United States? What is a hydroelectric dam?

Worldwide, running water represents only .3 percent of the world’s surface. Much of the water returned to Earth’s surface in the form of precipitation runs off into rivers, streams, lakes, ponds, or the ocean. The surface, however, absorbs water through the process of infiltration. Together, run-off and infiltration represent the world’s water-shed and are the two most common processes that govern the destiny of surface water. The longest river in the world is the Nile, at 4,145 miles. In the United States, however, the Mississippi-Missouri river system represents the third largest river in the world, at 3,740 miles. These rivers may be used for the production of electricity through a hydro-electric dam. By turning turbines in a reactor with the pressure of oncoming water, we can develop electricity from natural and non-polluting methodologies.

# Ponds & Lakes

8: What is the difference between a pond and lake? Name the four stages of succession of a pond. Explain how an Oxbow Lake is formed. What is the largest lake in the world? What is the largest lake in the United States? What is the deepest lake in the world? What is Lake Effect Snow? Explain. What is the cause of summerkill in some lakes?

Both ponds and lakes are forms of statically stored liquid water. Although a pond is shallow, supporting the growth of rooted plants, while a lake does not offer said support. Like many other ecosystems, ponds can recover from an environmental incident through a succession. The plants in the ecosystem are crucial to the pond’s recovery, as seeds are flown into the pond by nearby birds and small animals make their homes, these pioneers begin to fix the environment. The pioneer seeds begin by developing small weeds and submergent vegetation, as the population of small animals grows. Eventually the pond develops an increasing layer of decomposing matter from dead plants and the pond floor grows annually. Finally, the pond floor grows to support non-submergent plants that cover the pond. Erosion and decomposition are apparently crucial to the development of a pond. Incidentally, these processes can create crecent shaped lakes known as oxbows. Around the bend of a river, water flows more slowly, leading to a build-up of decomposing silt. Meanwhile, the water along the outside edge of the pond flows fasters, eroding the banks and making the meander wider. Eventually this meander widens to the point of becoming non-existent, and the river continues along a different path, leaving an oxbow in its place. Both the largest and deepest of these lakes is the Caspian Sea, at 143,244mi2 and 1,025 meters deep. In the United States, however, the largest lake remains Lake Superior, at 31,700mi2. As wind blows over these lakes, it picks of evaporative water. The winds continue into the mountains, where they cool and precipitate. As the temperature around lakes rises over summer, the algae reaches it’s perfect reproductive conditions and reproduces at an unsustainable rate. When the algae grow too large, they cover the sunlight, killing plants below, then they themselves die and cover the lake bed with layers of decomposing matter and consumes the oxygen in the water, killing the small fish and animals alike. In lakes, this effect is known as the “summerkill”.

# Wetlands

9: What are the types of freshwater wetlands- name and define them. Explain why wetlands are so important. What is happening to our wetlands?

There are several types of wetlands, including:

Swamps – slow moving streams, rivers, or isolated depressions that host trees and some shrubs

Bogs – a peat-accumulating wetland that supports the growth of some shrubs, evergreens, and mosses

Prairie Pothole – shallow depressions with viable wetness

Mash – wetlands existing along rivers and stream that absorb excess water

Like the marshes, wetlands absorb excess water and reduce the damage caused by over-flows. As commerce and the need for deeper water-ways has expanded, the wetlands have shrunk, reducing the ability for the environment to reduce flood damages.

# Shorelines

10: What kind of lifeforms will you find in the intertidal zone? What is a barrier island?

What is an estuary? What is life like in an estuary? What is a salt marsh? What is the Mangrove Forest? How are the trees specially adapted to living in that environment? Why are they important?

In the intertidal zones of shorelines, a veritable assortment of life-forms can be found such as octopus, crustaceans, and starfish. A barrier island is a small land mass, separated from the mainland, which serve as a buffer against winds, tides, and storms. The seawater and land meet at estuaries, where a mixture of diverse animals who enjoy increased amounts of worms, clams, and crabs. Salt marches are wetlands that occur between the land and the sea. Mangrove forests are near the mouths of large rivers, where effluent water provides the trees with excess nutrients. These trees have adapted to grow roots which quickly penetrate the ground, forming enough structural support to keep the leaves above the water. These trees absorb the energy of the waves and the effluent pressure of the river water, reducing erosion.

# Temperate Ocean Zones

11: Name and describe the different zones of the ocean and how they are divided. Describe the different photic zones of the ocean. What are kelp forests? Where are they found?

The ocean is divided into several zones classified by such factors as depth, altitude, and light-exposure. The bottom of the ocean is what’s known as the benthic zone, and the water itself, the pelagic zone, which extends from the high-tide zone to the benthic zone. The neritic zone is a component of the over-arching pelagic zone and extend from the high tide zone to 600ft below the surface. The ocean below the neritic zone is known as the ocean zone, and contains the epipelagic, mesopelagic, and bathypelagic zones; these zones correspond roughly to the others and are defines by the amount of sunlight each zone receives. The euphotic, or sunlight, zone supports photosynthetic activities by plants and phytoplankton. The disphotic, or twilight, zone is bathed with limited amounts of sunlight. Finally, the aphotic, of midnight, zone is exposed to no sunlight. Kelp forests are large areas of underwater land that are inhabited by dense kelp. These photosynthetic organisms use long leaves known as blades to absorb sunlight and produce sugars. Such kelp forests can be found off the coast of the California and smaller forests can be found off the coast of the eastern United States.

# Tropical Ocean Zones

12: What is coral made of? Explain. Where are most coral reefs located? Where is the largest coral reef?

Coral is a structure composed of polyp, these creatures attach themselves to the bottom of the ocean and extend into the water. Thousands of these creates compose colonies, which collectively form the reefs. Most coral reefs are located in warm water that’s typically consistent year round. The tropical regions near the equator produce the ideal temperature range for these reefs to grow. The largest of which is the Great Barrier Reef, off the coast of Australia.