Chapter 6: Biomes

Section 1: What is a Biome?
What is a Biome?

• Biomes are large regions characterized by a _________________________________.
• The _________________________________ of a region determines what type of biome can exist in that region.
• Each biome is made up of many individual _________________________________.
  o Communities within the biome have adapted to the small differences in climate and the environment inside the biome.
• Major biomes include deserts, forests, grasslands, tundra, and several types of aquatic environments.
• All living things are ______________________________ to their environment.
• Any change in one part of an environment, like an _______________________________ of a species of animal or plant, causes a _______________________________ of change in other parts of the environment.
• Remember, each organism depends in some way on other living and nonliving things in its surroundings.

To understand a world biome, you need to know the following:
• What the _________________________________ of the region is like.
• Where each biome is __________________________ and what its _________________________________ is like.
• The special ________________________________ of the vegetation.
• The types of animals found in the biome and their _________________________________ adaptations to their environment.

Biomes and Vegetation
• Biomes are described by their ____________________________ because plants that grow in an area ____________________________ that can live there.
• Plants in a particular biome have ________________________________ that allow the plants to survive in that biome.
• These adaptations include ________________________________.
  o For example, plants in the tundra tend to be short because they cannot obtain enough water to grow larger.

Biomes and Climate
• ____________________________ is the average weather conditions in an area over a long period of time.
• Climate is the ____________________________ factor is determining which plants can grow in a certain area, which in turn defines the biome.
• ____________________________ are the two most important factors that determine a region’s climate.

Temperature and Precipitation
• Most organisms are adapted to live within a particular range of temperatures and will not survive at temperatures too far above or below their range.
• Precipitation also ____________________________ the organisms that can be found in a biome because all organisms need water, and the bigger the animal, the more water it needs.
• Biomes that do not receive enough rainfall to support large trees support communities ____________________________ by small trees, shrubs, and grasses.
• In biomes where rainfall is not frequent, the vegetation is mostly ________________________________.
• In extreme cases, ________________________________ results in no plants, no matter what the temperature is.
• The ________________________________ the temperature and precipitation are, the ________________________________ the vegetation is.

Latitude and Altitude

• ________________________________ is the distance north or south from the equator, and is expressed in degrees.
• ________________________________ is the height of an object above a reference point, such as sea level or the Earth's surface.
• Climate ________________________________ with latitude and altitude.
• For example, climate gets ________________________________ as latitude and altitude _________________________________. This is why it gets colder as you move further up a mountain.
• As latitude and altitude ________________________________, biomes and vegetation ________________________________.
• Trees of tropical rainforests usually grow closer to the ________________________________, while mosses and lichen of the tundra grow closer to the ________________________________.
• The temperate region includes biomes such as ________________________________, ________________________________, which usually have moderate temperatures and fertile soil that is ideal for agriculture.

Section 2: Forest Biomes

Forest Biomes

• Of all the biomes in the world, ________________________________ are the most widespread and the most diverse.
• The large trees of forests need a lot of water, so forests can be found where temperatures are ________________________________ and where rainfall is ________________________________.
• There are three main forest biomes of the world: ________________________________.
Tropical Rainforests

- Tropical rainforests are forests or jungles near the equator.
- They are characterized by ______________________________________ and _______________ in temperature and contain the greatest known diversity of organisms on Earth.
- They help regulate world climate and play vital roles in the _________________________________________.
- They are humid, warm, and get strong sunlight, which allows them to ________________________________________ that is ideal for a wide variety of plants and animals.

Nutrients in Tropical Rainforests

- Most nutrients are within the ____________________________, not the soil.
- Decomposers on the rainforest floor ______________________ and _______________________, but plants quickly absorb the nutrients.
- Some trees in the tropical rain forest support ______________ that feed on dead organic matter on the rainforest floor.
- In this relationship, the fungi __________________ the nutrients from the dead matter directly to the tree.
- Nutrients from dead organic matter are removed so efficiently that runoff from rain forests is often as ____________________.
- Most tropical soils that are cleared of plants for ________________________________ for more than a few years.
- Many of the trees form above ground roots called ______________________________ that grow sideways from the tree to provide it with __________________________ in the thin soil.

Layers of the Rainforest

- In tropical rain forests, different types of plants grow in different layers.
- There are ___________________________ main layers of the rain forest:
  - ○ __________________________________
  - ○ __________________________________
  - ○ __________________________________
  - ○ __________________________________
- The ____________________________ is the top foliage layer in a forest where the trees extend above surrounding trees.
- Trees in this layer grow and emerge into __________________________ reaching heights of __________________ and can measure up to 5 m around.
- Animals such as eagles, bats, monkeys, and snakes live in the emergent layer.
- The ____________________________ is the layers of treetops that __________________ the forest floor, and is considered to be the ________________________________ of the rain forest.
- The tall trees, more than 30 m tall, form a dense layer that absorbs up to ______________________ of the sunlight.
- The canopy can be split into and __________________________ caneopy with the lower canopy receiving less of the sunlight.
- __________________________ are plants that use another plant for support but not for nourishment, and are located on high trees in the canopy.
- Growing on tall trees allows them to ______________________________ needed for photosynthesis, and to __________________________ that run down the tree after it rains.
Most animals that live in the rain forest live in the canopy because they depend on the __________________ that grow there.

The __________________ is the foliage layer that is beneath and shaded by the main canopy of a forest.

______________________ reaches this layer allowing only trees and shrubs adapted to shade to grow there.

Most plants in the understory do not grow more than ____________________.

_________________________ with large flat leaves that grow on the forest floor capture the small amount of light that penetrates the understory.

Species Diversity

The diversity of rainforest vegetation has led to the __________________ of a diverse community of animals.

Most rainforest animals are ____________________________ that use specific resources in particular ways to avoid __________________________ and have adapted amazing ways to capture prey and avoid predators.

Insects use __________________________ to avoid predators and may be shaped like leaves or twigs.

Threats to Rainforests

Every minute of every day, ___________________________ acres of tropical rainforest are cleared for ___________________________.

Exotic pet trading robs the rain forests of rare and valuable plant and animal species only found there.

________________________ occurs when land inhabited by an organism is destroyed or altered.

If the habitat that an organism depends on is destroyed, the organism is at risk of disappearing.

An estimated ____________________________ native peoples live in tropical rain forests and are also threatened by habitat destruction.

Because they obtain nearly everything they need form the forest, the loss of their habitat could force them to leave their homes and move into cities.

This drastic change of lifestyle may then cause the native peoples too lose their culture and traditions.

Temperate Forests

________________________ are forests communities that are characterized by:

- __________________________
- __________________________
- __________________________
- __________________________
- __________________________

They occur in North America, Australia, and New Zealand, and are dominated by evergreen trees such as the ____________________________.

Temperate Deciduous Forests

________________________ are forests characterized by trees that ___________________________ in the fall, and located between 30° and 50° north latitude.

The range of temperatures can be extreme, with summer temperatures soaring to 35°C and winter temperatures often falling below freezing.

They receive __________________________ of precipitation annually, which helps to decompose dead organic matter contributing to the rich soils of the forest.
Plants of Deciduous Forests

- Plants in the deciduous forests grow in ____________ with tall trees, such as ____________, dominating the ____________ while shrubs cover the _____________.
- Also, _______________ reaches deciduous forest floors than rain forests floors allowing more plants to grow.
- Temperate forest plants are _______________ to survive seasonal changes.
- In the fall and winter, trees _______________ their leaves and seeds go _______________ under the insulation of the soil.
- With the returning warmth in the spring, the trees grow new leaves and seeds germinate.

Animals of Deciduous Forests

- The animals of temperate deciduous forests are adapted to use the forest plants for both _______________ _______________.
- Birds cannot survive the harsh winter of the deciduous forests so each fall they _______________ for warmer weather and better availability of food.
- Other animals, such as mammals and insects, _______________ so that they do not need as much food for energy, enabling them to survive the winter.

Taiga

- The _______________ is the region of _______________ below the arctic and subarctic tundra regions.
- The taiga has long winters and little vegetation.
- The growing season can be as short as _______________ with most plant growth occurring during the summer months because of nearly constant daylight and larger amounts of precipitation.

Plants of the Taiga

- A _______________ is a tree that has seeds that develop in cones.
- Their leaves’ _______________ helps them to retain water in the winter.
- The conifer’s shape also helps the tree _______________ to the ground and not get weighed down.
- Conifer needles contains substances that make the soil _______________ when they fall to the ground preventing plants from growing on the floor.
- Also, soil forms slowly in the taiga because the climate and acidity _______________ decomposition.

Animals of the Taiga

- The taiga has many _______________ that in the summer attract birds that feed on insects.
- To avoid the harsh winters, birds _______________, while some year round residents, such as shrews, burrow underground for better insulation.
- Other animals, such as snowshoe hares, have adapted to avoid predation by shedding their brown summer fur and growing white fur that camouflages them in the winter snow.
Section 3, Grasslands, Deserts, and Tundra

Grassland, Desert, and Tundra Biomes

- In climates that have less rainfall, forest biomes are replaced by ________________________________.
- As even less rain falls in these biomes, they change into desert and tundra biomes.
- As precipitation ___________________________________ in an area, the diversity of the species in the area also ____________________________________________.
- But, the number of individuals of each species present may still be very large.

Savannas

- __________________________________________________________ are plains full of grasses and scattered trees and shrubs that are found in ________________________________.
- Found mainly in regions with a ________________________________, such as East Africa and western India.
- Although savannas receive little precipitation throughout the year, they do have a ________________________________.
- Many animals are only active during the wet season.
- __________________________________________________________ help to restore nutrients to the soil during the dry season.

Plants of the Savanna

- Because most of the rain falls during the wet season, plants must be able to survive prolonged periods without water.
- Some plants have large ________________________________ to help them survive the dry season.
- These roots also enable the plant to grow ________________________________ after a fire.
- The grasses also have ________________________________ that expose ________________________________ to help conserve water, while some trees shed their leaves.
- Almost all have ________________________________ for protection from herbivores.

Animals of the Savanna

- __________________________________________________________, like the elephant, have adopted migratory ways of life, following the rains to areas of new grass and fresh watering holes.
- Predators often stalk these animals for food.
- Many savanna animals give birth only during the ________________________________, when food is abundant and the young are more likely to survive.
- Some species of herbivores reduce competition for food by ________________________________ at different heights than other species do.

Temperate Grasslands

- ________________________________ are communities (or biomes) that are dominated by grasses, have few trees, and are characterized by ________________________________, with rainfall that is intermediate between that of a forest and a desert.
- Temperate grasslands have the ________________________________ soil of any biome.
- Few natural temperate grasslands remain because many have been replaced by ________________________________ and farms growing crops such as corn, soybeans, and wheat.
- Temperate grasslands are located on the interiors of continents where too little rain falls for trees to grow and include the prairies of North America.
- __________________________________________ often play a crucial role in maintaining grasslands as rain clouds from the west are blocked.
• However, rainfall does increase as you move eastward, allowing taller grasses to grow.
• Heavy precipitation is ___________________________ in the grasslands, allowing the hot temperatures in the summer to make the grasslands ___________________________.

Plants of Temperate Grasslands
• The roots system of prairie grasses form ___________________________ that survive ___________________________ allowing the plants to come back from year to year.
• Few trees survive on the grasslands because of the lack of rainfall, fire, and the constant winds.
• The ___________________________ in the area determines the types of plants that will grow in that area with varying root depth and grass height.

Animals of Temperate Grasslands
• Some grazing animals, such as the bison and pronghorn antelope, have ___________________________ for chewing the coarse prairie grasses.
• Other grasslands animals, such as prairie dogs, owls, and badgers, live protected in underground burrows that protect them from predators on the open grasslands.

Threats to Temperate Grasslands
• ___________________________ have changed the grasslands.
• ___________________________ cannot hold the soil in place as well as native grasses can because the roots of crops are shallow, so ___________________________ eventually occurs.
• ___________________________ is also caused as the grasses are constantly eaten and trampled.
• Constant use can change the fruitful grasslands into desert-like biomes.

Chaparral
• ___________________________ is a type of ___________________________ biome with vegetation that includes broad-leaved evergreen shrubs and is located in areas with hot, dry summers and mild, wet winters.
• Chaparrals are located in the middle latitudes, about 30° north and south of the equator.
• Chaparrals are located primarily in coastal areas that have ___________________________ climates.

Plants of the Chaparral
• Most chaparral plants are low-lying, ___________________________ that tend to grow in dense patches and include chamise, manzanita, scrub oak, and herbs like sage and bay.
• These plants have ___________________________ that contain oils that promote burning, allowing ___________________________ to destroy competing trees.
• Chaparral plants are well adapted to ___________________________ from small bits of surviving plant tissue.

Animals of the Chaparral
• A common adaptation of chaparral animals is ___________________________, shape or coloring that allows an animal to blend into its environment.
• Animals such as quail, lizards, chipmunks, and mule deer have a brownish gray coloring that lets them move through the brush without being noticed.
Threats to the Chaparral

- Worldwide, the greatest threat to chaparral is _________________________________.
- Humans tend to develop lands of the chaparral for ______________________________ because these biomes get a lot of sun, are near the oceans, and have a mild climate year round.

Deserts

- ________________________________ are regions that have little or no vegetation, long periods without rain, and extreme temperatures.
- Although there are hot and cold deserts, one characteristic they both share is the fact that they are the __________ on Earth.
- Deserts are often located near large mountain ranges because mountains can block the passage of moisture-filled clouds, limiting precipitation.

Plants of the Desert

- All desert plants have ________________________________ for obtaining and conserving water, which allows the plants to live in dry, desert conditions.
- Plants called ________________________________, such as cacti, have thick, fleshy stems and leaves that conserve water.
- Their leaves also have a ________________________________ to prevent water loss, while sharp spines on the plant keep animals away.
- Many plant roots spread out just under the surface to absorb as much rain as possible.

Plants of the Desert

- Some plants are adapted to survive for long periods _________________________________.
- When conditions are too dry, these plants ________________________________ their seeds that stay dormant until the next rainfall.
- Then, new plants quickly germinate, grow, and bloom before the soil becomes dry again.
- These plants can survive their water content dropping to as low as 30 percent of their mass.

Animals of the Desert

- Animals of the desert have adapted many different ways to prevent _________________________________.
- ________________________________ have thick, scaly skin that prevents water loss.
- Amphibians survive by ________________________________, or burying themselves in the ground and sleeping through the dry season.
- Insects are covered with ________________________________ that helps them _________________________________.
- In addition, most desert animals are ________________________________, meaning they are active mainly at night or dusk when it is cooler.

Tundra

- The ________________________________ is a treeless plain that is located in the ________________________________ and that is characterized by very low winter temperatures, short, cool summers, and vegetation that consists of grasses, lichens, and perennial herbs.
- Summers are short in the tundra, so only the top few centimeters of soil thaw.
- ________________________________ is the permanently frozen layer of soil or subsoil and can be found in the tundra regions.

Vegetation of the Tundra

- ________________________________, which can grow without soil, cover vast areas of rocks in the tundra.
- The soil is thin, so plants have ________________________________ to help anchor them against the icy winds.
• Most flowering plants are __________________________, which keeps them out of the wind and helps them __________________________ from the sunlit soil.

• Woody plants and perennials have evolved __________________________ that grow flat along the ground.

**Animals of the Tundra**

• Millions of migratory birds fly to the tundra to __________________________ in the summer when food is abundant.

• Caribou migrate throughout the tundra in search of food and water.

• Hunters such as wolves prey on migratory caribou, deer, and moose.

• Rodents stay active, but burrow underground to avoid the cold.

• Other year-round residents, such as arctic foxes, lose their brown summer coat for white fur that __________________________ them with the snow.

**Threats to the Tundra**

• The tundra is one of the most __________________________ biomes on the planet.

• The food chains are relatively simple so they are easily disrupted.

• Until recently these areas have been __________________________ by humans.

• But oil was located in parts of the tundra, and oil exploration, extraction, and transport has disrupted many tundra habitats.

• Pollution caused by spills or leaks of oil and other toxic materials may also poison the food and water sources of organisms of the tundra.