# **Climate and Biomes Discussion Guide (for use during or after reading)**

1. Define and describe climate. How is climate different than weather? (What Is Climate?, p. 4-5)
   1. Weather and climate are related but are two different concepts. Weather is the state of the atmosphere at a particular place and time. Climate, on the other hand, is the average weather of a place or region over a period of time. Climate is described by its temperature, variations in temperatures, amounts of sun, kinds and amounts of precipitation, levels of humidity, frequency of storms, and wind speed and direction.
2. Describe the five major influences that affect climate: latitude, elevation, topography, water bodies, and wind. (What Affects Climate?, p. 6-11)
   1. Latitude is one of the five major influences that affect climate. Latitude describes and area’s distance from the equator. The closer an area is to the equator, the warmer it is because it is closer to the sun. The tilt of Earth also affects the climate. The tilt not only causes different seasons throughout the year, but also affects how many daylight hours an area will get. The closer an area is to the equator, the longer the summers and days.
   2. Elevation also affects an area’s climate. Elevation refers to a place’s distance above sea level. The higher an area, the colder it is.
   3. Differences in topography also affect climate. Land features such as mountains alter patterns of wind and precipitation, therefore changing the climate.
   4. Climate is also affected by an area’s relative location to large bodies of water. Large bodies of water, such as oceans, may warm or cool nearby land and air. In addition, the air above oceans absorbs moisture, which can make for a wetter climate.
   5. Finally, wind systems affect the climate of the land and water over which they move. Wind systems blow continuously around the planet in a variety of directions, changing climates as they go. Winds alter the ocean’s surface waves and currents, therefore altering climates even more. In addition, winds can create such massive storms as tornadoes and hurricanes.
3. What is a biome and how is it different than an ecosystem? Support your answer with an example. (What Is a Biome?, p.12-13)
   1. A biome is a specific environment that is home to living things suited to the particular place and climate. Examples of biomes include ice, tundra, desert, taiga, savanna, grassland, temperate forest, and tropical rain forest. Biomes and ecosystems are related but are not the same. An ecosystem is all the living and nonliving things in a specific environment and the interactions that occur among them. In general, biomes contain more than one ecosystem.
4. Describe the tropical rain forest biome and the dangers of deforestation. (Tropical Rain Forest Biomes, p. 14-17)
   1. The tropical rain forest biome has a tropical, wet climate only found around the equator. This biome receives at least 100 inches of rain annually. Plants and trees grow well in the tropical rain forest biome because of the rain, humidity, and temperatures.
   2. Deforestation, the mass cutting down of forests or large areas of trees, threatens many of Earth’s rain forests. About 20% of the Amazon rain forest has already been cleared for farming, building, or mining. This is dangerous for the millions of species of animals and plants that call the tropical rain forest home!
5. Compare temperate forest biomes with taiga forest biomes (Temperate Forest Biomes and Taiga Forest Biomes, p. 18-21)
   1. Temperate forest biomes grow in places with moderate climates, fair amounts of rainfall, and different seasons. They are located farther away from the equator than tropical rain forests and experience a variety of warm to cool temperatures. Temperate forest biomes are never too hot or too cold. They are dominated by trees, including deciduous as well as conifers and evergreens. Many plants and animals have adapted to survive the changing conditions throughout the year and call the temperate forest biome their home.
   2. Taiga forest biomes are also known as boreal forests, meaning “of northern regions.” They are located in vast areas of the far north of Europe, Asia, and North America. Unlike temperate forest biomes, taigas have a subarctic climate with extremely long, cold winters and short, cool summers. Much of the taiga is covered in permafrost, layers of Earth that stay frozen all year long. Melting permafrost has created wetlands, making taigas home to aquatic plants and animals. Taigas contain conifer trees as well as animals that have adapted to survive the harsh seasons.
   3. Both temperate and taiga forest biomes used to cover much more land than they do today. Hunting and fishing habits started as long as 10,000 years ago along with current threats from pollution and excessive logging have contributed to the loss of both biomes.
6. Describe the three main types of grassy biomes: savannas, steppes, and prairies. (Grassy Biomes, p. 22-25)
   1. Savannas, also called tropical grasslands, are dominated by grass rather than trees. They are found between rain forests and deserts in tropical areas. They are typically hot all year round and experience a short rainy season and a long dry season. Wildfires are common in savannas and help the biome by removing dead and dying growth to maintain the balance between larger plants and grasses. During the rainy season, life returns to the savanna with green grass and plants as well as herds of animals.
   2. A steppe is another grassland biome found between Earth’s tropical and polar regions. Steppes have semiarid climates with enough rain for small plants and short grasses. Temperatures in steppes vary with extremely hot summers and extremely cold winters.
   3. A prairie is a wide stretch of grassland with long, thick grasses. Prairies have temperate climates with rain in late spring and early fall, hot and dry summers, and long and cold winters. Prairies do not receive a ton of rain but do receive more rain than steppes.
7. What are dry biomes like? How have animals and plants adapted to survive in dry environments like deserts? (Dry Biomes, p. 26-29)
   1. Deserts are the driest biomes, receiving less than 10 inches of rain each year. Deserts are extremely hot during the day but become chilly at night because they have no cloud coverage to trap the sun’s heat. Deserts located far from the equator can even experience winter! Dry biomes are mostly comprised of sand but sometimes contain stone and rock, hills, mountains, and even huge salt flats.
   2. Plants and animals have adapted to survive in dry environments like deserts. Many desert animals are nocturnal, so their active hours occur at night when it is cooler. Some desert animals have developed large ears to help stay cool. Many desert plants have developed large root systems to seek out water from far away and store any water they have until it is needed.
8. Describe the two main types of polar biomes. (Polar Biomes, p. 30-33)
   1. When thinking about polar biomes, people often think of the tundra. The tundra exists mostly around the Arctic Circle or on top of very high mountains. It has a tundra climate with very dark and very cold (negative 25 degrees Fahrenheit!) winters. Summers in the tundra are extremely short, lasting only 6-10 weeks with temperatures that can reach up to 32-50 degrees Fahrenheit. The tundra exists beyond the tree line because the freezing temperatures and wind conditions make it almost impossible for life. Only small plants such as shrubs, grass, and colorful lichens that provide food for tundra animals live here.
   2. The ice biome contains ice caps, which are thick glaciers that cover massive sections of land. They are found near the North and South poles. Ice caps contain no vegetation and very few animals because it is difficult to survive.
9. What is the aquatic, or marine, biome? What are its current threats? (Aquatic Biomes, p. 34-37)
   1. The aquatic biome, also known as the marine biome, is the largest biome on Earth. It covers about 71% of Earth’s surface. Aquatic biomes can be further broken down into saltwater and freshwater biomes. The aquatic biome includes such ecosystems as estuaries, kelp forests, and coral reefs.
   2. Aquatic biomes are in danger from global warming. Rising sea temperatures make it difficult for creatures to survive. For example, coral cannot survive in hot water. When corals die, many other animals in a reef lose their habitat and food supply, causing many to die, too.
10. Earth’s climate has changed naturally over history. Why are scientists and environmentalists concerned about global warming now? (Our Changing World, p. 38-39)
    1. Scientists know that Earth’s climate has changed naturally over the course of history. Earth’s temperature has warmed and cooled over time; however, Earth’s climate has become much warmer than expected over the last 200 years or so. Scientists agree that this change and pattern of warmer temperatures is directly related to such human activities as cutting down forests and burning fossil fuels. If governments and businesses do not work together to address this change in climate, biomes will be affected even more drastically than they currently are.