Getting to Know: Climate and Factors that Affect It

Deserts are some of the most arid places on Earth. For example, in the Sonoran Desert of Mexico and the southwestern United States, the average rainfall amount is between 3 and 15 inches each year. Most of that rainfall occurs during two annual rainy seasons. In addition, the temperatures in the Sonoran Desert can change between blistering heat and freezing cold in a single day.

However, a variety of animals and plants can survive in the Sonoran desert. Saguaro cacti and quail are just a few of the organisms that call the Sonoran Desert home. Desert plants and animals have adaptations that enable them to live in arid environments. In fact, the organisms that live in any area and the climate of that area are closely linked.

For example, the tropical rainforest has a very different climate. The temperature varies very little from day to day or from year to year. However, rainforests are not dry—more than 80 inches of rain falls in a typical year.

Because the climate is warm and wet, the plants and animals that live in a tropical rainforest are very different than those in the desert. Rainforest organisms have adaptations to help them live in a warm, wet climate.

The plants and animals that live in the Sonoran Desert are adapted to its climate.

The plants and animals that live in a rainforest need much more water than those in the desert.

What is climate?

Climate refers to the average weather conditions in an area over a long period of time. It includes the average temperature, the range of temperatures (lowest to highest), and the average precipitation. There are many different climates on Earth.

How would you describe the climate in your area? Do you enjoy about the same temperatures all year long or do you have a cold winter and warm summer? Is it dry where you live with sporadic rain and clear skies or perhaps it is often rainy with high humidity and cloudy skies.

These overall patterns of temperature and precipitation are part of the climate in an area.
Misconception 1: *Weather and climate are the same, right?*

That is not correct. Weather is the condition of the atmosphere in a particular location at any given moment. Weather is short-term and local. Climate refers to the average conditions in a region over a long period of time.

What causes different climates on Earth?

You might remember that Earth is tilted on its axis. One effect of this is that the Sun heats Earth unevenly. Different parts of Earth receive more direct sunlight than others. When an area receives direct sunlight, it gets more of the Sun’s energy. When sunlight hits an area of Earth at an angle, the area gets less energy from the Sun. The amount of solar energy a region receives affects its climate. For example, polar regions have a much colder climate than equatorial regions because they receive less direct sunlight.

Mountain ranges can also have an important effect on the climate of nearby areas. Moisture in the air often falls on one side of a mountain range, making the climate on that side have a higher average precipitation. Of course, this means the air that goes over the mountains has less moisture. For this reason, the climate on the opposite side of the mountain range is very dry. This phenomenon is known as a *rain shadow effect.* As a result, one side of a mountain range can be covered in rainforest, whereas the other side of the mountain range can be desert-like.

In this lesson, you will learn about what makes each of the climates found on Earth unique. As you explore, consider the climate in which you live and how its characteristics affect you from day to day.

Misconception 2: *An area’s climate depends only on how far the area is from the equator; other factors are insignificant. Is that right?*

That is incorrect. Although it is true that a region’s climate is affected by its latitude and how much direct sunlight it receives, factors such as altitude, mountain ranges, air currents, and nearby bodies of water also affect climate. For example, Mount Kilimanjaro in Tanzania, Africa, is located very close to the equator at only 3° latitude, yet the 19,340-foot summit is covered in snow year-round.