

**Module: Physical Geography**  
**Topic Content: Factors That Affect Climate**

**Factors That Affect Climate**



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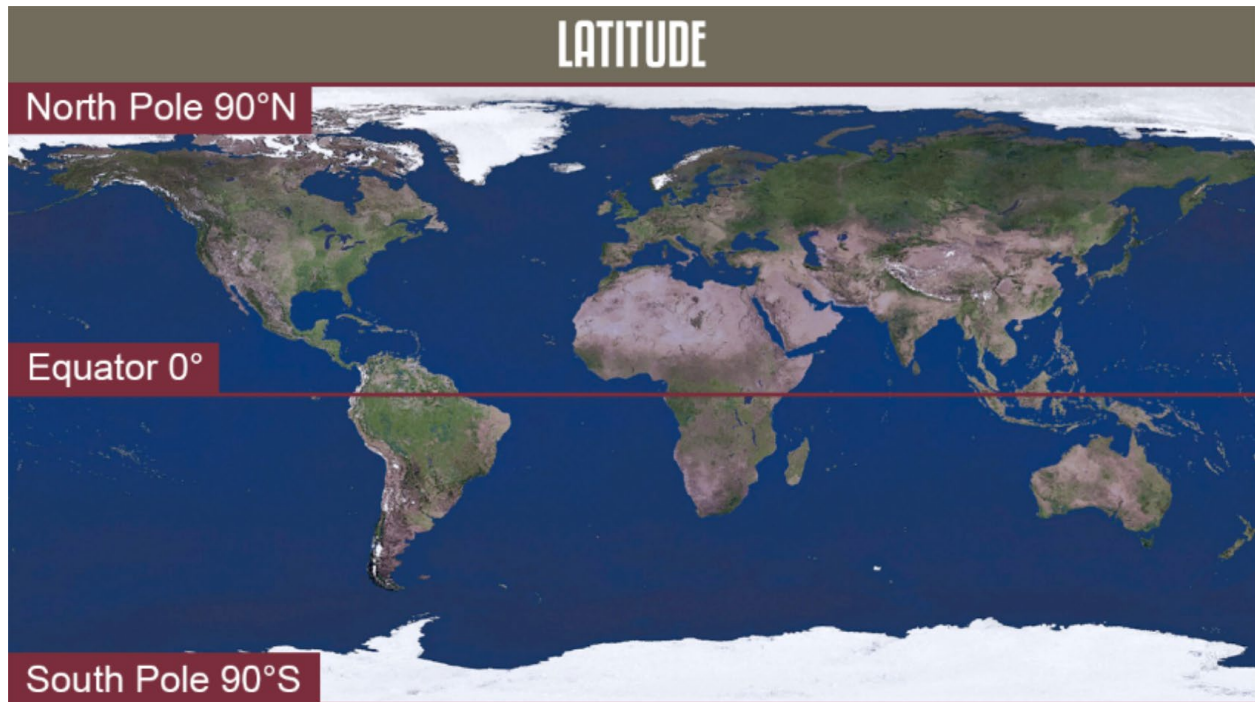


There are six main factors that can affect a location's climate. Click each of the buttons to learn more.

# Module: Physical Geography

## Topic Content: Factors That Affect Climate

### Latitude

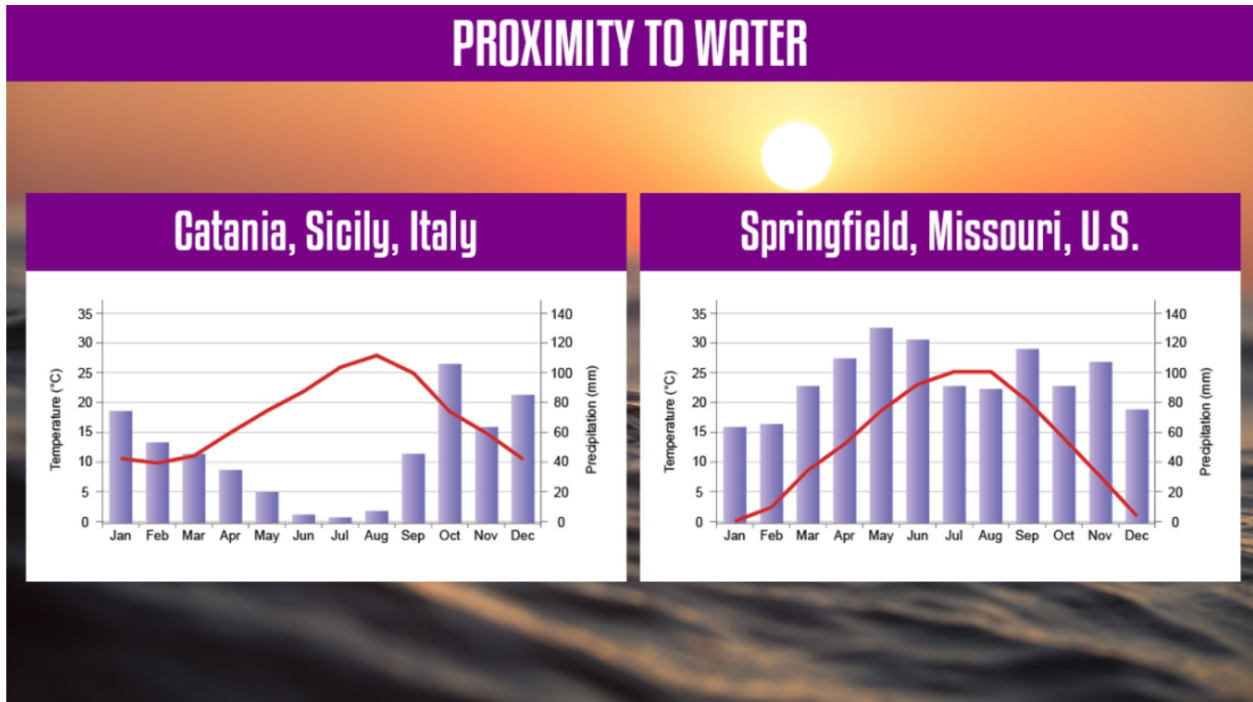


Latitude is used to measure a location's distance north or south of the equator. Lines of latitude are measured in degrees and circle the globe parallel to the equator. The equator has a latitude of zero degrees, the North Pole has a latitude of ninety-degree north, and the South Pole has a latitude of ninety degrees south. Places located near the equator tend to be warmer than places farther from the equator. This is because the equator receives direct sunlight all year long, whereas locations farther away from the equator receive less direct sunlight at particular times of the year. This change in direct sunlight is caused by the tilt of the Earth's axis as it orbits the sun. Latitude is the most important variable in determining a place's climate, because it impacts every location on Earth.

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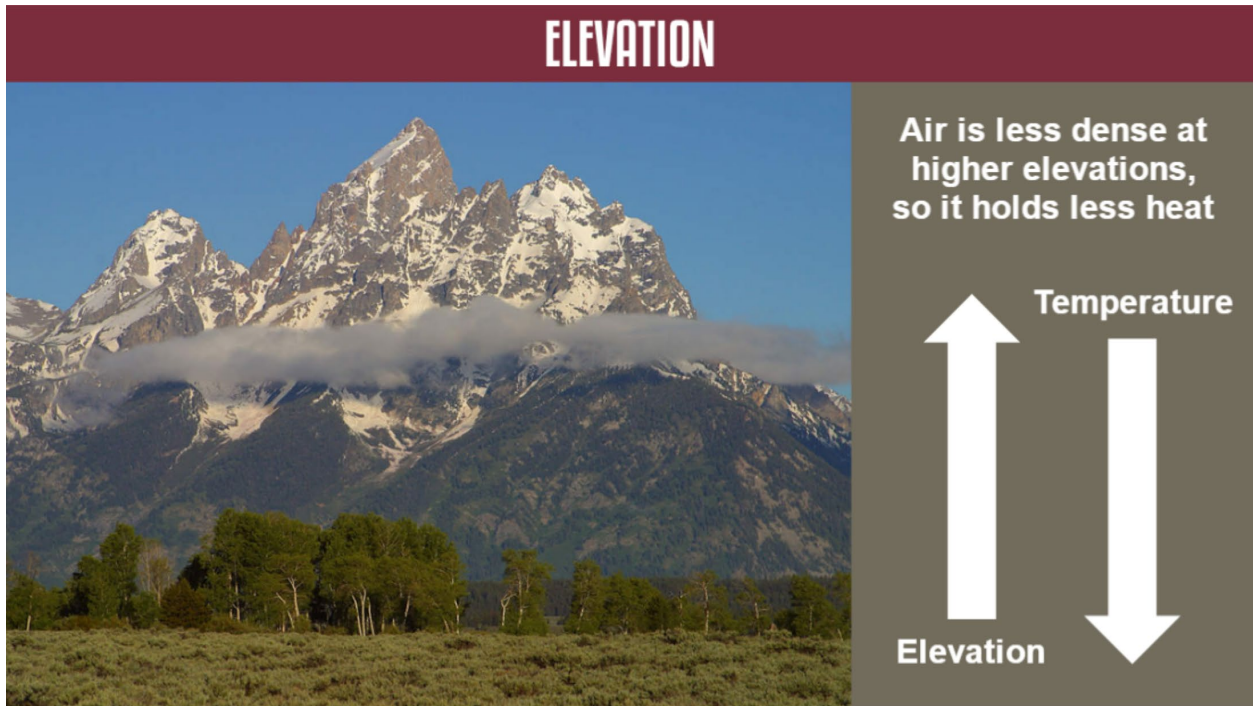
### Proximity to Water



Large bodies of water, like oceans, seas, and large lakes, tend to moderate the local climate. This means that places located near a large body of water generally have mild temperatures, and experience less of a difference between high and low temperatures throughout the year. Conversely, places located farther from a large body of water experience greater variations in temperature. This occurs because water heats up and cools down more gradually than land, which helps keep the temperature of the air over a body of water more consistent. Take a look at the climate graphs for Catania, Sicily and Springfield, Missouri. Both of these cities are located at 37° North latitude; however, Catania is on an island in the Mediterranean Sea, while Springfield is not near any large bodies of water. Notice that the average temperatures in Catania have a narrower range than those in Springfield.

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**Elevation**

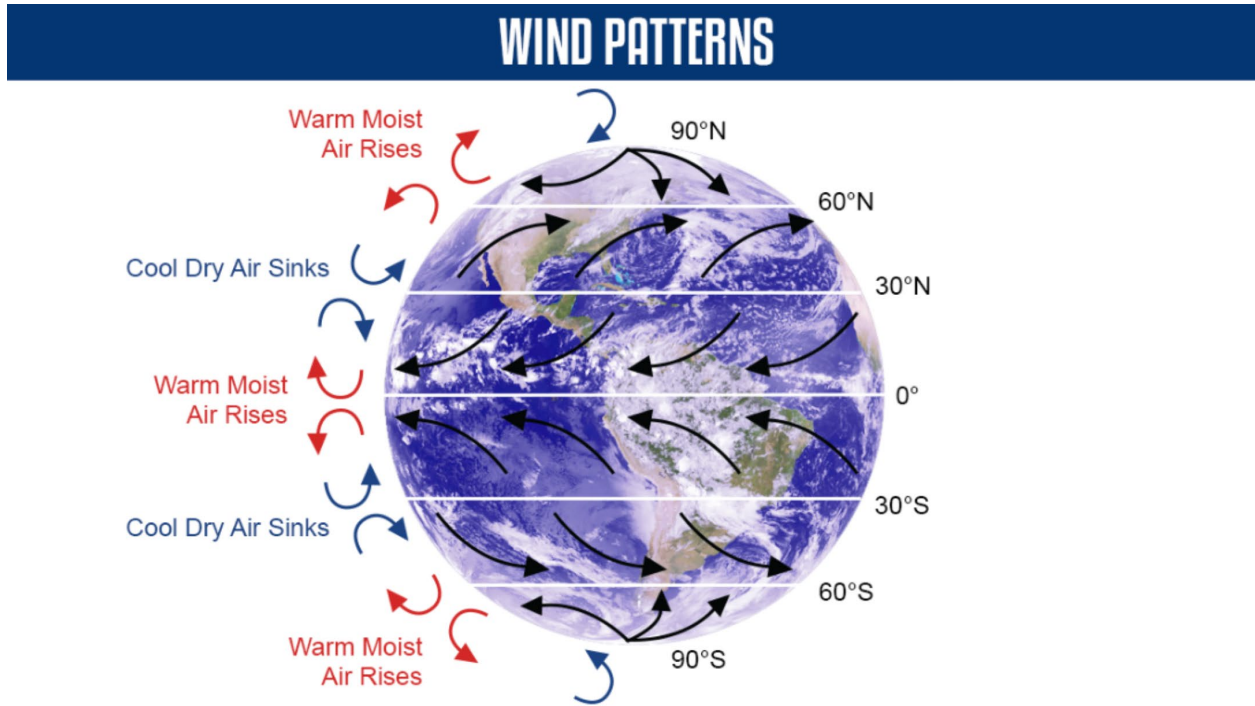


Elevation affects climate because air at higher elevations is less dense, and therefore holds less heat. As the elevation increases, the temperature tends to decrease. For example, the top of a mountain is more likely to have a colder climate than the area at its base, as depicted in this image of Grand Teton National Park.



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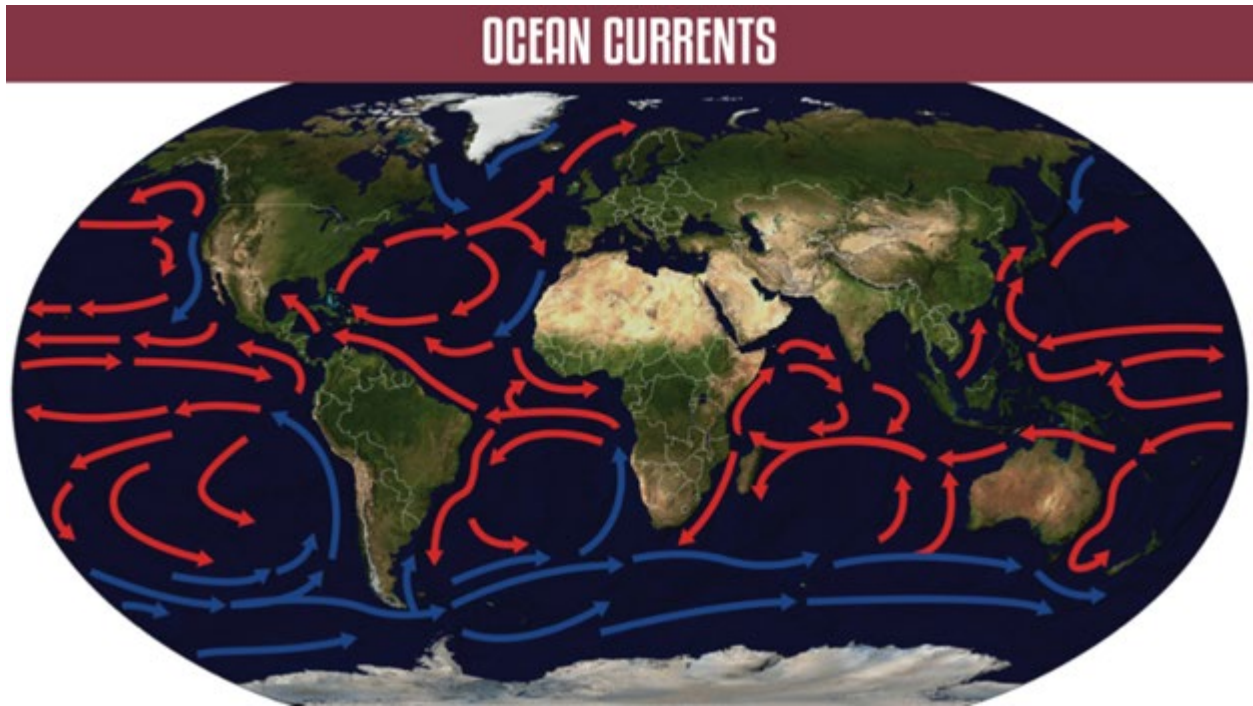
**Wind Patterns**



Earth has a general wind pattern. Winds that originate from the equatorial region tend to be warm and moist, while winds that blow from the polar regions tend to be cool and dry. A place's location relative to these winds can impact its climate pattern.

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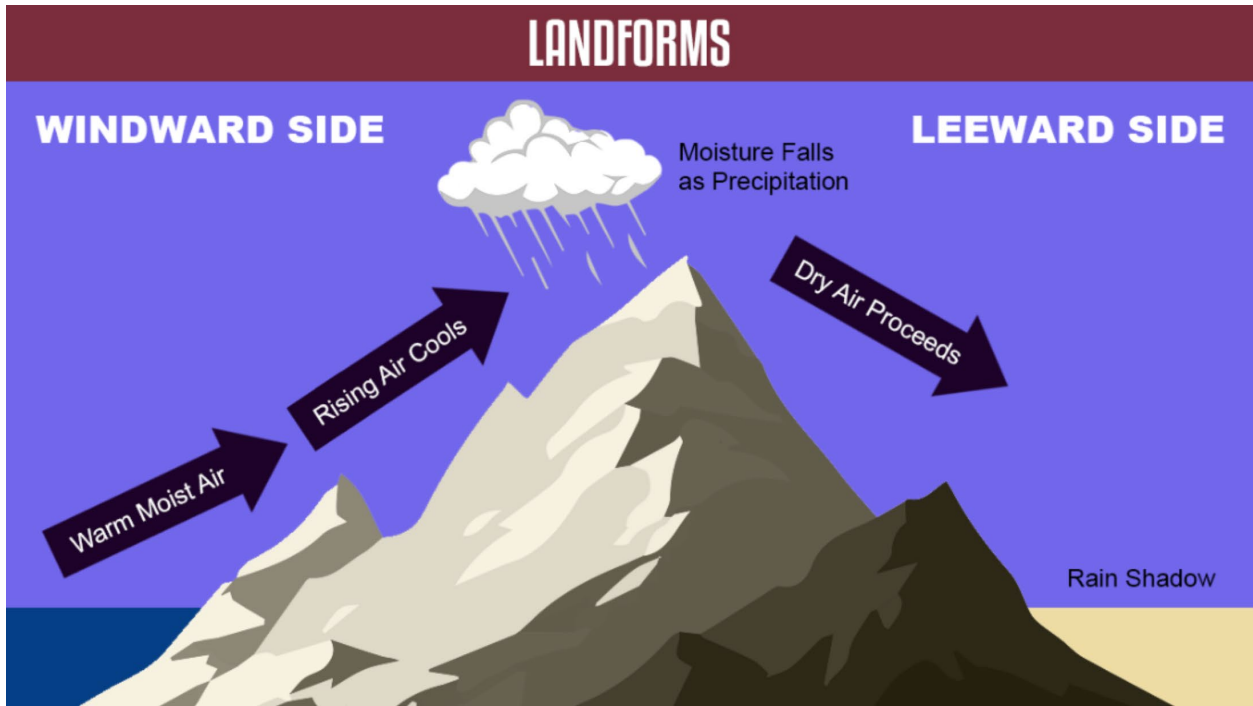
**Ocean Currents**



Ocean currents are patterns of warm or cold water that move through the ocean. A warm current can help moderate or even raise temperatures along the coast, while a cold current can decrease coastal temperatures. For example, Iceland has a much warmer climate than one would expect for its latitude, because it lies in the path of the North Atlantic current, which brings warm water to the island from areas closer to the equator.

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**Landforms**



Landforms, especially mountains, are able to influence the amount of precipitation a location receives. The “rain shadow effect” begins as warm, moist air blows in from the sea. When the air hits a mountain, it rises. As elevation increases, temperature decreases, thus the air cools as it rises up the mountain. As the air cools, it cannot hold as much moisture, so the moisture falls out of the air as rain or snow. By the time the air crosses the peak of the mountain, it has become very cool and has little moisture left. Therefore, the other side of the mountain receives little rain. This is called the “rain shadow effect.” The side of the mountain that the wind comes from, called the windward side, gets more rain than the leeward side. Sometimes the leeward side of a mountain receives so little rain that it has a rain shadow desert. The rain shadow effect can be observed in the Rocky Mountains, which span western North America. Due to the mountainous terrain, the northern part of the Rocky Mountains receives almost three times as much precipitation as the southern part, which is drier, particularly in the rain shadow.