

## Lesson 4: Resource Sheet 1

### Factors affecting weather and climate

#### Latitude

As Figure 1 shows, energy from the sun has twice the area to heat at latitude 60° north (and 60° south) than it has at the Equator. As a result, average temperatures generally fall as you move from the Equator towards the poles.

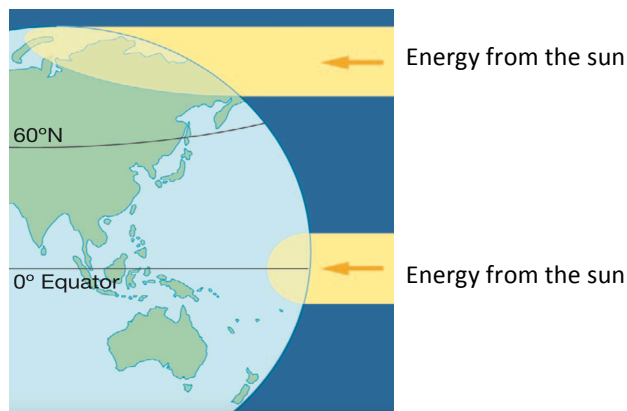


Figure 1: The energy coming from the sun must spread over a much larger area of the earth's surface as you approach the poles. As a result, temperatures decline as you approach the poles.

#### Seasonal differences

The angle at which the earth tilts as it travels (revolves) around the sun influences:

- the angle at which the sun's rays reach the earth's surface
- the changing of the seasons
- the number of daylight hours

In December to February the Southern Hemisphere is tilted towards the sun. From June to August, the Northern Hemisphere is tilted towards the sun. This is why the Northern Hemisphere has its summer in the middle of the year, while Australia is having its winter. See Figure 2.

Because the earth's axis is tilted at an angle of 23.5°, there are seasonal differences in the number of daylight hours we have each day. The shorter the day, the less opportunity there is for the earth and its atmosphere to absorb heat from the sun. This is why the number of daylight hours in Australia's winter is less than the number we have in summer. It also helps to explain why Australia's winters are cold and summers hot.

## Revolution of the earth- Seasons and length of daylight hours

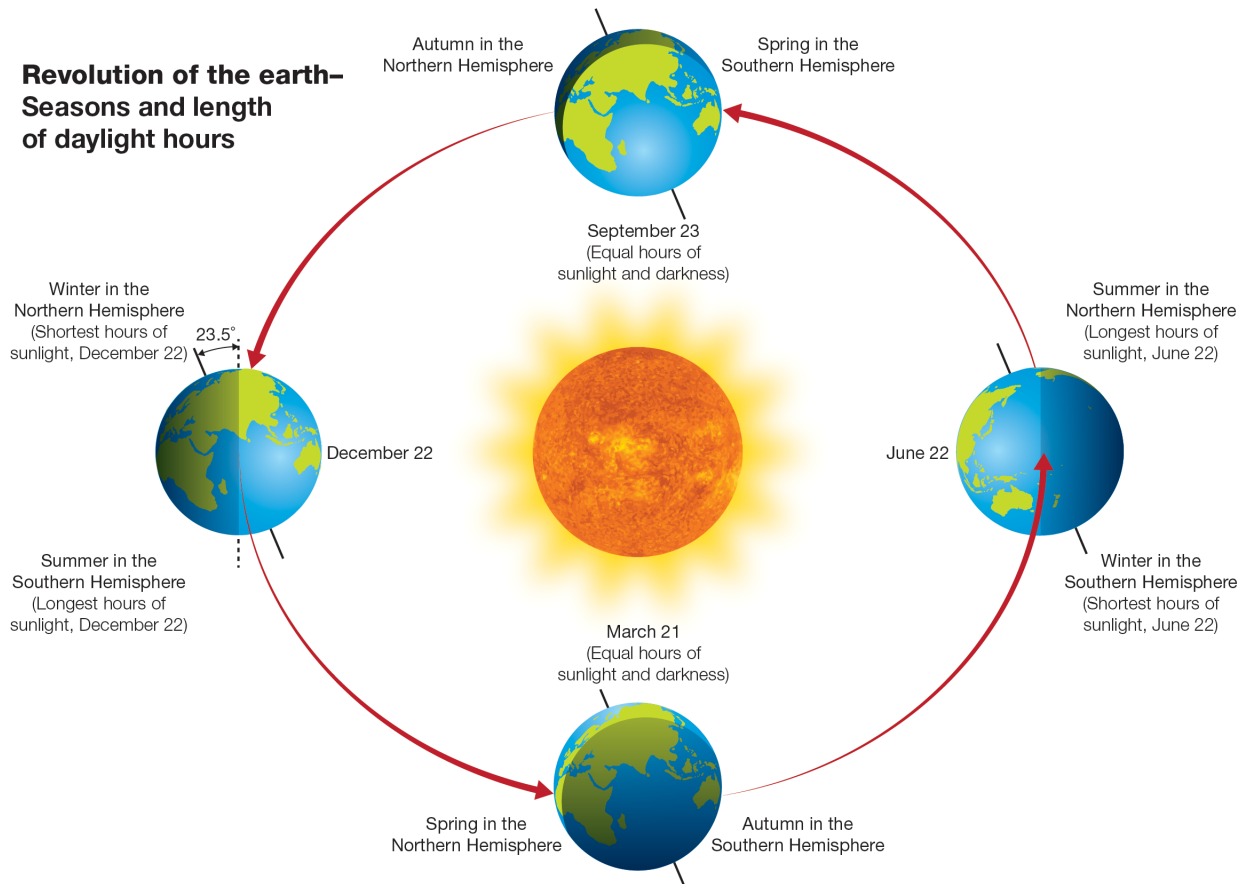


Figure 2: Seasonal changes in weather and climate are a result of the earth's revolution around the sun and the tilt of the earth's axis.

## Aspect

The direction in which a place faces is known as its aspect. Places facing the sun will generally be warmer than ones that don't.

## Altitude

Because of their or height above sea level (elevation) mountain areas are cooler than areas at lower elevations. On average, temperature drops about 6.5°C with every 1,000 metres of increase in elevation.

## Distance from the sea

Distance from the sea influences both temperature and rainfall:

- **Temperature:** The world's oceans gain and lose heat much more slowly than the land. The ocean, therefore, maintains more even temperatures. Places near the coast experience smaller differences in temperature than inland places. Places away from the coast can have higher temperatures during the day and lower temperatures at night because of the speed at which land gains and loses heat.
- **Rainfall:** Winds blowing off warm seas carry a lot of moisture. Because of this, places near the coast often receive less rainfall than those further inland. By the time the winds reach inland areas, they have lost most or all of their moisture.

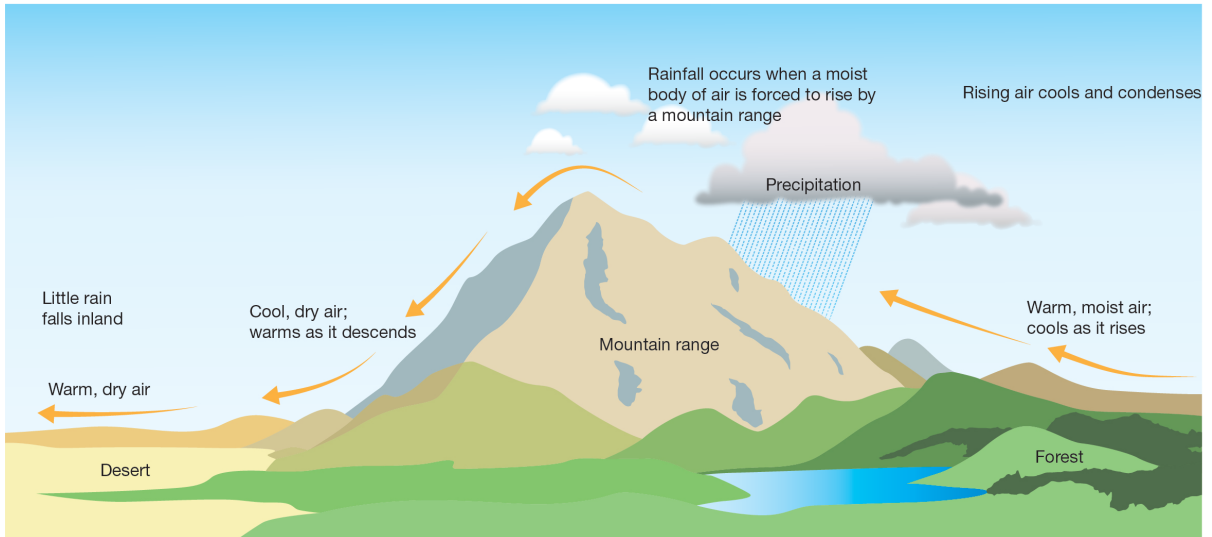
## Ocean currents

The temperature of ocean currents influences both temperature and rainfall.

- **Temperature:** Oceans absorb heat during the day and release it slowly during the night. This helps keep coastal areas much warmer than inland areas.
- **Rainfall:** Water evaporates much more quickly from oceans affected by warm ocean currents. As a result, nearby coastal areas are likely to have higher levels of rainfall. Areas affected by cold ocean currents are likely to experience lower rainfall as a result of lower evaporation rates. The waters off the west coast of Australia are quite cold. As a result, the deserts of Western Australia extend to the sea.

## Mountain barriers

Mountains act as barriers to the movement of air. When warm, moist air meets a mountain, it is forced to rise. As the air cools, the moisture it carries condenses and rain falls on the windward side of the mountain. This is the side facing the wind. The air that then flows over the mountain is much drier. Deserts are often found on the leeward (sheltered) side of large mountain ranges. See Figure 3.



*Figure 3:* As warm moist air is forced to rise by a mountain range, condensation occurs and rainfall develops. The air beyond the mountains is dry resulting in little rainfall.