

## CLIMATE REGIONS

### LESSON 1

#### FACTORS THAT INFLUENCE TEMPERATURE AND RAINFALL

Different areas experience different temperature and rainfall patterns. There are five different factors that affect temperature and rainfall:

- Distance from the equator (latitude)
- Distance from the sea
- Height above sea level
- Ocean currents
- Mountains (relief)

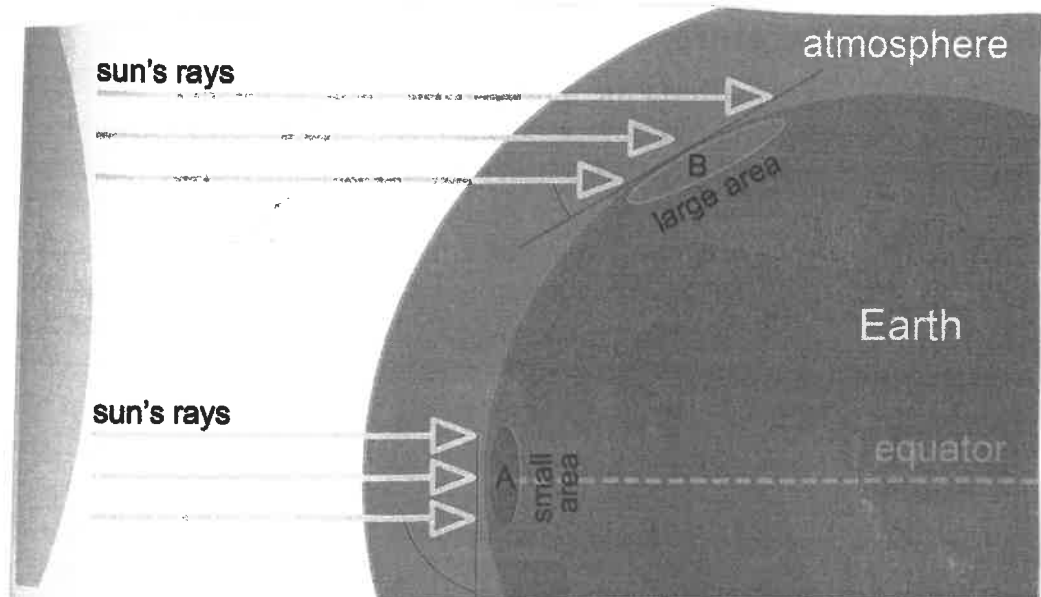
How do the above factors affect temperature and rainfall?

Distance from the equator

- Temperature decreases with latitude.
- The further away from the equator a place is, the lower the average temperature.
- Places that are close to the equator have higher temperatures than places close to the poles.
- The decrease in temperature is caused by the fact that the Earth's surface is curved.
- At the equator the temperature is high because they receive direct rays from the sun and the sun's rays are concentrated on a small area.
- At the poles because of the shape of Earth, the rays are spread over a larger area therefore greater area to heat up.

How latitude influence rainfall and temperature

- Places close to the equator will have higher temperatures than the polar regions.
- Places with high temperatures will have more chances of rainfall than places with lower temperatures.



The angle at which the sun's rays strike the Earth

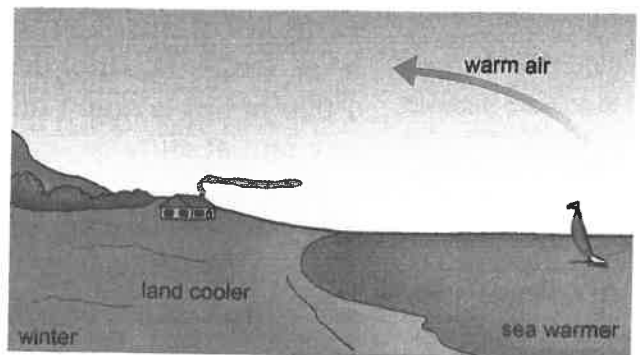
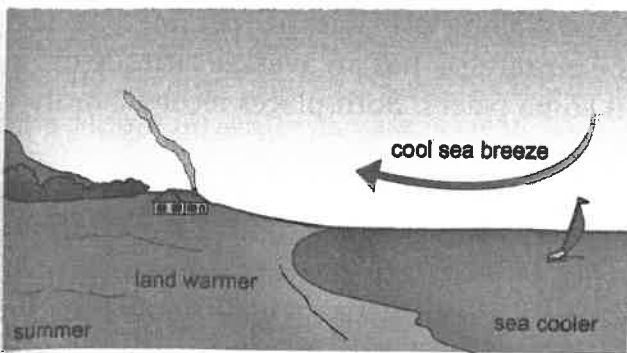


### Distance from the sea

The sea affects the climate of a place. Temperature and rainfall are influenced by how far a place is from the sea. Places far from the sea have hotter summers and cooler winters than places close to the sea. On the coast the temperatures during winter are warmer and summers are cooler than places which may be at the same latitude but are far from the sea. The sea helps to cool coastal places in summer and warms them in winter.

How distance from the sea influence rainfall and temperature?

- Places near the sea where there is a warm ocean current are likely to get more rain than places that are further inland.

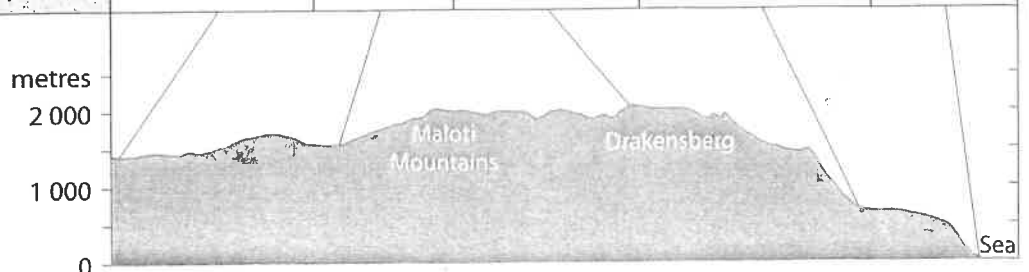


The effects of the sea on temperature.

### Height above sea level (altitude)

The higher the place is, the lower the temperature. Temperature decreases with height (the higher you go the colder it gets). As altitude increases the atmosphere becomes less dense. Incoming solar radiation (energy from the sun) passes through the atmosphere without heating it. Radiation only begins to heat the land and oceans when it strikes Earth's surface. Mountainous areas and high areas are cooler than those at lower altitudes. Temperatures decrease by 6,5°C for every 1000 metre increase in altitude

	Bloemfontein	Maseru	Mokhotlong	Pietermaritzburg	Durban
Altitude	1 400 m	1 528 m	2 178 m	658 m	4 m
Mean annual temperature	16,1°C	15,1°C	13,1°C	19,2°C	20,4°C
Precipitation	560 mm	691 mm	638 mm	927 mm	1 009 mm



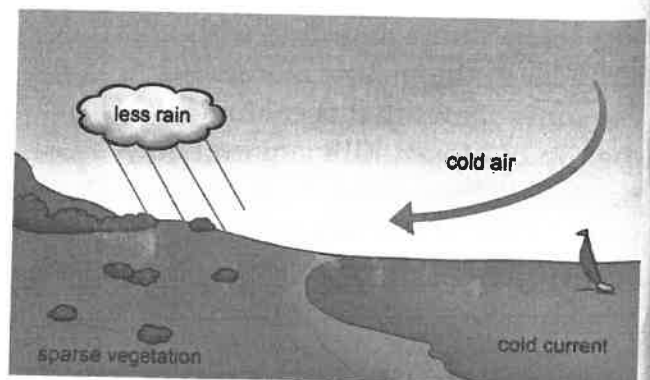
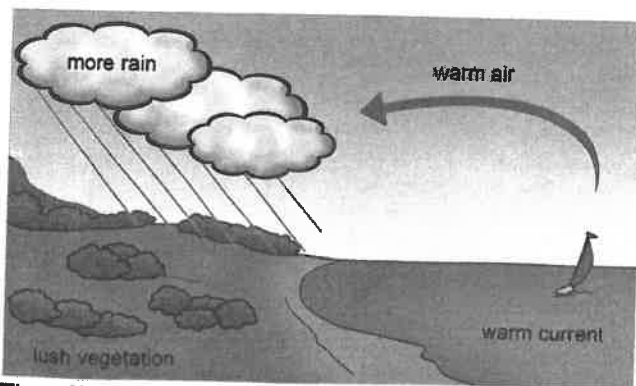


## Ocean currents

Ocean currents can be warm or cold. The main causes of ocean currents are winds, differences in water temperature and the rotation of Earth. Ocean currents affect the temperature of coastal areas by increasing or decreasing temperatures. Ocean currents also influence rainfall.

How ocean currents influence rainfall and temperature?

- Currents that flow from close to the equator are warmer currents.
- Currents that begin close to the poles are cold currents.
- Water from the warmer oceans evaporates to form clouds and rain will fall (places next to warm ocean currents often have warm temperatures and high rainfall)
- Places near cold currents are much drier.



The effects of currents on temperature.

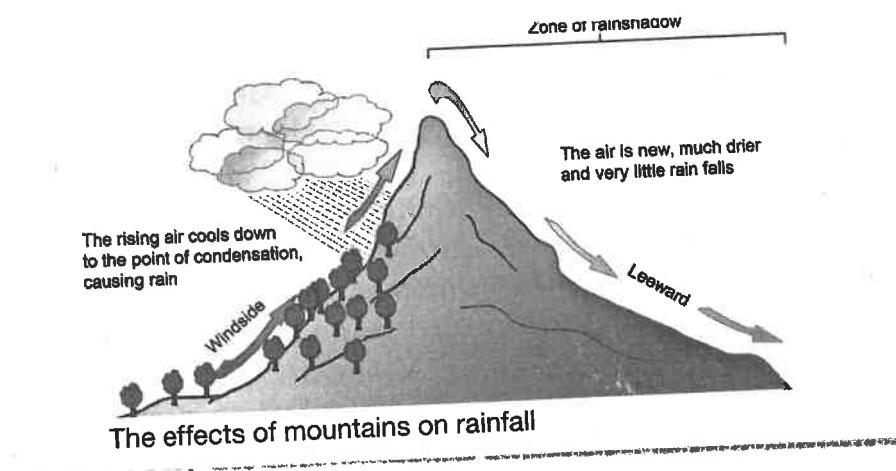
## Mountains (relief)



Relief refers to the shape of the land. Some areas receive more solar radiation than others. Some places face the sun while other places face away from the sun and are in the shade for long periods.

How mountains influence rainfall and temperature?

- Mountain slopes that face the sun are warmer than those that do not.
- Places that receive more hours of radiation will have higher temperatures.
- There are two sides of the mountain that is the side that is facing the sun and the side that is in the shadow.
- The side that is facing the sun is called the windward side and the side in the shadow zone is called the leeward side.
- On the windward side the temperature will be high since that side is facing the sun and on the leeward side the temperature will be low.
- More rain will fall on the windward side of the mountain because warm air is forced to rise over the mountain, as it rises it cools and the water vapour condenses, producing clouds and rain.
- On the leeward side there is no rain because the air is cool therefore it will descend.
- The dry side of the mountain is called the rain shadow zone.



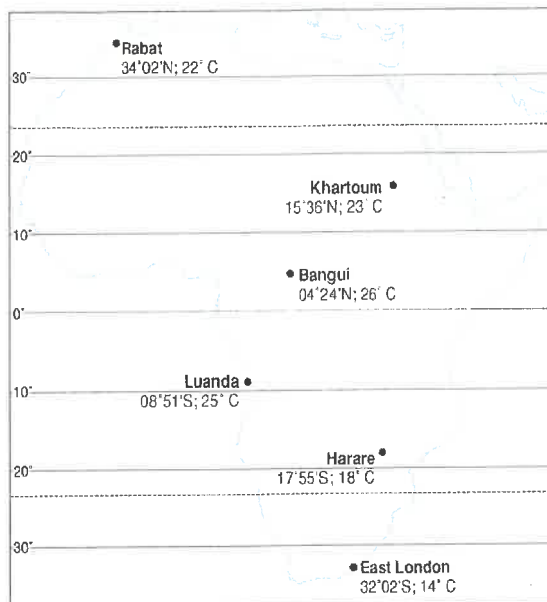




## ACTIVITY 1

1. Draw your own diagram to explain how the Earth's shape affects temperatures

Refer to the map below to answer the following questions



**Figure 3** Latitude and average September temperatures for five African cities.

2. Arrange the places in order from the equator. Start with the closest places. For each place indicate the temperature and the distance from the equator.
3. Use your atlas to locate the following places and answer the questions for each
  - a) Perth (Australia)
  - b) Moscow (Russia)
  - c) Durban (South Africa)
  - d) Singapore (near Malaysia)
  - How far are they from the equator? (their latitude)
  - Are they coastal or inland cities?
  - If coastal, are they near a warm or cold ocean current?

