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## **Kinds of climate**

There are different kinds of climate in different parts of the world. Each kind of climate has certain temperature and rainfall characteristics. You will learn about 11 different kinds of climate.

### **Equatorial climates**

Equatorial climates are very hot and very wet throughout the year. They do not have different seasons.

### **Tropical climates**

Tropical climates have hot summers, with warm winters. These areas also have high rainfall, which occurs mostly in summer.

### **Subtropical climates**

The subtropical climate is similar to that of the tropical climate. Summers have relatively high temperatures and the precipitation is evenly distributed throughout the year.

### **Temperate**

Temperate climates have warm summers and cool winters. These areas get quite a lot of rain, mostly in summer. However, some areas have rain throughout the year.

### **Desert climates**

Desert climates are very dry, with almost no rain. Some years there is no rainfall. Deserts can be hot or cold: the main characteristic is the very low rainfall. In hot deserts, the days can be very hot, while the nights are very cold.

### **Semi-desert climates**

Semi-desert climates have very little rain, usually less than 250 mm per year. As with the desert climates, these areas can be hot or cold, with the low rainfall as its main characteristic.

### **Continental climates**

Continental climates have warm summers and cold winters. This means that they have a large temperature range. These areas receive quite a lot of rain, which falls throughout the year.

### **Polar climates**

Polar climates are very cold throughout the year. There is very little precipitation, and it comes in the form of snow. The land is covered in ice and snow throughout the year.

### **Mediterranean climates**

Mediterranean climates have hot, dry summers and (relatively) warm, wet winters. These areas get a fair amount of rain, almost all of it in the winter months.

### **Tundra**

Tundra climates have cool summers and very cold winters. Most precipitation is in the form of snow. The snow melts in summer, but the ground just below the surface remains frozen.

### **High mountain (alpine)**

High mountain climates are affected by altitude. They are different in different places. However, the temperature is lower than it would be if there were no mountains. These areas have heavy rain or snow.

# Temperature and rainfall characteristics of different kinds of climate (bar and line graphs)

The graphs below show the mean monthly rainfall and temperature figures of one place from each climate region. Places in the same climate region will have similar graphs. Rainfall is shown as a bar graph, and temperature as a line graph. Graphs like these, which show both temperature and rainfall, are called **climate graphs**. Look at the graphs and read the information to find out about the rainfall and temperature characteristics of each climate region. Take note of the latitude of each place. It will help you determine when it is summer and winter in that place.

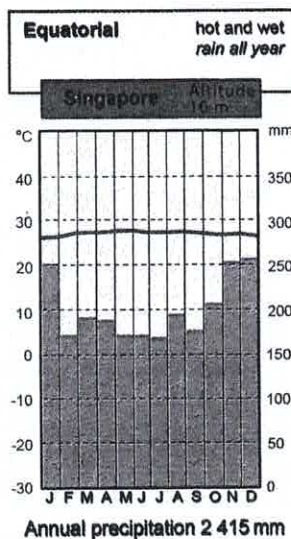
## New word

**climate graphs:** graphs that show the temperature and rainfall of a specific place over a number of months or years

**Equatorial: Very hot and very wet**

Singapore: 1°22'N

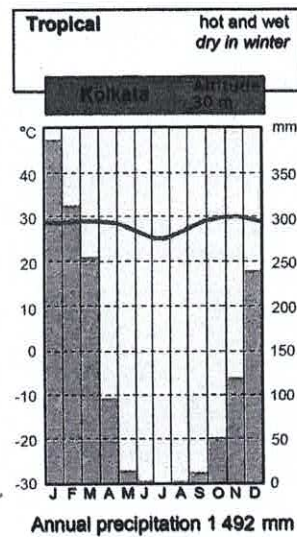
Annual rainfall: 2 415 mm



**Tropical: Hot and wet**

Kolkata: 12°28'S

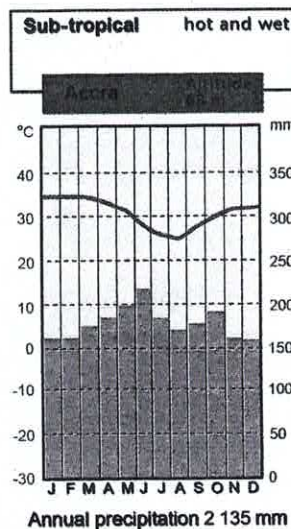
Annual rainfall: 1 492 mm



**Sub-tropical: hot and wet**

Accra, 5°33'S

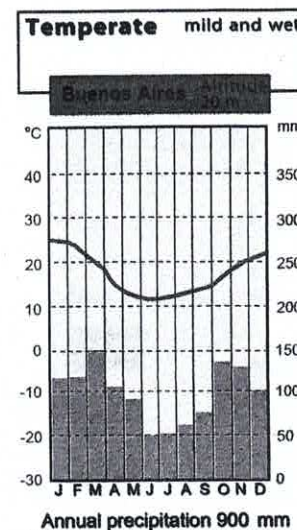
Annual rainfall: 787 mm



**Temperate: Mild and wet**

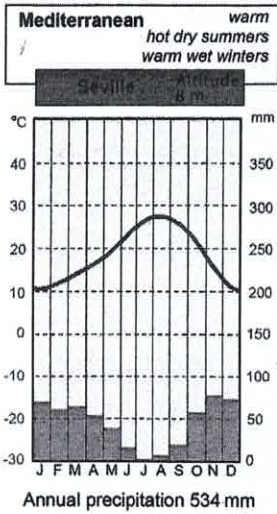
Buenos Aires, Argentina: 34°35'S

Annual rainfall: 900 mm

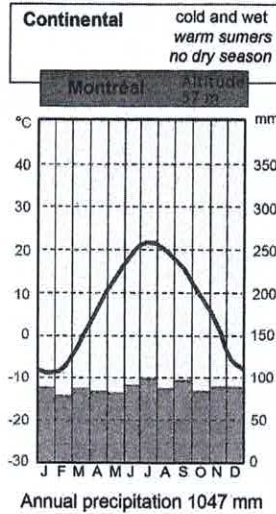


**Mediterranean: Warm, most rain in winter**

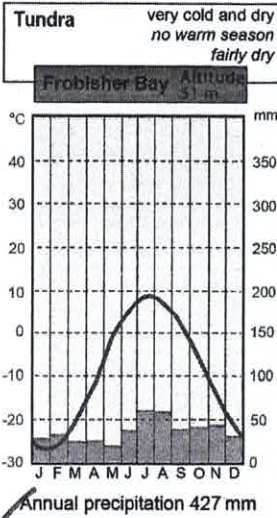
Seville, Spain: 37°24'N  
Annual rainfall: 534 mm



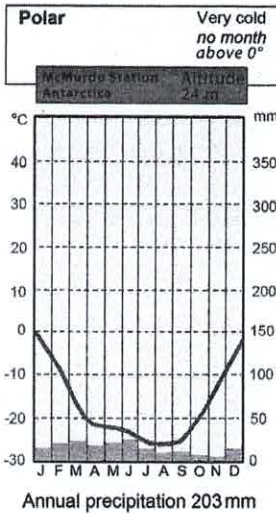
**Continental: Cold and wet**  
Montreal, Canada: 45°30'N  
Annual rainfall: 1 047 mm



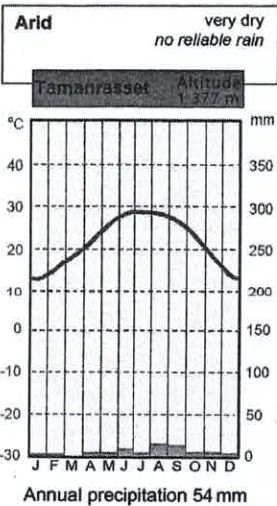
**Tundra: Very cold and fairly dry**  
Frobisher Bay, Canada: 53°12'N  
Annual rainfall: 427 mm



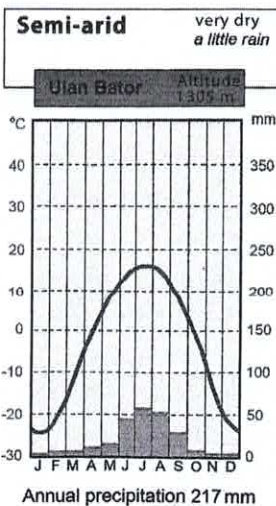
**Polar: Very cold - no month above 0 °C**  
McMurdo station, Antarctica 77°88'S  
Annual rainfall: 203 mm



**Desert: Almost no rain**  
Tamanrasset, Algeria: 22°48'N  
Annual rainfall: 54 mm



**Semi-desert: Very little rain**  
Ulan Bator, Mongolia: 47°55'N  
Annual rainfall: 217 mm



# Climate regions of the world

Large areas of land that have the same kind of climate are called climate regions. The map on page 63 shows you where the Earth's main climate regions are.

## Links between climate regions and factors that affect temperature and rainfall



There are many links between the world's climate regions and factors affecting temperature and rainfall. Here are some of the most important ones:

### The effect of latitude

- The climate regions with the highest temperatures are closest to the equator, and those with the lowest temperatures are closest to the poles.
- The regions with the highest rainfall are in the latitudes where air rises and cools to form rain.
- Desert and semi-desert regions are found close to latitudes 30° north and south: latitudes where air sinks.
- The Mediterranean regions are all on the west coast of continents, between latitudes 30° and 40° north and south. These are the latitudes to which the small weather systems that form between 40° and 60° north and south bring rain in winter.

### The effect of altitude and relief

- The world's main mountain ranges and other high areas all have a mountain climate, with lower temperatures than lower places at the same latitude.
- In Southeast Asia, moist winds blow from the sea over India and the Himalayas. Places on the windward side of the Himalayas get much more rain than the leeward side to the north. This is why the wet tropical and temperate regions are south of the mountains, and the dry desert and semi-desert regions are to the north.

### The effect of distance from the sea

- Large areas of Europe, Asia and North America at high latitudes have continental climates with large temperature ranges because the areas are far from the sea.

### The effect of ocean currents

- Each of the southern continents is wetter on its east than west coast at about latitude 30° south because of the warm current off the east coast and the cold current off the west coast.
- Great Britain has a temperate climate because of the warm Norwegian current, while the east coast of Canada (at the same altitude) has a colder continental climate because of the colder Labrador current.

# Revision

## Revision summary

- Temperature and rainfall are affected by factors such as latitude, distance from the sea, altitude, ocean currents and relief.
- Places at low latitudes near the equator have higher temperatures than places at higher latitudes, nearer the poles.
- Latitudes where air rises, cools and condenses are more likely to have rain than places where air sinks.
- The sea has a moderating effect on temperature; places near the coast are not as hot or as cold as places further inland.
- Places on the coast will have more rainfall than places further inland when warm, moist winds blow onshore from the sea and cause rain near the coast.
- Temperature decreases with altitude, but altitude does not affect rainfall.
- Wind blowing over a warm current will collect more water vapour and bring more rain than wind blowing over a cold current.
- Mountains affect temperature as temperature decreases with altitude.
- Mountains affect temperature by causing air to rise, cool and therefore bring about rain on the windward side of the mountain. The windward side gets more rain than the leeward side, which is in a rainshadow.
- South Africa's climate is affected by the factors affecting temperature and rainfall:
  - Places at higher altitude are colder than places at a lower altitude.
  - Places on the east coast are warmer than places on the west coast because of the warm Mozambique current on the east coast and the cold Benguela current on the west coast. These places also receive more rain.
  - Places inland have a greater temperature range than coastal places.
  - More rain falls on the windward than the leeward side of the escarpment and the mountains in the south of the Western Cape. The Karoo is dry because it is in a rainshadow.
- Temperature, rainfall, humidity and wind are all elements of weather. Daily variations in these elements are referred to as weather, while climate is the weather pattern in an area measured over a longer period of time (30 years or longer).
- Large areas of the world have the same climate. These are called climate regions.
- Different climate regions have different summer and winter temperatures, different amounts of rainfall and different seasonal patterns of rain.
- The conditions in each climate region are related to the factors affecting temperature and rainfall.

**Activity****Read and interpret graphs**

1.1 Copy the table below into your workbook.

1.2 Use the graphs and other information to help you complete it.

Kind of climate	Highest monthly temp (°C)	Lowest monthly temp (°C)	Temperature range (°C)	Highest monthly rainfall (mm)	Lowest rainfall (mm)	Annual rainfall (mm)
Equatorial	29	28	1	260	170	2 415
Tropical		25		380	0	1 492
Subtropical						
Temperate	26	11	15	150	50	
Mediterranean		10	18	75	0	534
Continental	21	-9	30	100		1 047
Tundra	9		37	60	20	427
Polar		-25		25	5	203
Semi-desert	16	-24		60	2	217
Desert	29	12	17		0	54

[10]

2 Use your table to help you say which kind of climate has:

- 2.1 the lowest temperature (1)
- 2.2 the highest temperature (1)
- 2.3 the smallest temperature range (1)
- 2.4 a temperature range of 30 °C or more (4)
- 2.5 the most rain in a year (1)
- 2.6 the least rain in a year (1)

[9]

3 Which kind of climate receives rain mostly during winter? [1]

Total: 20 marks