

# Factors that affect climate

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## LATITUDE

### **1. What is a key factor in determining whether the temperature of an area is hot or cold?**

Distance from the equator is the key determining factor whether a region is hot or cold.

### **2. Why does Canada have such a wide range of annual temperature ranges?**

The wide ranges in latitude has a major impact on the climate in Canada

### **3. What happens to the temperature as the latitude increases?**

As latitude increases, in Canada, temperatures become cooler.

4. The sun's rays are more direct at the equator than the poles because the sun's rays spread their heat/energy over a much larger area

## OCEAN CURRENTS

1. The temperature of an ocean current affects the temperature of the air that passes over it.

### **2. What determines whether it is a cold or warm current?**

The temperature of an ocean current in comparison to the surrounding water determines whether it's a cold or warm current.

3. The North Pacific current on the West Coast of Canada heats the cool, moist air that passes over it, giving the coastal regions of British Columbia a milder climate that might be expected at this latitude.

### **4. Using the same explanation as above, explain how ocean currents affect the climate on the East Coast of Canada.**

On the east coast, the cold Labrador Current, which flows southward from the arctic, cools the air of the coastal locations in Labrador and northern Newfoundland.

### **5. Is 15 degrees Celsius a cold or warm current?**

An ocean current of 15°C is a warm current if the surrounding water is 13°C, but is considered to be cold if the surrounding water is 18°C.

## **6. How is fog produced?**

- 1) The meeting of warm air and cold air creates fog.

## **WIND AND AIR MASSES**

### **1. What is an air mass?**

An air mass is a large volume of air that takes on the climatic conditions of the area where it formed.

2. An air mass originating over the ocean contains considerable amount of water. As air passes over land, the moisture is released in some form of precipitation.

### **3. What effect will these air masses (originating over water) have on maritime environments?**

A maritime location is more likely to receive precipitation than inland or continental locations.

### **4. Describe the characteristics of an air mass that begins over a continental environment.**

This air will be dry because it lacks a ready source of moisture.

### **5. In general, air masses take on the characteristics of what?**

This air mass will take on the characteristics of the area in which they form.

### **6. What is air pressure?**

7. Air tends to move from high pressure areas (cold, heavier, denser air) to low pressure areas (warmer, lighter, less dense air).

### **8. What is wind?**

Wind is the result of air moving from a high-pressure area to a low-pressure area

### **9. What are prevailing winds?**

Prevailing winds are winds that are most commonly found in an area. In Canada, the prevailing winds are the westerlies which blow from west to east.

10. The prevailing winds over most of Canada blow from the **west** to the **east** and are called the **westerlies**. They move the **air masses** that affect Canadian climate.

11. **What is a polar front?**

A polar front is a stormy boundary between cold, dry polar air and warm moist tropical air.

12. The polar-front jet stream is high in the atmosphere (above the polar front) and is a **current of fast moving air**. This jet stream moves from **west** to **east** and controls the location of the polar front.

13. **What is the temperature of the air to the north and south of the polar-front jet stream?**

To the north of the jet stream, there is cold air, while to the south of the jet stream there is warm air.

## **ELEVATION**

1. **What happens to the air temperature as elevation increases (gets higher)?**

As air rises, it expands because of the lower air pressure. As the air expands, it cools.

2. **What is the dewpoint?**

When air is cooled, it eventually reaches a temperature at which it is saturated with water vapour that is it is holding as much water as it possibly can at that temperature and air pressure. This is called dewpoint.

3. **What is condensation?**

Further cooling once the air had reached its dewpoint is called condensation. Condensation is the change of water vapour into liquid water.

**RELIEF** (refers to the difference in elevation):

1. **What acts as a barrier to the movement of air masses?**

Mountains

2. **Explain why Vancouver has a different climate than Calgary.**

Because of its location relative to the mountains.

3. Air temperature drops 1 degree Celsius for every 100 meters increase above sea level. Therefore, if a mountain is 1400 meters above sea level and the temperature at 0 meters is 15 degrees Celsius, the temperature at the peak of the mountain would be **1°C**.

4. As air rises up the windward slope of a mountain it expands and cools. As it descends down the leeward slope of the mountain it contracts and becomes warmer. Therefore, on the leeward slope of the mountain the climate is drier, warmer climate (rain shadow)

### **NEAR WATER:**

1. In your own words, explain how distance from water “moderates” continental and maritime climates.

#### **Continental climate:**

- The temperature range in these areas is great because there are no large bodies of water to moderate the hot temperatures of summer and cold temperatures of winter.

#### **Maritime climate:**

- Range between the highest and lowest average monthly temperature is relatively small because of the moderating effect of the large water body.