

WEATHER & CLIMATE

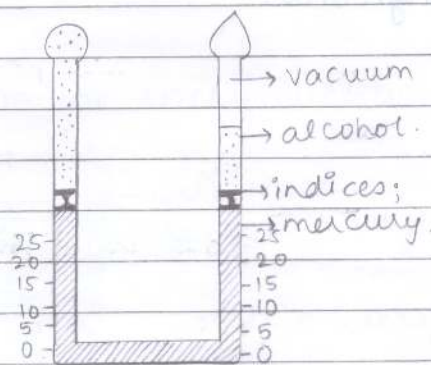
Weather is the state of atmosphere for a short period of time & over a small area.

Climate is the state of atmosphere for a long period of time & over a large area.

⇒ Elements of Weather:

→ Temperature:

Temperature is measured with a Six's minimum & maximum thermometer which records the minimum & maximum temperatures of a day in degrees celsius.



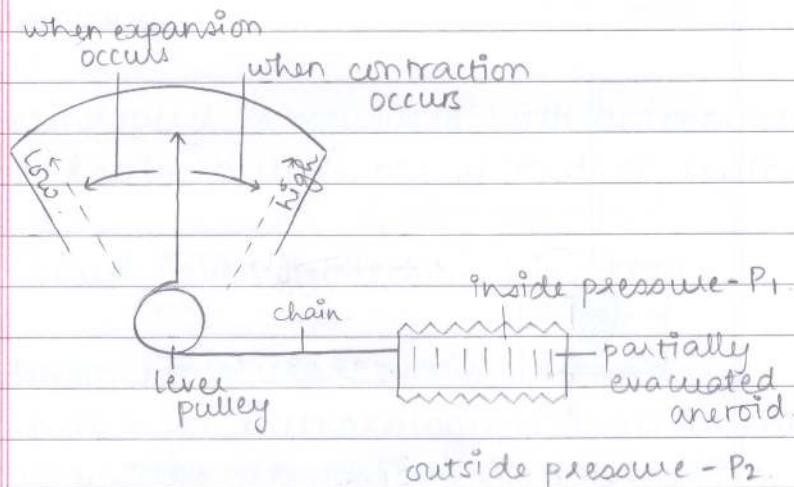
- The Six's minimum & maximum thermometer is made up of 3 columns - alcohol, mercury & alcohol. Mercury is sandwiched

between the columns of alcohol. When there is a change in temp, the whole sandwich contracts or expands.

- There are two indices to reset the thermometer. During the day, once they reach the maximum & minimum temperatures, they stay there.
- Contraction happens in the right direction.
- Expansion occurs in the left direction.

→ Pressure:

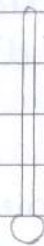
- Pressure is measured using mercury or aneroid barometer in millibars.



When $P_2 > P_1 \rightarrow$ The aneroid cell contract
 When $P_1 > P_2 \rightarrow$ The aneroid cell expands

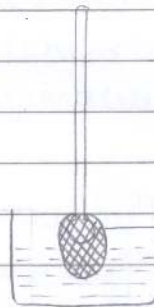
→ Humidity:

- Humidity is measured with hygrometer
- Relative humidity is measured with wet & dry bulb thermometer in %.



→ Dry bulb thermometer shows actual temperature of the air.

Temperature measured is T_d .



muslin cloth

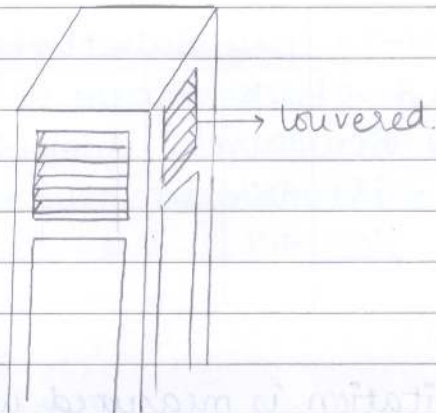
Temperature measured is T_w

The wet bulb thermometer works on the principle that evaporation causes cooling.

If $T_d = T_w \rightarrow$ Relative humidity is 100%.
If difference between T_d & T_w is greater, the relative humidity is less.

Td-Tw	Dry bulb temp	
	18°C	20°C
0°C	100%	
1°C	93%	
2°C	91%	

- Precipitation is measured with rain gauge in centimeters.
- Wind direction is determined by a windvane.
- Windspeed is measured with anemometer in knots, metres per second or km/hr.
- Cloud Cover is measured in oktas.
- ⇒ Stevenson's Screen is a standard shelter for meteorological instruments. It is kept at a height of 1.5 m from the ground by legs to avoid strong temperature gradients at ground level. It is painted white to reflect heat radiation because the temperature of the air in the shade is to be measured. It has louvered sides to allow free passage of air.



⇒ TEMPERATURE:

→ Max daily temp. (D_{max}).

→ Min daily temp (D_{min}).

→ Daily mean temp = $\frac{D_{max} + D_{min}}{2}$
(D_{mean}).

→ Daily range of temp (D_{range}) = $D_{max} - D_{min}$.

→ Monthly mean = $\frac{\sum D_{mean} \text{ of all days in month}}{\text{No. of days in month}}$
(M_{mean}).

→ Yearly mean (Y_{mean}) = $\frac{\sum M_{mean} \text{ of 12 months}}{12}$.

→ Yearly range of temp
(Yrange) = $\frac{\text{Max}}{\text{Mmean}} - \frac{\text{Min}}{\text{Mmean}}$

→ Daily mean temp tells how hot or cold a place or day is.

→ Daily range of temp tells the location of a place. If the difference is high, the place may be desert & if the difference is low, it may be a coastal area.

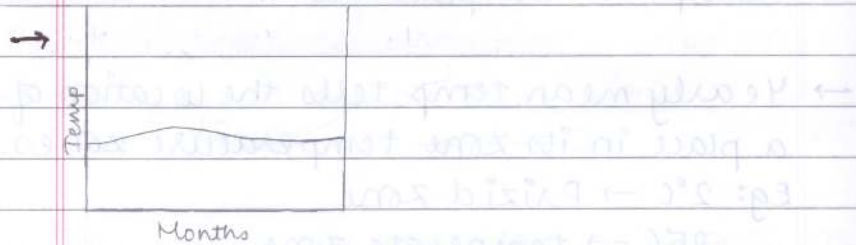
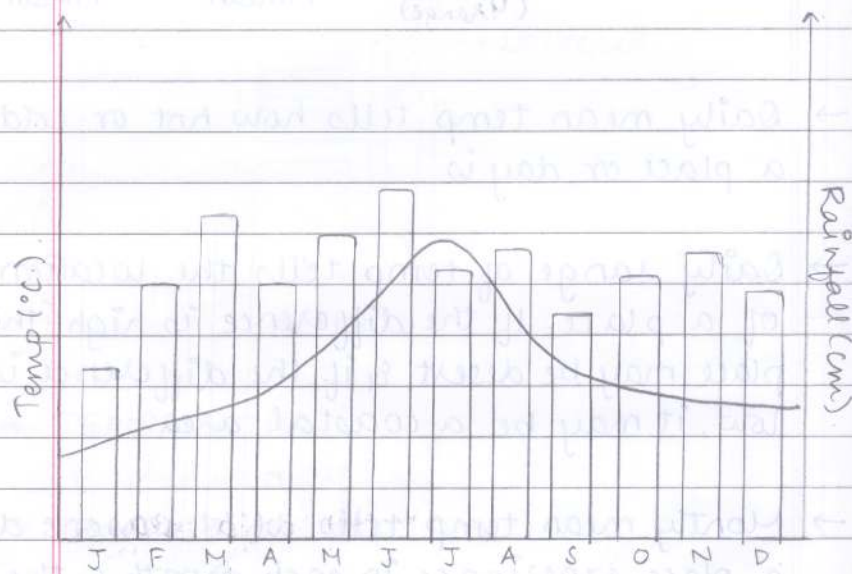
→ Monthly mean temp tells what seasons does a place experience in each month & the hemisphere the place lies in.

→ Yearly mean temp tells the location of a place in its ~~zone~~ temperature zones.

Eg: $2^{\circ}\text{C} \rightarrow$ Frigid zone

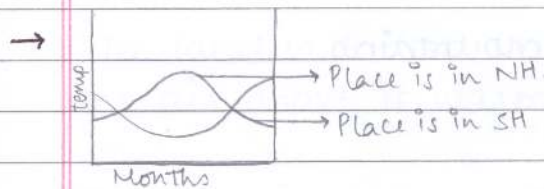
$25^{\circ}\text{C} \rightarrow$ temperate zone

→ Yearly range of temp tells how hot the summers & how cold the winters are of a place.



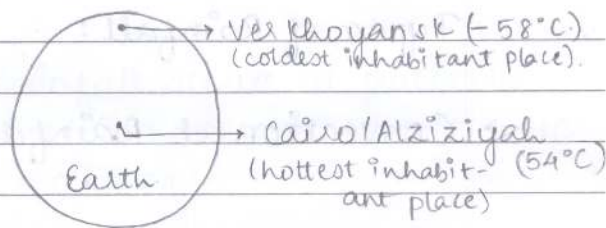
Flat graph indicates that:

- Annual range of temperature is less.
- Place is on the coast.
- There is hardly any difference between summer & winter temperatures.



→ SPACIAL VARIATION in temperature -
Change in temperature with place

TEMPORAL VARIATION in temperature -
Change in temperature with time



⇒ FACTORS affecting temperature of a place:

→ Latitude (affects annual mean temp)

→ Distance from sea (affects daily & yearly range of temperature).

→ Altitude

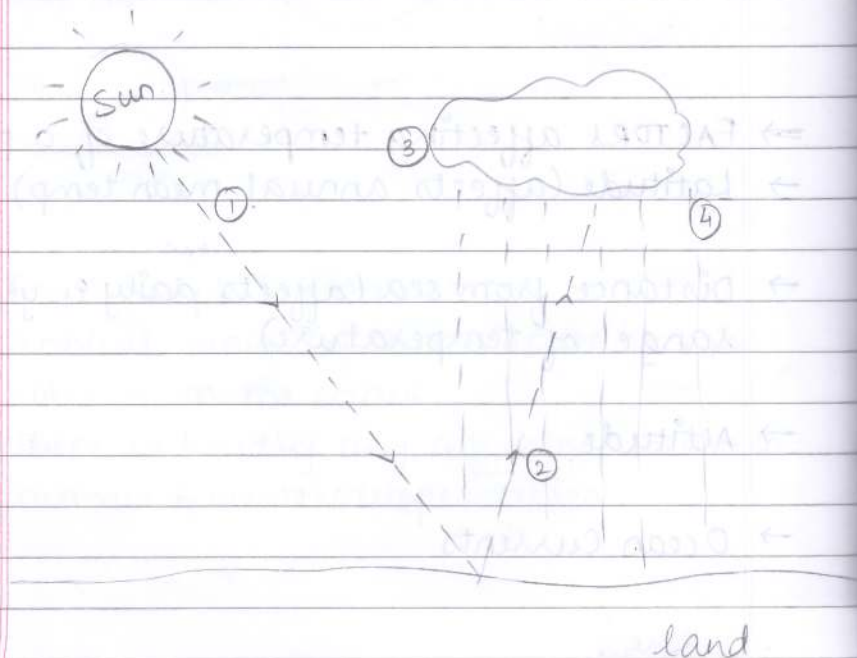
→ Ocean Currents

- Slope of the mountains.
- Cloud cover
- Vegetation (it increases humidity of a place)
- Wind direction.

⇒ RAINFALL:

Types of Rainfall:

- Convectional Rainfall:

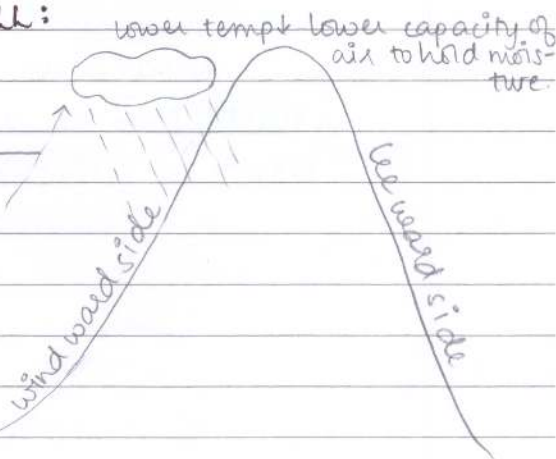


- The land is heated by the sun making the air above it warm.
- The hot air rises up & cools & begins to condense to form water droplets.
- The water droplets & dust particles forms clouds.
- When the clouds are saturated with moisture, there is heavy rain.
- This type of rainfall occurs at places in the equatorial region near the sea. It occurs everyday at 4 o'clock.
- ★ Drop in temperature results in drop of capacity of air to hold moisture.

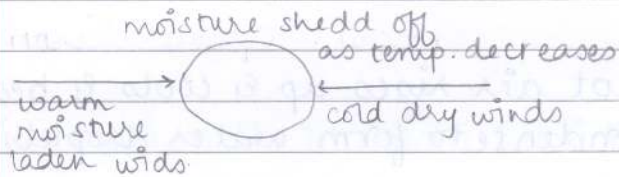
→ RELIEF RAINFALL:

winds are forced to rise up due to barrier & with that the clouds also rise

no rainfall here



→ FRONTAL RAINFALL:



- Common where warm westerlies & polar easterlies meet ($40 - 45^{\circ}$ N & S).
- Warm air & cold air meet.
- Warm air - less dense
Cold air - more dense.
Warm air is forced over the top of cold air.
- As it rises, the warm air starts to cool.
- Its capacity to hold moisture decreases.
So water vapour starts to condense.
- The condensing water creates clouds & rainfall. *

⇒ TYPES OF CLOUDS:

→ clouds are collections of water droplets or ice crystals.

→ CIRRUS clouds:

- Found high in the atmosphere - over 5500m
- Common throughout the world
- Thin & wispy in appearance
- Move fairly quickly.

→ STRATUS clouds:

- Low level - below 2000m
- Usually grey in colour
- Move fast
- Can produce light rain & snow.

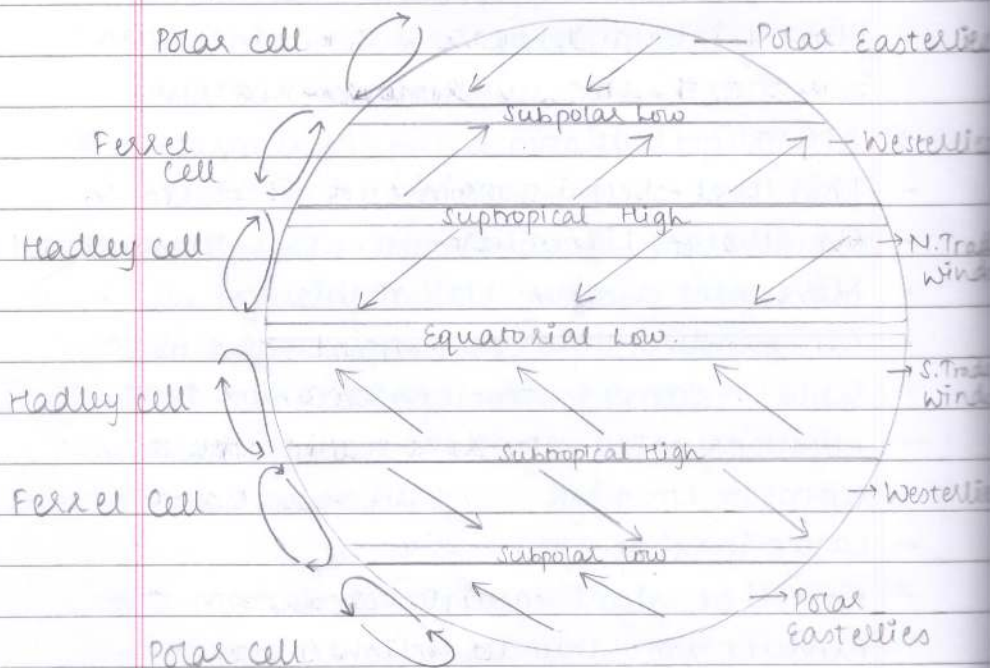
→ CUMULONIMBUS clouds:

- Up to 10 km high
- Large in size
- Look like giant cauliflower
- Produce rain, thunder & lightening
- Usually found in spring & summer.

→ CUMULUS cloud:

- Height - between 600 - 1200 m.
- Have a woolly appearance
- can produce light rain
- Have a short life cycle.

→ AIR PRESSURE & WIND:



ITCZ - Inter tropical convergent zone
Where trade winds meet.