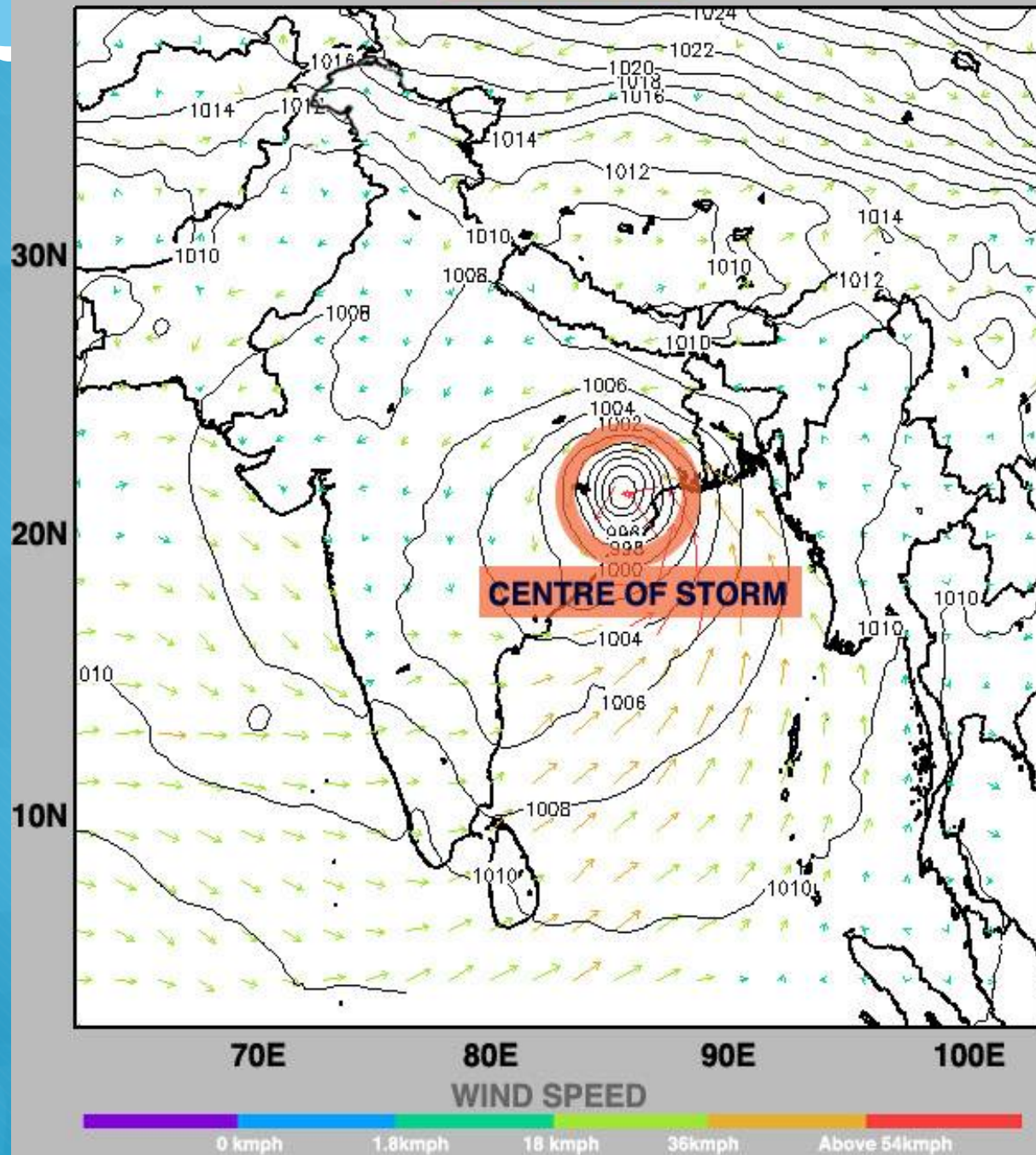


The background features a stylized weather scene. In the top right corner, a large, bright yellow sun is partially visible. To its left, there are several light blue, fluffy clouds. Below the clouds, a grey rain cloud is depicted with white raindrops falling. The entire scene is set against a blue background with a subtle pattern of overlapping squares and circles. A dark blue, rounded rectangular banner is positioned diagonally across the lower half of the image, containing the text "Meteorology and Health" in white, bold, sans-serif font.

Meteorology and Health

13 Oct, 2013





Today's Weather

- Max temperature-31, feels like 35
- Min Temperature- 20, feels like 18
- Precipitation- 0%
- Humidity-22%
- Wind- 8 kmph, WNW
- Dew point-12.8 °C
- Pressure- 14.7 psi
- Max UV Index-7
- Sunshine hours-10
- Visibility 1.9 miles



Elements of meteorology

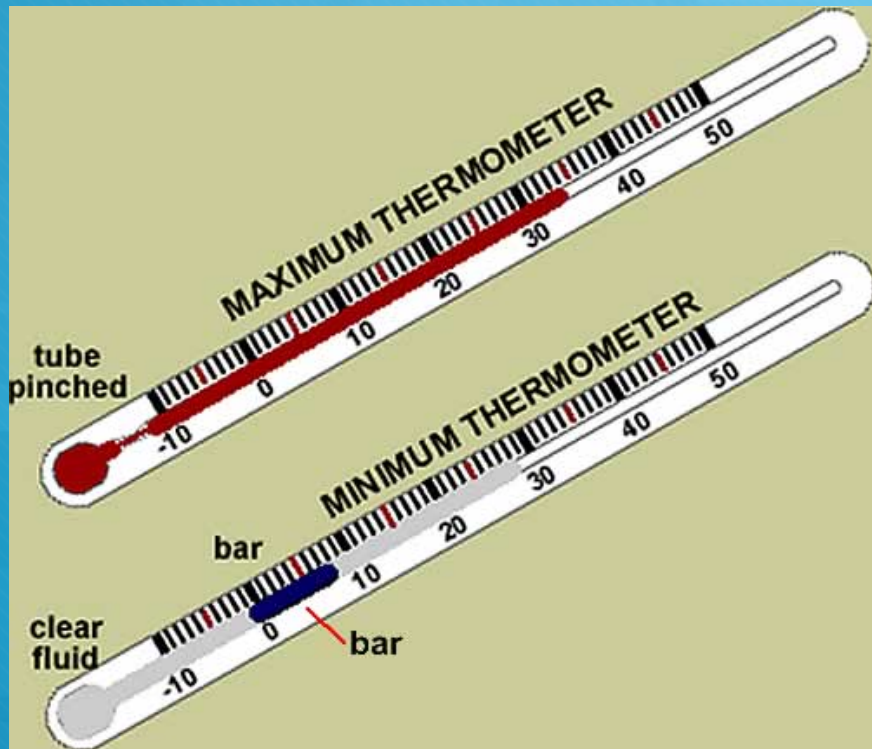
- Atmospheric pressure
- Air temperature
- Humidity
- Rainfall
- Direction and speed of wind

Dry and wet bulb thermometer



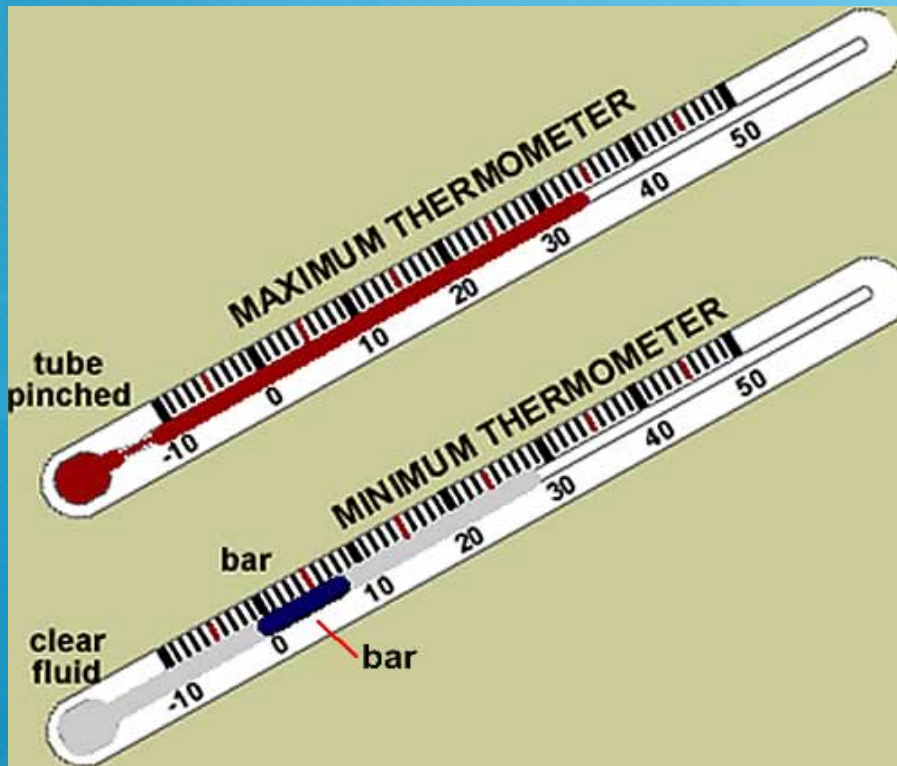
- Mercury thermometers
- The wet bulb - evaporation of water lowers temperature.
- In case both the thermometers record similar readings - air is completely saturated with moisture

Maximum Thermometer



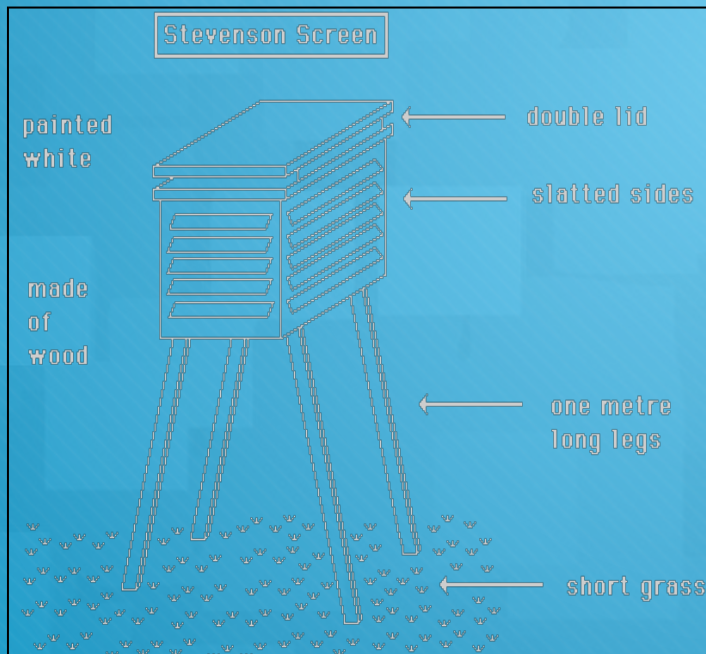
- Mercury thermometer - a very fine constriction near the neck of the bulb.
- With the rise in temperature, the mercury expands and rushes across the constriction

Minimum thermometer



- Minimum thermometer has alcohol inside, in which a dumb-bell shaped index is immersed.
- When the temperature falls the spirit drags the index down towards the bulb end, but when the temperature rises the spirit expands and runs past the index.

Stevenson's screen



- To ensure an accuracy of measurement of air temperature, the thermometers are mounted in a box of approved pattern called as the 'Stevenson's screen'.

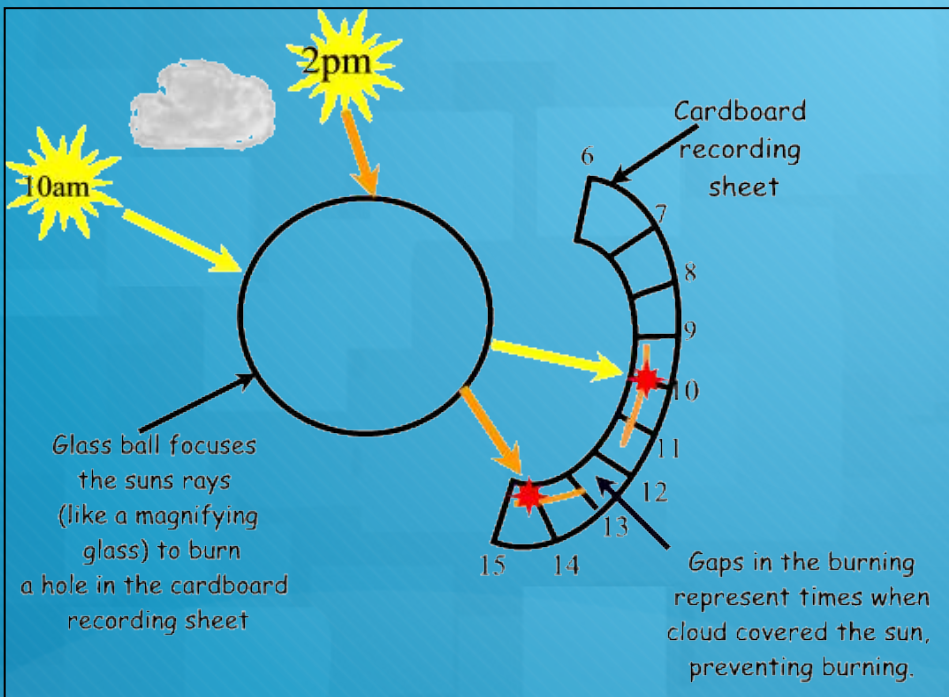


Solar Radiation

- The Sun's rays warm up the atmosphere
- Another factor, which contributes to rise in environmental temperature is the heat given out by hot objects on the earth's surface, after they have absorbed heat. This heat given out is known as radiant heat

Campbell - Stokes Sunshine Recorder

- The number of hours of sunshine

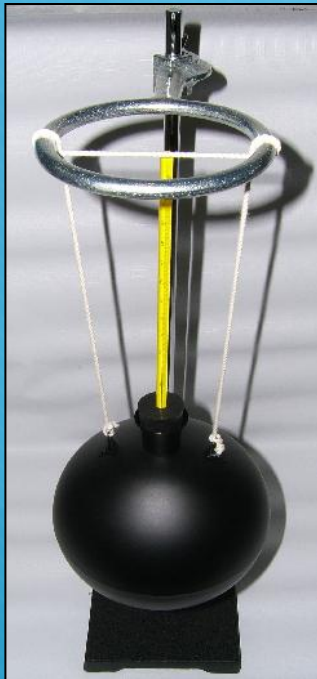


Solar radiation thermometer



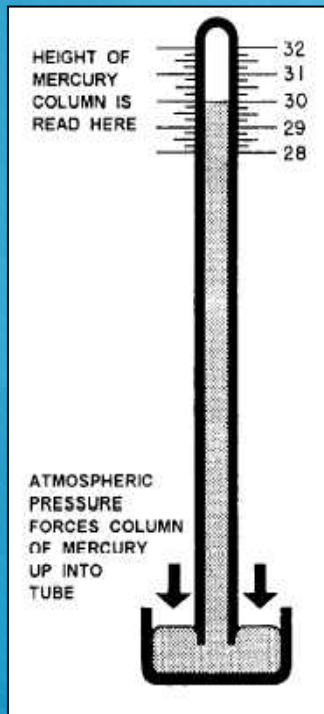
- Intensity of solar radiation
- Black bulb thermometer enclosed inside a glass shield

Black Globe thermometer



- Radiant heat
- Hollow copper globe painted black
- Mercury thermometer such – bulb placed in the center of the globe.
- The globe thermometer records a higher temperature than the ordinary air temperature thermometer, since it is affected both by the air temperature and the radiant heat.

Atmospheric Pressure



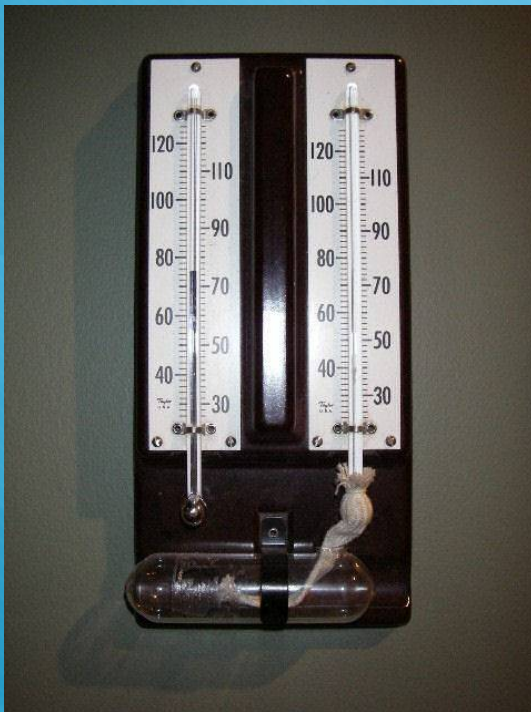
- The atmospheric pressure close to sea level on the earth's surface is measured as 760 mm of mercury (Hg) and is called as 1 atmosphere of pressure. This pressure falls as the altitude increases and rises as the altitude decreases at the rate of 1 atmosphere for each 33 feet depth below sea level.
- Measured with barometer.
- Fortin's barometer and Kew Pattern Station barometer



Atmospheric Humidity

- The moisture content of air - Absolute humidity and Relative Humidity
- Relative humidity describes the moisture content of air at any given temperature as a percentage of the maximum possible moisture content
- $RH > 65$ percent - the air feels stick
- $RH < 30$ percent is unpleasant and dry
- The higher the temperature of air, more the water vapor it can hold before saturation point is reached.
- When the air becomes completely saturated, evaporation from any surface in that area ceases altogether. If the air is cooled, the excessive moisture precipitates for the particular temperature. This is called 'Dew Point'.

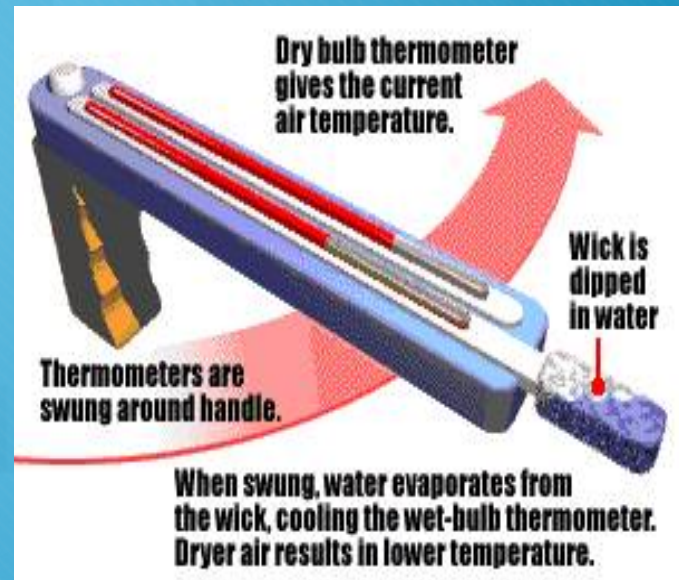
Mason's Hygrometer



- Most widely used
- Consists of dry and wet bulb thermometers
- The drier the air the greater the rate of evaporation and lower would be the readings on the wet bulb.
- In a moisture-saturated atmosphere, the readings of dry and wet bulb coincide.

Sling Psychrometer

- Consists of a dry and a wet bulb thermometer mounted side by side
- The instrument is whirled
- The readings on the thermometer show a dip due to evaporation of water brought about by the air movement created due to the rotation.
- The two thermometer readings are used to determine the relative humidity of the air using suitable tables and charts.





Air Movement

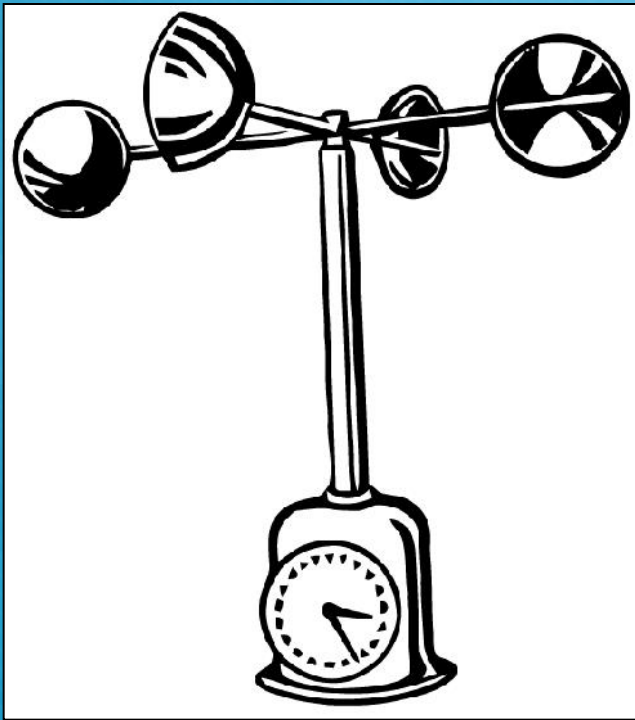
- Air movement determines the cooling power of air and it influences the comfort levels in an environment.

Kata Thermometer



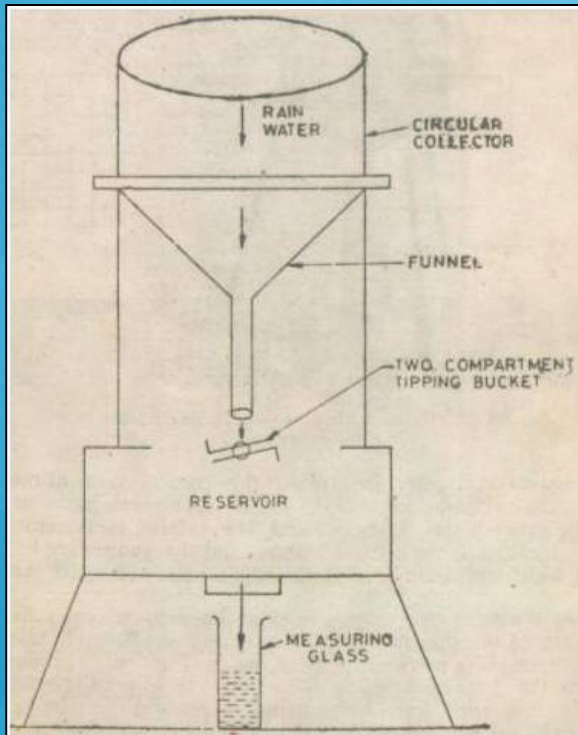
- Alcohol thermometer
- dry and wet kata
- The two thermometers are set to 130°F
- Then both the instruments are suspended in air
- The time in seconds is recorded for the alcohol to drop across the cooling range used in calculating wind velocity

Anemometer



- These are used to measure the unidirectional wind velocity
- A thermoanemometer is a mercury anemometer with an electrically heated metallic coil around its bulb.

Measurement of Precipitation



- Precipitation is a collective term used for all forms of water precipitated from the atmosphere such as rain, snow, hail, dew and frost.
- Symon's rain gauge



HEAT STRESS

- Heat Stroke
- Heat Exhaustion
- Heat Cramps
- Heat Tetany
- Heat Syncope
- Heat Oedema



Heat stroke

- *Triad of hyperpyrexia (rectal temperature $>40^{\circ}\text{C}$), CNS dysfunction and anhidrosis*
- Management-
 - Rapid cooling to bring down the core temperature to below 39°C , reducing it by approximately 0.2°C per minute
 - Rehydration and care of comatose patient



Heat exhaustion

- Core temp is less than 40°C
- No CNS dysfunction
- Feeling of exhaustion, nausea, headache or light headedness, features of dehydration, hypovolaemia and syncope.
- Sweating is profuse and skin is moist.
- Management-
 - Shifting the patient to a cool, shaded and ventilated place.
 - Feet should be elevated
 - ORS
 - Rapid cooling to bring down the core temperature to below 39°C, reducing it by approximately 0.2°C per minute



Heat Cramps

- Spasms of muscles especially lower extremity and shoulder, following heavy muscular exertion in hot environment, with associated intake of hypotonic oral fluids.
- Management-
 - Oral administration of 0.1% to 0.2% salt solution.



Heat Tetany

- Carpopedal spasms and paraesthesiae following short exposures to excessively hot environment, leading to hyperventilation and respiratory alkalosis
- Management-
 - Removing the patient to a cool environment and asking him to slow down the respiration



Heat Syncope

- Syncope following exposure to heat stress as a result of peripheral vasodilatation
- Management-
 - Removal of patient to cool environment and oral rehydration



Heat Oedema

- Pitting oedema of hands and feet, usually in the elderly, following exposure to heat stress
- Management-
 - Reassurance, elevation of affected limbs and, if required, compression bandage



COLD STRESS

- Hypothermia
- Loss of sensation, muscular weakness, coma death
- Immersion or trench foot-wet cold conditions
- Frostbite-dry cold conditions



HIGH ALTITUDE

- 2700 m (9000 feet) and above
- Acute Mountain Sickness, High Altitude Cerebral Oedema and High Altitude Pulmonary Oedema



Acute Mountain Sickness

- The latent period -6 to 12 hours.
- Symptoms include headache, fatigue, stomach illness, dizziness, and sleep disturbance



High Altitude Pulmonary Oedema

- 'Latent period' between 6 to 96 hours



Risk Factors for AMS and HAPO

- Physical exercise
- Not properly acclimatized
- The speed with which an individual reaches high altitude, especially into a crucial altitude of 3000m and above



Prevention

- Acclimatization should be undertaken whenever a person reaches an altitude of 2500 metres or above by 1 to 2 days of complete rest followed by gradually increasing physical effort for next 2 to 4 days at a particular level of high altitude.
- This process should be repeated for every 1000 metres gain in altitude.
- **Chemoprophylaxis:**
 - Acetazolamide orally, for three days before induction into high altitude areas



Low altitudes

- Caisson disease
- Atmospheric pressure increases by one atmosphere for every 33 feet depth below sea level
- Under high pressure, gases like oxygen, nitrogen and carbon dioxide are dissolved in blood.
- Excess of nitrogen leads to loss of mental functions, excess of oxygen can lead to convulsions and death
- When a person comes up to the surface, dissolved gases are released leading to air embolism.



Thermometer used to calculate wind
velocity is-Kata...Tata...Bata

Question Time



You may get Caisson disease if you are-
Driver...Diver...Drummer

Question Time



Cold injury in dry-cold conditions is
Frostbite...Chocobite...Nutbite

Question Time



THANK YOU

Have a bright day !!!