7th – Weather Climate and Adaptation I

Weather: the state of the atmosphere conditions like temperature, humidity, rainfall, snow, cloud cover, wind etc at a given place and time is called weather of the place at that time. Temperature, humidity, rainfall, snow, cloud cover, wind etc are called weather elements. The characteristics pattern of weather elements in a place over a period of time is called **climate** of the place.

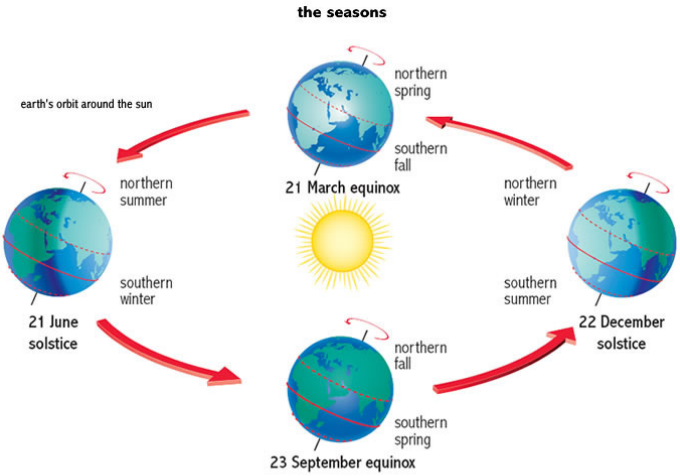
Weather forecast is a prediction of the weather conditions for a place over a short period of time like the next days. Terms like hot, cold, humid, rainy, cloudy etc are the factors that are generally mentioned in a weather forecast. A special thermometer called the maximum-minimum thermometer is used to measure the maximum and minimum temperature in a day.

Humidity of the air is measured by an instrument called hygrometer. The amount of rainfall is measured by an instrument called the rain gauge.

Factors that affect the climate of the Earth as a whole are:

1. Distance from the sun: the distance of the Earth from the Sun plays a major role in determining the temperature on the surface of the Earth and therefore is climate. The places closer to the sun are hotter as compared to places farther from the sun.

2. Earth rotates about its axis: the angle that the Earth's axis of rotation makes with the direction perpendicular to the plane of the Earth's orbit around the sun is called angle of inclination. The angle of inclination is about 23.5°. From 21st March to 23rd September, the Northern hemisphere is closer to the sun. So, it is hotter than the Southern hemisphere, which is farther away from the sun. The reverse happens in the next half of the orbit.



3. Sunrise and Sunset: length of day is given by the difference in times of sunrise and sunset. In the Northern hemisphere, longest day of the year is 22nd June and shortest day of the year is 22nd December.

Climate of a place: climate of a place depends on many factors for example Distance from equator (latitude), distance from sea, distance from mountains etc.

1. Distance from equator: The places which are closer to the equator are much warmer as compared to those who are closer to the poles. This is because sun rays fall directly on the equator and at an angle to the poles.

2. Height above sea level and Distance from sea and mountains: the higher the place, the cooler it is. Hill stations have a cooler climate as compared to plains. Places near the coast, like Goa and Mumbai are neither too hot nor too cold. Whereas places far from the sea have extreme climates with very hot summers and very cold winters.

Weather of a place: weather of a place depends on temperature and humidity of that place.

LEARNING WITH INNOVATION....

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1. Temperature: temperature on any day is defined be the amount of sunlight received from the Sun. During the day, sun heats up the Earth and generally the nights are cooler.
2. Humidity: amount of water vapour present in the atmosphere determines humidity. Places near the coast have greater humidity than places far from the sea. Humidity is higher in rainy reason than during summers and winters.

Adaptation: Adaptation is the ability to adjust to one's surroundings.

Adaptations of animals to different climates: Climate differs from place to place. That is why animals have special characteristics that enable them to live in a particular climate. These special characteristics are called adaptations.

Hot and Dry climates: In hot and dry climates, water is scarce and animals need adaptations to conserve water.

1. Camels:

- Camels have long eyelashes, ear hair and nostrils that they can close to keep the sand out when wind blows.
- They have thick eyebrows that provide shade from the sun.
- Their wide feet help them to walk on sand without sinking into it.
- The hump of a camel is a reservoir of fatty tissues. It can go a week without water.
- They can withstand body temperatures from 34ºC to 41.7ºC throughout the day.

2. Kangaroo rats:

- They live in borrow which they seal off to block out midday heat and recycle the moisture from their own breathing.
- They do not drink water. They get all the nutrients from seeds.
- They are active only during morning and evening to escape the heat.

3. **Reptiles and birds**: excrete metabolic wastes in the form or uric acid, an insoluble white compound, wasting very little water in the process.

Hot tropical and temperate climates: it is hot and humid in the tropics and warm in the temperate regions. These animals have faster evaporation by active sweating, panting and licking as evaporation causes cooling.

Animals found in the tropics have long legs and tails.Many animals have large ears. Example: gorillas and colourful birds.

Extremely cold climate: animals in this region keep their bodies warm by layers of fat deposit. Some large fish and mammals keep their bodies warm by excessive muscular activity and thick, waterproof fur.

1. Polar bears:

- Polar bears have a thick layer of fat called "blubber" under the skin, which keeps their bodies warm and insulated from cold.
- The white fur of the polar bear act as good insulator against the cold.
- Female polar bears dig dens in the snow where they might hibernate i.e. remain inactive or dormant, during the worst part of the winters.

2. Penguins:

- They huddle together in groups to stay warm and fight their enemies.
- The male penguins huddle together to protect the eggs laid by the females from the cold.

3. Arctic fox, Arctic hare usually have furry paws and furry ears. The furry paws act as snow shoes and help them to move in the snow easily.

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