CHAPTER-15

SOME NATURAL PHENOMENA

NOTES:

- A natural phenomenon is anything that occurs on its own in nature. For example. Cyclone, winds, storms, lightning and earthquakes etc.

Lightning

- Lightning is an electric sparks that occur on a huge scale. It is caused by the accumulation of charges in the clouds.

The sparks that the Greeks knew About

- The ancient Greeks were aware of electric charges from 600 BC. They knew that when amber (kind of resin) was rubbed with fur, then amber can attract light objects such as hair.
- Woolen or polyester clothes also attract hair and can produce a spark and crackling sound when they are taken off from the body in the dark.
- Benjamin Franklin, an American scientist in 1752 discovered the static electricity and showed that lightning and spark produced from these clothes are all same phenomena.

Charging by Rubbing

- When we rub two objects with each other they get charged due to transfer of electrons between them.
- For example when a plastic comb is rubbing with dry hair the comb acquires some charge.
- In the process of charging the plastic comb, hairs also get charged.
- Objects that carry a charge by means of rubbing or other processes are called**charged objects**.

Types of charges and their interaction

- ❖ It is a convention to call the charge acquired by a glass rod when it is rubbed with silk as positive. The other kind of charge is said to be negative.
- ❖ Like charges repel each other and unlike charges attract each other.
- ❖ The electrical charges generated by rubbing two objects are static and they do not move by themselves.

Transfer of charges

- ❖ The electrical charge can be transferred from a charged object to another conducting material through a metal conductor.
- ❖ The charge is transfer due to the movement of electron from one atom to another.
- ❖ A device that can detect whether an object is carrying charge or not is known as electroscope.
- ❖ When the charged objects lose their charge by transfer, they are known as discharged objects.
- ❖ The process of transferring of charge from a charged object to the earth is called earthing.

The story of Lightning

- ❖ During the development of thunderstorm, the air currents move upward while the water droplets move downwards. This causes separation of charges between clouds and between clouds and earth.
- ❖ When the magnitude of the accumulated charges becomes very large, air (normally a poor conductor) start conducting and allows the flow of electricity. The negative and positive charges meet, producing streaks of bright light and sound and is called as lightning.
- ❖ Electric discharge is the process of flow of charge from cloud to cloud or from cloud to earth due to separation of positive and negative charges.

Lightning Safety

Steps to follow during lighting and thunderstorm

Outside the house

- Find a safe place or shelter under small tress
- If you are inside a car or vehicle, stay inside with windows and doors shut.
- If you are in an open field, stay away from all tall trees and pole or other metal objects.
- Do not lie on the ground. Instead squat low on the ground. Place your hands on your knees with your head between the hands.

Inside the house:

- Avoid contact with telephone, electrical wires and metal pipes.
- Avoid bathing to avoid contact with running water.
- Electrical appliances like computers, TVs etc. should be unplugged.

Lightning conductors

- Lightning conductor is a device used to protect buildings from the effect of lightning.
- A metallic rod that is taller than the building is installed within the walls during construction. One end of the rod is kept out in the air and other is buried deep in the ground. The rod provides easy route for the transfer of electric charge to the ground.

Earthquakes

- Earthquake is a natural phenomenon which we are not yet able to predict accurately.
- It can cause large scale damage to human life and property.

What is an Earthquake?

- Earthquake is the sudden shaking or trembling of the earth for a very short period due to disturbance deep inside the earth's crust.
- Major earthquakes can cause immense damage to buildings, bridges, dams and people and also can cause floods, landslides and tsunamis.

What causes an Earthquake?

- Earthquakes are caused due to movement or collision of plates in the uppermost layer of the earth crust.
- Earth's crust is not in one piece. It is fragmented and each such fragment is known as a plate.
- These plates are in continual motion and sometimes they brush past one another or collapse under another due to collision, causing an earthquake on the surface of the earth.
- Boundaries of the plates are weak zones where earthquakes are more likely to occur. These weak zones are also known as **seismic** or **fault zones**.
- In India, most threatened areas are Kashmir, Western and Central Himalayas, the whole North East, Rann of Kutch, Rajasthan and the Indo-Gangetic Plane.
- Power of earthquake is expressed in terms of magnitude on a scale. This scale is called as a **Richter Scale**.
- An earthquake with magnitude higher than 7 on the Richter scale is considered destructive.
- This scale is not linear. An increase in 2 in magnitude means 1000 times more destructive energy.
- Tremors deep inside the earth produce waves on the surface of the earth which are called **seismic waves**.
- An instrument that used to records the seismic waves is called a **Seismograph**.
- Seismograph consists of a vibrating rod or pendulum that starts vibrating when tremors occur. A pen is attached to the vibrating system which records the seismic waves on a paper which moves under it.

Protection against Earthquakes

- Building in the seismic zones should be so designed that they can withstand major tremors.
- In highly seismic areas, build of mud houses with light roofs is better than using heavy construction material in order to minimize damage.
- Cupboards and shelves should be fixed to the walls.

- Be careful while hanging wall clocks, photo-frames, water heaters etc. so that during earthquake not to fall on people.
- Some buildings may catch fire during an earthquakesso must have proper working fire fighting equipment.

Steps to follow to protect yourself during earthquake

At home:

- Stay under a table till the shaking stops.
- Stay away from tall and heavy objects.
- If you are in bed, stay there and protect your head with a pillow.

Outdoors:

- Find a clear spot, away from buildings, trees and overhead power lines.
- If you are in a car or a bus then go to the clear spot and stay inside till the tremors stop.
