

## Notes on natural phenomena

Two other destructive natural phenomena.

- These are 1) lightning and  
2) earthquakes

### LIGHTNING

Lightning is an electric spark, but on a huge scale.

In 1752 Benjamin Franklin, an American scientist, showed that lightning is electric sparks.

#### Activities to understand the nature of electric charges

when a plastic comb is rubbed with dry hair, it acquires a small charge. These objects are called **charged objects**.

#### Activities to understand the nature of electric charges.

<u>Activity</u>	<u>Observation</u>	<u>Inference / result/Reason</u>
Rub a plastic scale on your dry hair,	The scale can attract very small pieces of paper.	<b><u>Charge is formed during rubbing</u></b>
Take a used ballpen refill and rub it vigorously with a piece of polythene. Bring it close to small pieces of paper. Take care not to touch the rubbed end of the refill with your hand or with a metallic object.	Ball pen refill attracts small bits of paper	<b><u>Charge is formed during rubbing</u></b>

**During Rubbing objects get charge**

#### Types of Charges

#### Activity to study Attraction and Repulsion of Charges

<u>Activity</u>	<u>Observation</u>	<u>Inference/result/Reason</u>
<b>Bring two inflated , charged balloons close together</b>	<b>The charged balloons are repelled</b>	<b>Like charges repel</b>
<b>Bring two used, charged refills close together</b>	<b>The charged refills are repelled</b>	<b>Like charges repel</b>
<b>Bring an inflated , charged balloon close to a charged refill</b>	<b>Charged balloon and charged refill are attracted</b>	<b>Unlike charges attract</b>

**The charges of the same kind repel each other, while charges of different kind attract each other**

#### Positive charge and Negative Charge:

**The charge acquired by a glass rod when it is rubbed with silk as positive. (convention)**

**The Plastic straw rubbed with polythene carry a negative charge .**

### **What happens during Rubbing?**

During rubbing negatively charged electrons are transferred from one object to the other.

The object which receive electrons get negative charge.

The object which loose electrons get positive charge.

**Electrons: Small particles present inside an atom.**

**Atoms: Tiny particles which makes up matter**

**Static Electricity:** The electrical charges generated by rubbing are static. They do not move by themselves.

**Conductors and Insulators:** Objects which allow electricity to pass through are called Conductors. Objects which do not allow electricity to pass through them are called insulators.

**Electroscope:** is a device used to detect the presence of electric charge in object

**Parts of a simple electroscope:** An empty glass bottle  
Metallic hook/paper clip  
Cardboard  
Two aluminum strips

**Construction of a simple electroscope:** Group activity to be done in class

**Working of A Simple Electroscope:** Touch the metallic paper clip with a charged object.

The aluminium foil strips receive the same charge from the charged object through the paper clip

The strips carrying similar charges repel each other and they become wide open. This indicated that the object carries charge

### **Activity to understand Discharging**

Touch the foil strips of a charged simple electroscope

.Observation: They come back to their original state. Repeat charging of foil strips and touching the paper clip. Every time you will find that the foil strips collapse as soon as you touch the paperclip with hand.

Reason: is that the foil strips lose charge to the earth through your body. The foil strips are **discharged**.

**Earthing:** The process of transferring of charge from a charged object to the earth is called **earthing**. Earthing is provided in buildings to protect us from electrical shocks due to any leakage of electrical current.

### **How is Lightning formed? (3 marks)**

Lightning is due to the charges produced by rubbing.

During the development of a thunderstorm, the air currents move upward while the water droplets move downward.

These vigorous movements cause separation of charges.

The positive charges collect near the upper edges of the clouds and the negative charges accumulate near the lower edges.

There is accumulation of positive charges near the ground also.

When the magnitude of the accumulated charges becomes very large, the air which is normally a poor conductor of electricity, is no longer able to resist their flow. Negative and positive charges meet, producing streaks of bright light and sound. We see streaks as lightning . The process is called an electric discharge.

The process of electric discharge can occur between two or more clouds, or between clouds and the earth

### **Lightning Safety ( HOME ASSIGNMENT)**

- 1) During lightning and thunderstorm no open place is safe.
- 2) On Hearing thunder rush to a safer place.
- 3) After hearing the last thunder, wait for some time before coming out of the safe place.

### **Finding a safe place**

- 1) A house or a building is a safe place.
- 2) A travelling car or bus, are safe with windows and doors shut.

### **Do's and Don'ts during a Thunderstorm**

#### **Outside**

- 1) Open vehicles, like motorbikes, tractors, construction machinery, open cars are not safe.
- 2) Open fields, tall trees, shelters in parks, elevated places are not safe.
- 3) Carrying umbrella is not safe.
- 4) If in a forest, take shelter under shorter trees.
- 5) If no shelter is available in an open field, stay far away from all trees.
- 6) Stay away from poles or other metal objects.
- 7) 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**

- 1) Lightning can strike telephone cords, electrical wires and metal pipes. During a thunderstorm contact with these should be avoided.
- 2) It is safer to use mobile phones and cordless phones. However, it is not wise to call up a person who is receiving your phone through a wired phone.
- 3) Bathing should be avoided during thunderstorms to avoid contact with running water. Electrical appliances like computers, TVs, etc., should be unplugged. Electrical lights can remain on. They do not cause any harm.

**Lightning Conductors:( 3 marks)** Lightning Conductor is a device used to protect buildings from the effect of lightning.

**Working of Lightning Conductor:** A metallic rod, taller than the building, is installed in the walls of the building during its construction. One end of the rod is kept out in the air and the other is buried deep in the ground. The rod transfer the electric charge to the ground. The metal columns used during construction, electrical wires and water pipes in the buildings also protect us to an extent. But do not touch them during a thunderstorm.

### **HOME WORK**

1. Like charges ----- and unlike charges ----- .
2. When a glass rod is rubbed with silk it gets -----charge.
3. When a plastic straw is rubbed with polythene it gets ----- charge.
4. What happens during rubbing?
5. What are electrons?
6. What are atoms?
7. Differentiate between Conductors and Insulators.
8. Name the device used to detect the presence of electric charge on an object.
9. What is discharging or earthing?
10. Name the scientist who discovered that lightning is electric sparks.