

# Natural Phenomena

# Electric Charge:

- It is the property of subatomic particles that causes it to experience a force when kept in an electric or magnetic field.
- Two types – Positive (protons-charge carrier) and Negative (electrons)

# Electrostatic Charge:

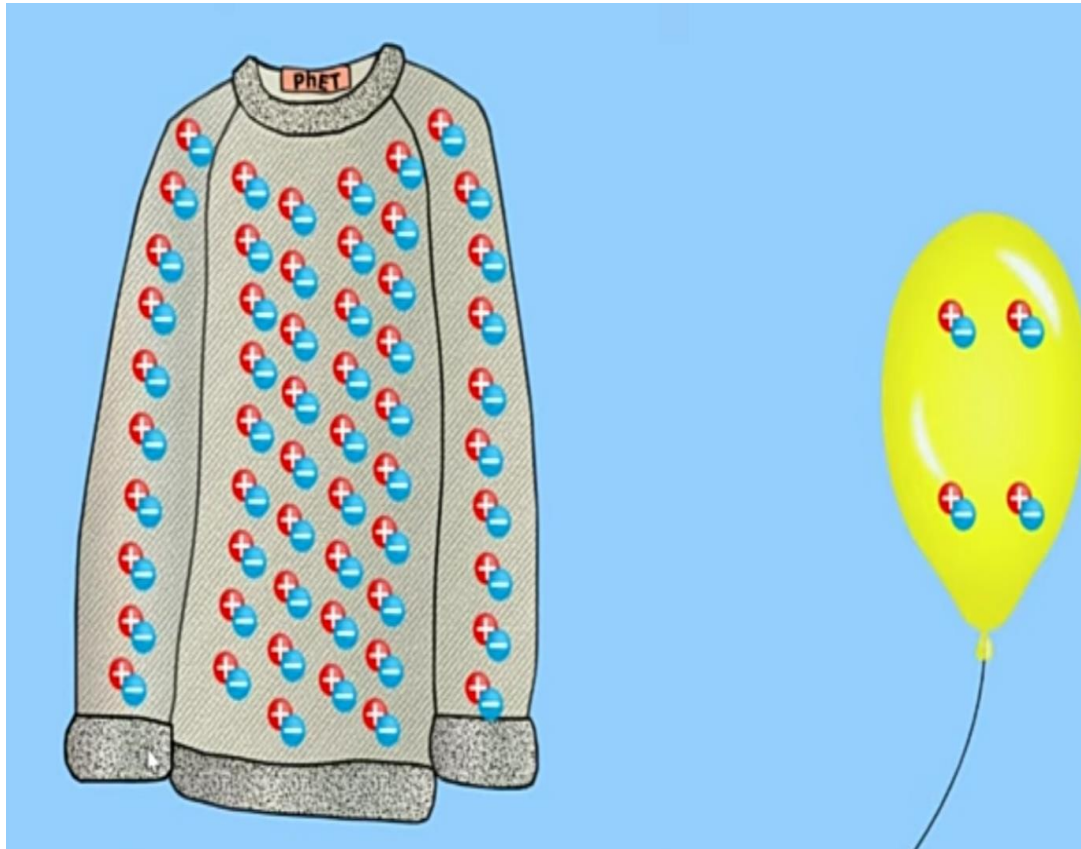
- Static electricity or electrostatic charge is a deficiency or excess of electrons which occurs on ungrounded or insulating surfaces.
- Physics that deals with phenomena due to attractions or repulsions of electric charges but not dependent upon their motion.

# Electrostatic Force:

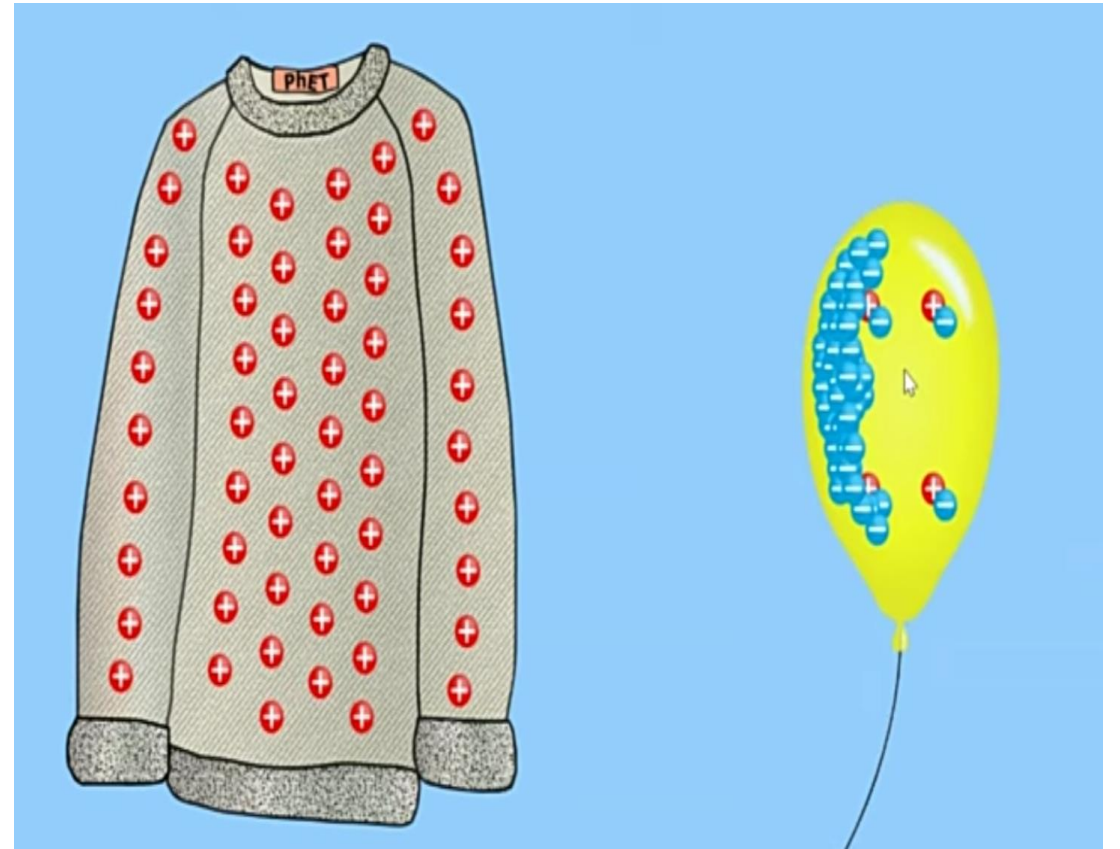
- The forces exerted by a charged body on another charged or uncharged body.
- This force comes into play even when the bodies are not in contact. It is an example for force at a distance.

# Examples:

**Before Rubbing:**



**After Rubbing:**

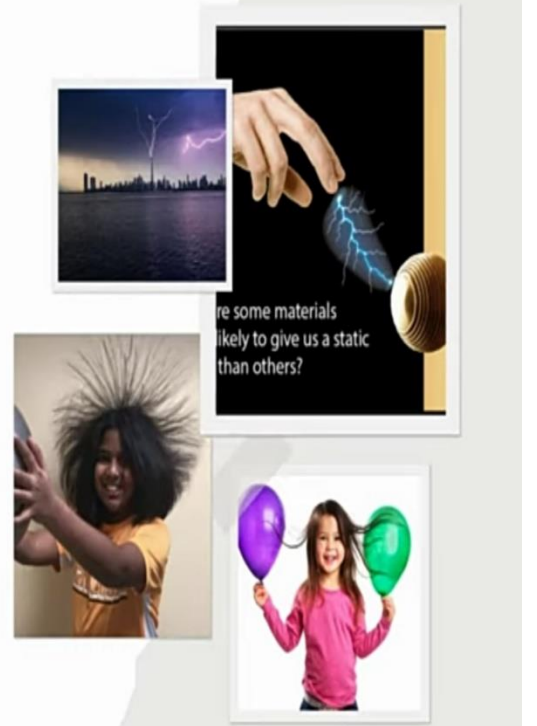


# Examples:



## STATIC ELECTRICITY

The results from an imbalance  
between negative and positive  
charges in objects



# Positive and Negative Charge:

- <https://youtu.be/Vrh5FeGUTJA>
- Exploring static electricity

# Equal and Opposite Charges:

- When two bodies are charged by rubbing against each other, they acquire equal and opposite charges.
- Glass rod with silk
- PVC with wool

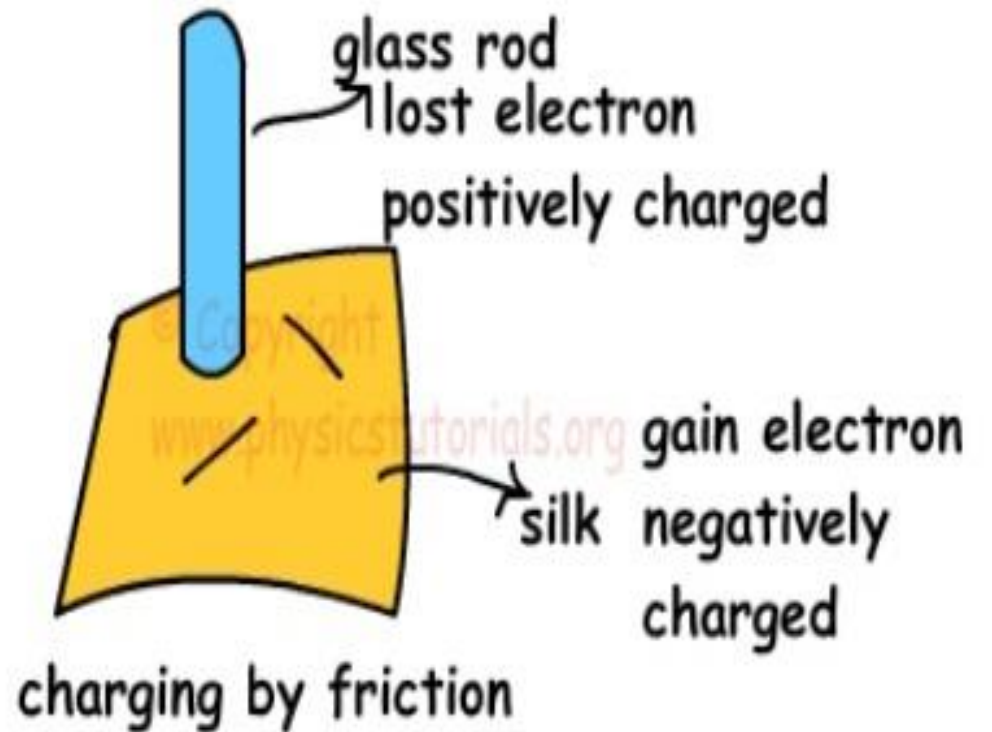


# Testing for Charge:

- Charged body attracts another body with opposite charge.
- Charged body can also attract an uncharged body – equal no. of positive and negative charges.
- Repulsion test

# Charging by Friction:

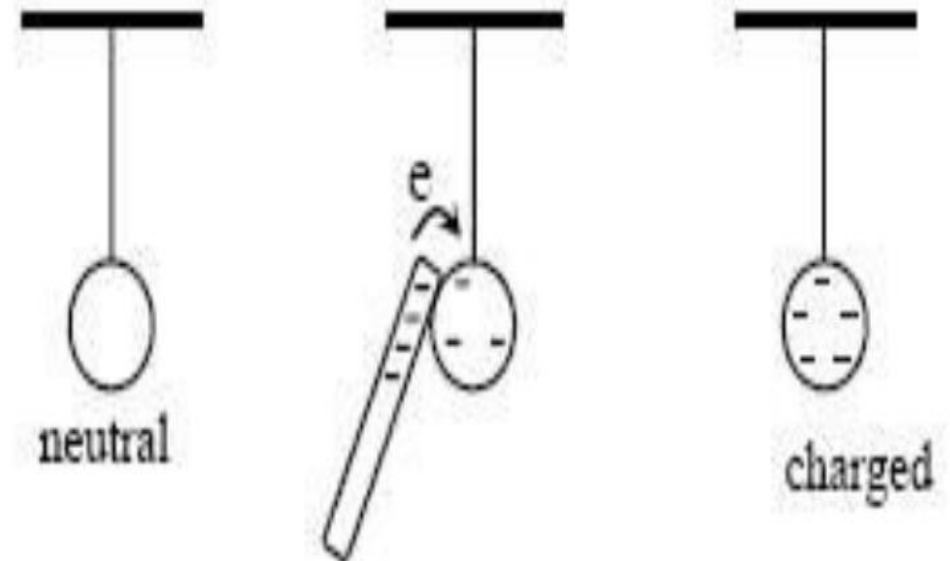
- Charging an object by rubbing against each other
- Objects acquire equal and opposite charges



# Charging by Conduction:

- Object can be charged by touching it to a charged body.
- Charged object acquires the same kind of charge as that on the charged body.

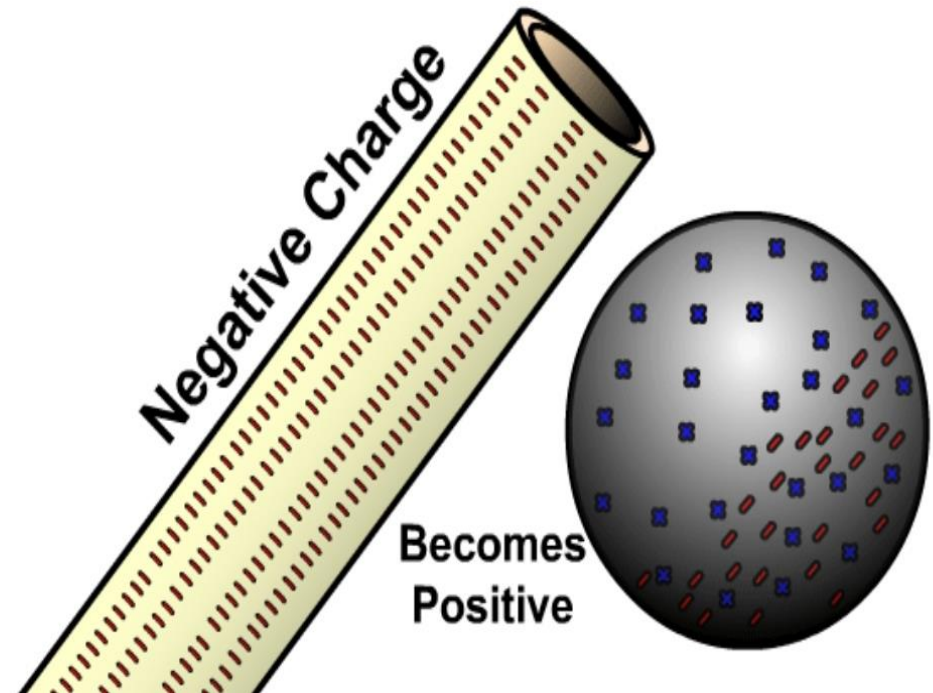
Charging by conduction:



# Charging by Induction:

- An object can be charged by bringing a charged body near it
- Charged object acquires opposite kind of charge as that on the charged body.

## Induction



# Lightning:

- Clouds gather charge during thunderstorm. water droplets present in the clouds develop charges.
- lighter droplets acquire positive charge and move to the upper regions of the clouds.
- bigger droplets acquire negative charge and move to the lower regions of the clouds.



# Lightning:

- Occurs due to the flow of massive electric charge from cloud to cloud, from one part of the cloud to another, or from a cloud to the ground.
- When a huge amount of charge builds up, insulating property of air breaks down - nearby air molecules are ripped apart.
- These torn molecules are charged and this air containing charged particles become a conductor of electric current.
- successive layers of air are made conductive in a zigzag or step like path.

# Lightning:

- A very large amount of current is generated during lightning strike thereby heating the air in the path.
- Temperature reaches about  $30,000^{\circ}\text{C}$  for a moment, which is hotter than the surface of the sun.
- This causes the flash of lightning.

# Thunder:

- Heat produced during temperature rise makes the air expand suddenly.
- This causes wave of vibrations(shock wave) which is cause of the thunder we hear.



## Risky areas during lightning:

- Projecting objects such as trees, poles, wires, lone buildings, taller buildings.

# Lightning conductor:

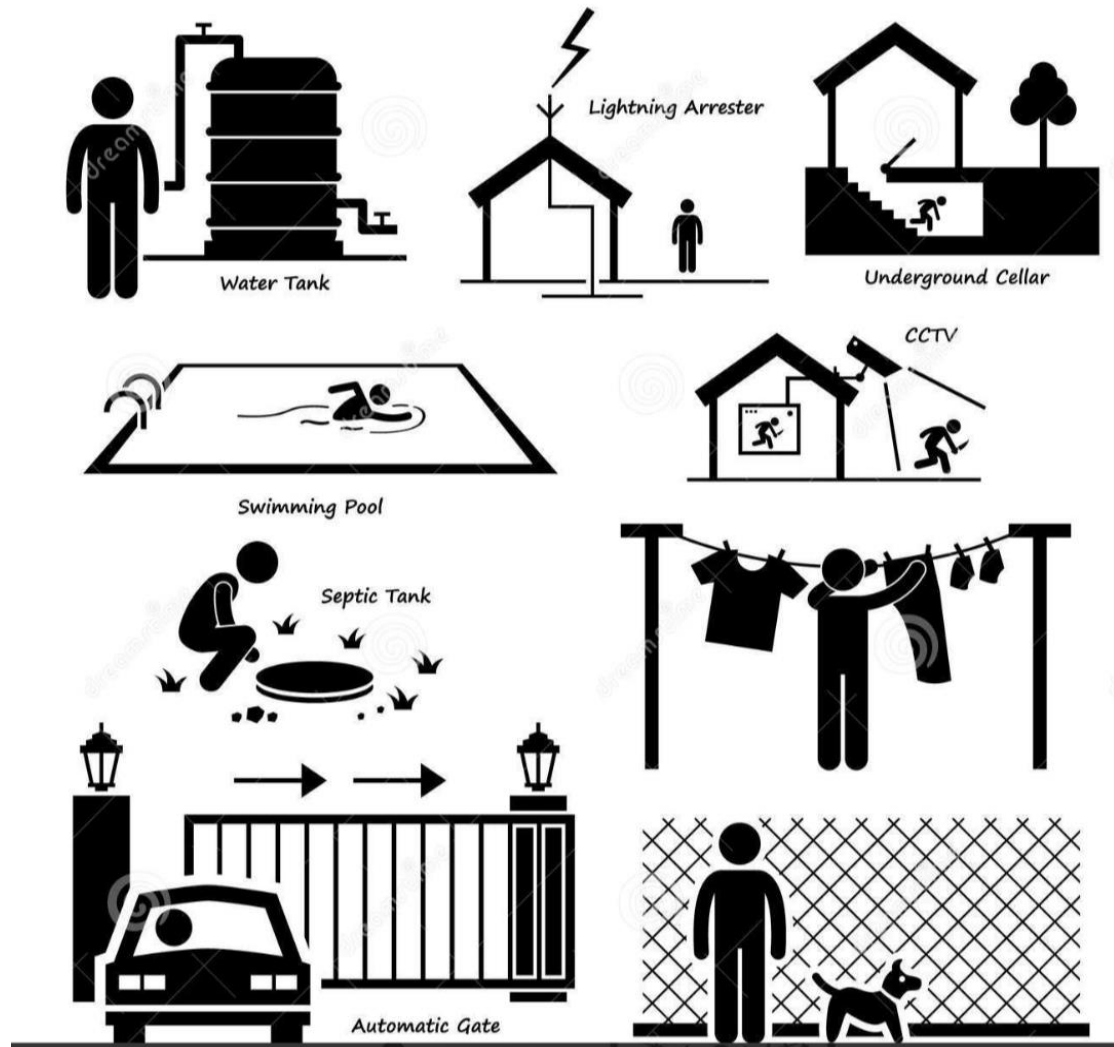
- Used to protect buildings from the damaging effects of lightning.
- They provide a direct easy path for the lightning to enter the ground without passing through a building or other object.



# Safety measures:

- Try to take shelter indoors, especially one with a lightning conductor
- Try to take shelter inside car or bigger vehicle such as trucks. Shut the doors of the vehicles.
- Do not take shelter under a tree
- If you are in a forest, choose a short tree
- If in an open place, stay away from trees and poles
- If you cannot find a safe place, squat down in a low-lying place.

# Safety measures:





Thank You