

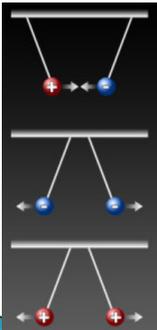
Electrostatics

- ▶ Electrostatics – electricity that is at rest.
- ▶ Electrostatics include the study of:
 - Charges
 - Forces between charges (both attractive and repulsive)
 - Behavior of charge in materials

Electrical Forces

- ▶ Electrical forces
 - are caused by the particles in atoms.
 - are much stronger than gravity. (we may not notice effect.)
 - can attract or repel.
- ▶ Electrons (e⁻) are negatively charged
- ▶ Protons (p⁺) are positively charged
- ▶ **Charge** is the name given for the attracting and repelling behavior.

Rules for Charges



- ▶ Opposite charges attract.
- ▶ Like charges Repel.

Transferring Charge

You can transfer charge two ways:

- ▶ **By contact** – two objects touching or rubbing transfer electrons. One object gains electrons and gets more negative and one object loses electrons and gets more positive.
- ▶ **By Induction** – a charged object induces a charge in another object by coming close and the charge within the neutral object is temporarily polarized.

Charging Objects

- ▶ **Charging by contact** – objects don't have to rub together to transfer charge.



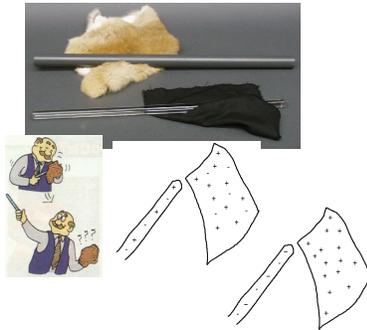
Charging Objects

- ▶ **Charging by Friction** – Electrons (aka charge) transfers when objects are rubbed together.
- ▶ Rubbing your shoes on the carpet...



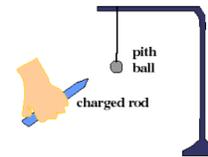
Charging Objects – Friction

- ▶ Rubbing a plastic rod on fur will transfer electrons (charge) to the rod.
- ▶ The fur is + and the rod is now – charged.



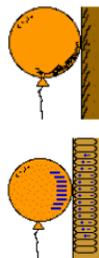
Charging Objects

- ▶ **Charging by induction** – If we bring an object *near* a conducting surface, even without physical contact, electrons will move in the conducting surface.

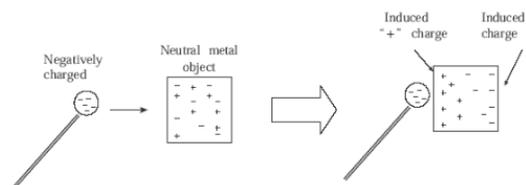


Charging Objects

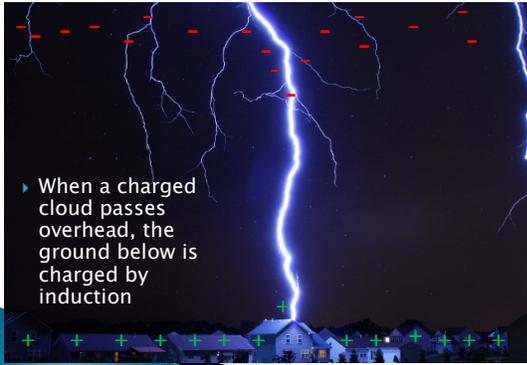
- ▶ Rub a balloon on your hair and it will collect excess – charges.
- ▶ It will stick to a wall, held by the attraction of the opposite charges.



Inducing A Charge



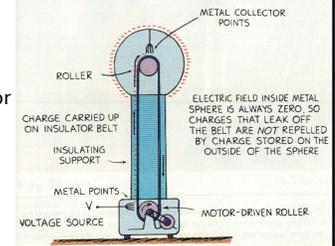
Charging by Induction



▶ When a charged cloud passes overhead, the ground below is charged by induction

Charging objects

- ▶ You can charge objects by:
 - Friction
 - Touching
 - Induction
- ▶ Inducing Charge
 - Van der Graff Generator



The End



- Charge
- ▶ Opposite Charges attract.
 - ▶ Charge by:
 - Contact & Induction