

Methods of Charging



S1-03-03 Explain attraction of neutral objects using the particle model of electricity.

S1-03-05 Explain electrostatic phenomena using the particle model of electricity.

Conductors & Insulators...

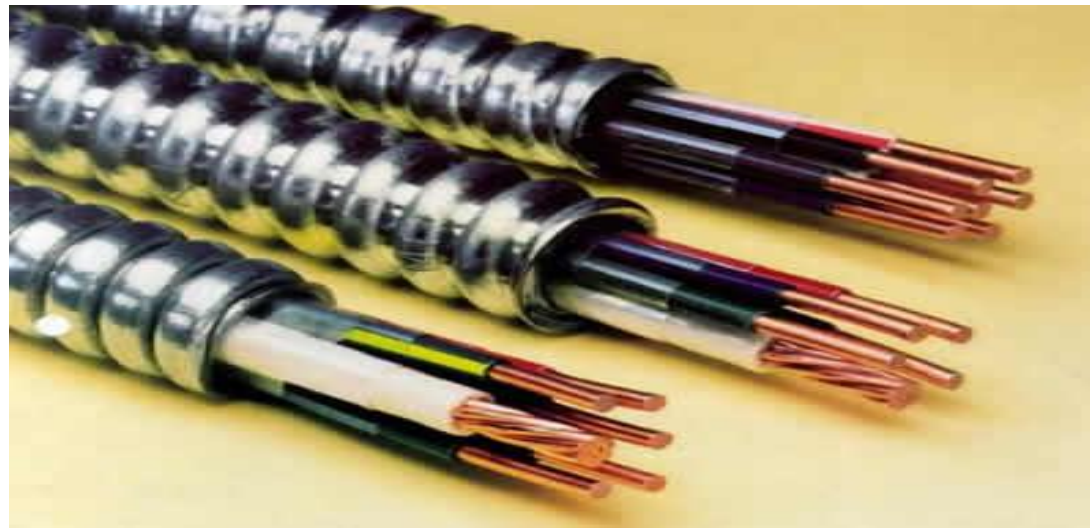
Review of conductors and insulators

1. Conductors:

- Conductors are materials made of ATOMS whose VALENCE ELECTRONS are able to MOVE FREELY.
- Charges will SPREAD AROUND in a conductor.
- Most METALS are conductors.
- Examples:

- COPPER (WIRE)

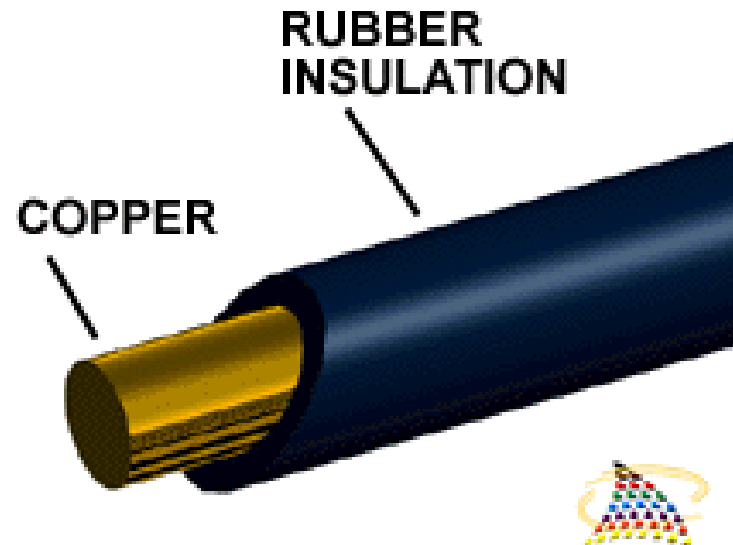
- GOLD



Conductors & Insulators...

2. Insulators:

- Are materials made of atoms whose VALENCE ELECTRONS cannot move around FREELY.
- Charges on an insulator STAY in ONE PLACE.
- Most NON-METALS are insulators.
- Examples:
 - WOOD
 - RUBBER
 - GLASS



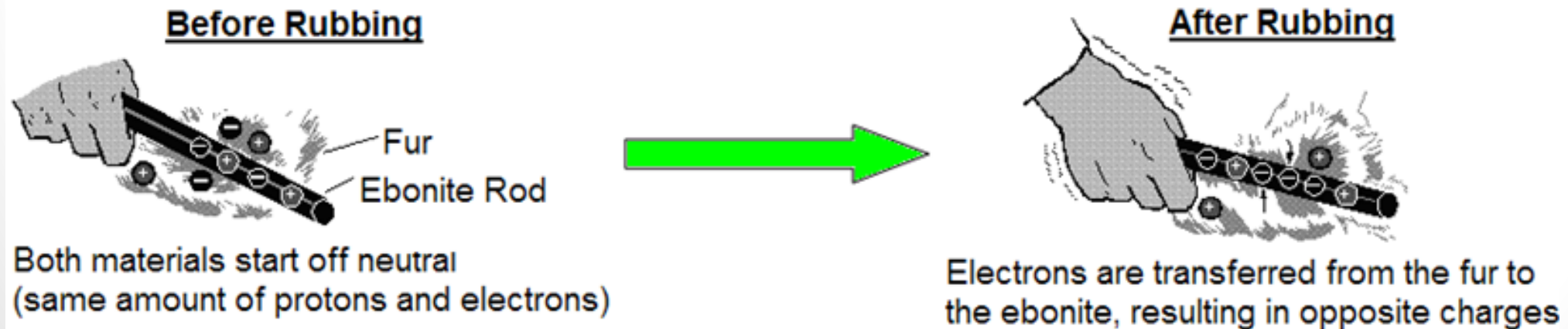
Methods of Charging...

There are 3 ways to give something a static charge:

1. Friction (rubbing)
2. Conduction (contact/touching)
3. Induction

1. FRICION

- When two materials are rubbed together, ELECTRONS are TRANSFERRED from one MATERIAL to ANOTHER.
 - The object LOSING ELECTRONS becomes POSITIVE
 - The object GAINING ELECTRONS becomes NEGATIVE



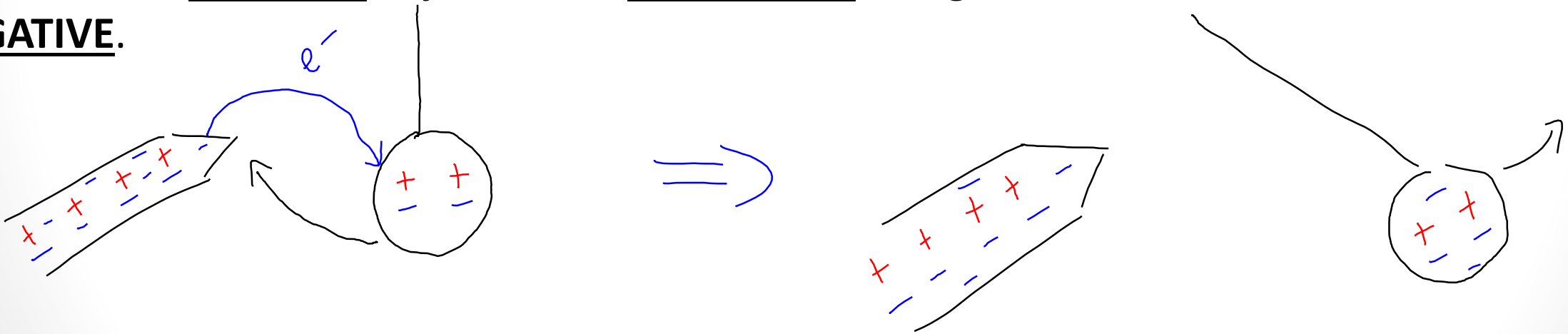
Methods of Charging...

2. CONTACT: (Conduction)

- You can PERMANENTLY charge an object by TOUCHING it with another object that is CHARGED.
- ELECTRONS will flow TO or FROM the NEUTRAL object.

Examples:

If you touch a NEUTRAL object with a NEGATIVELY charged one, it will become NEGATIVE.



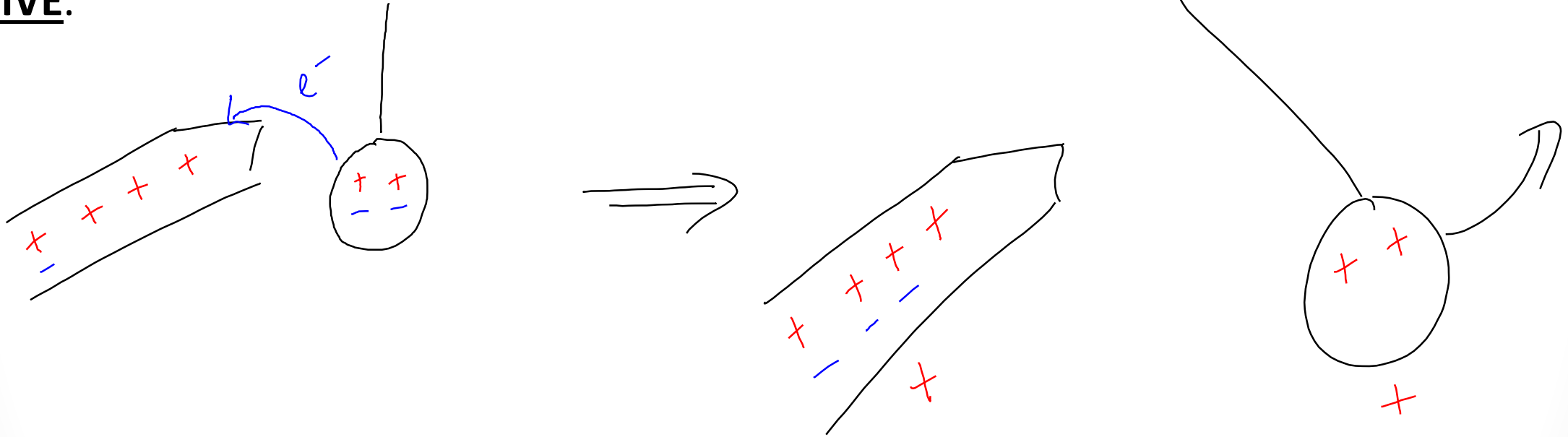
Methods of Charging...

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2. CONTACT:

Examples:

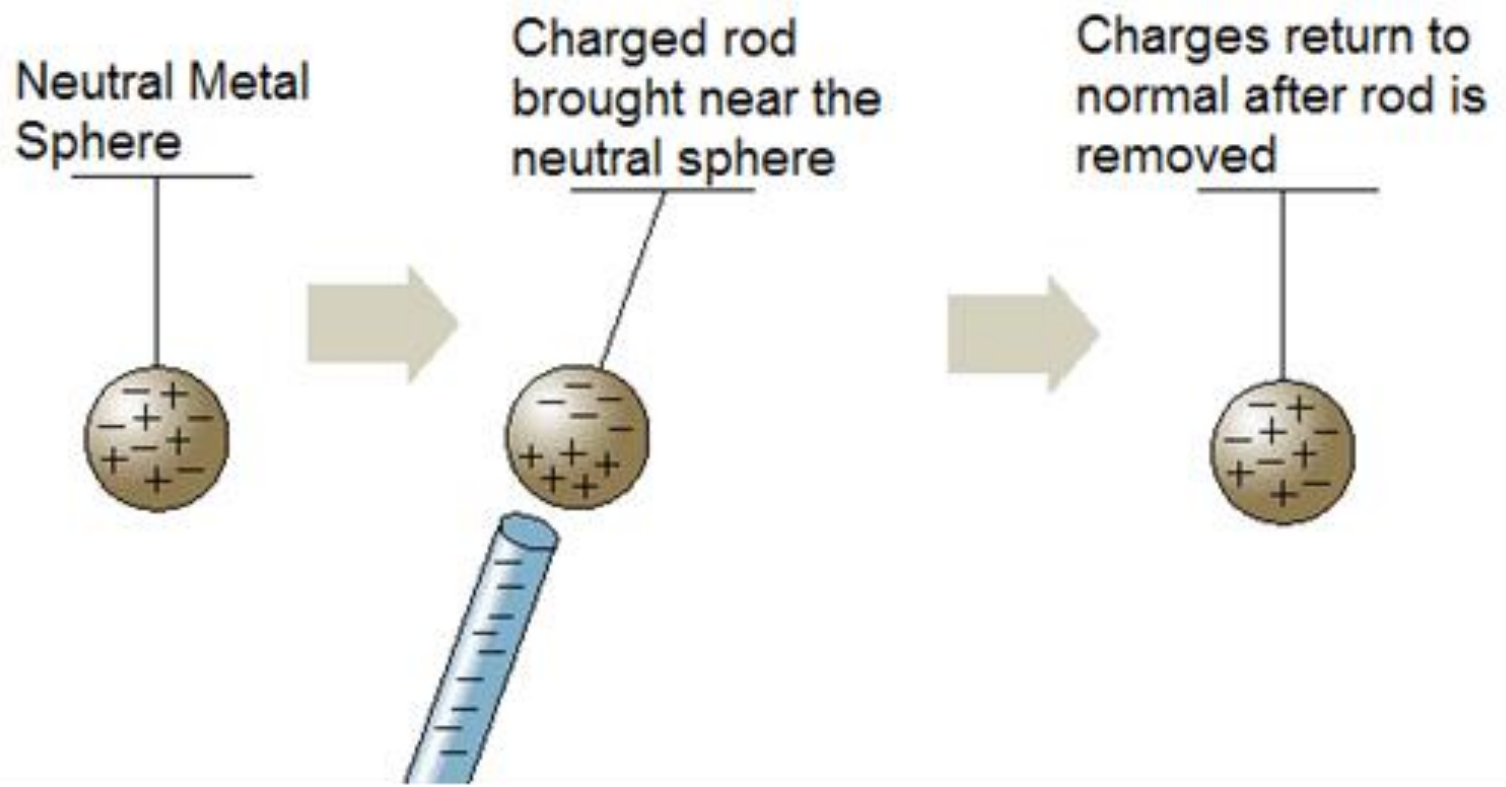
If you touch a NEUTRAL object with a POSITIVELY charged one, the object will become POSITIVE.



Methods of Charging...

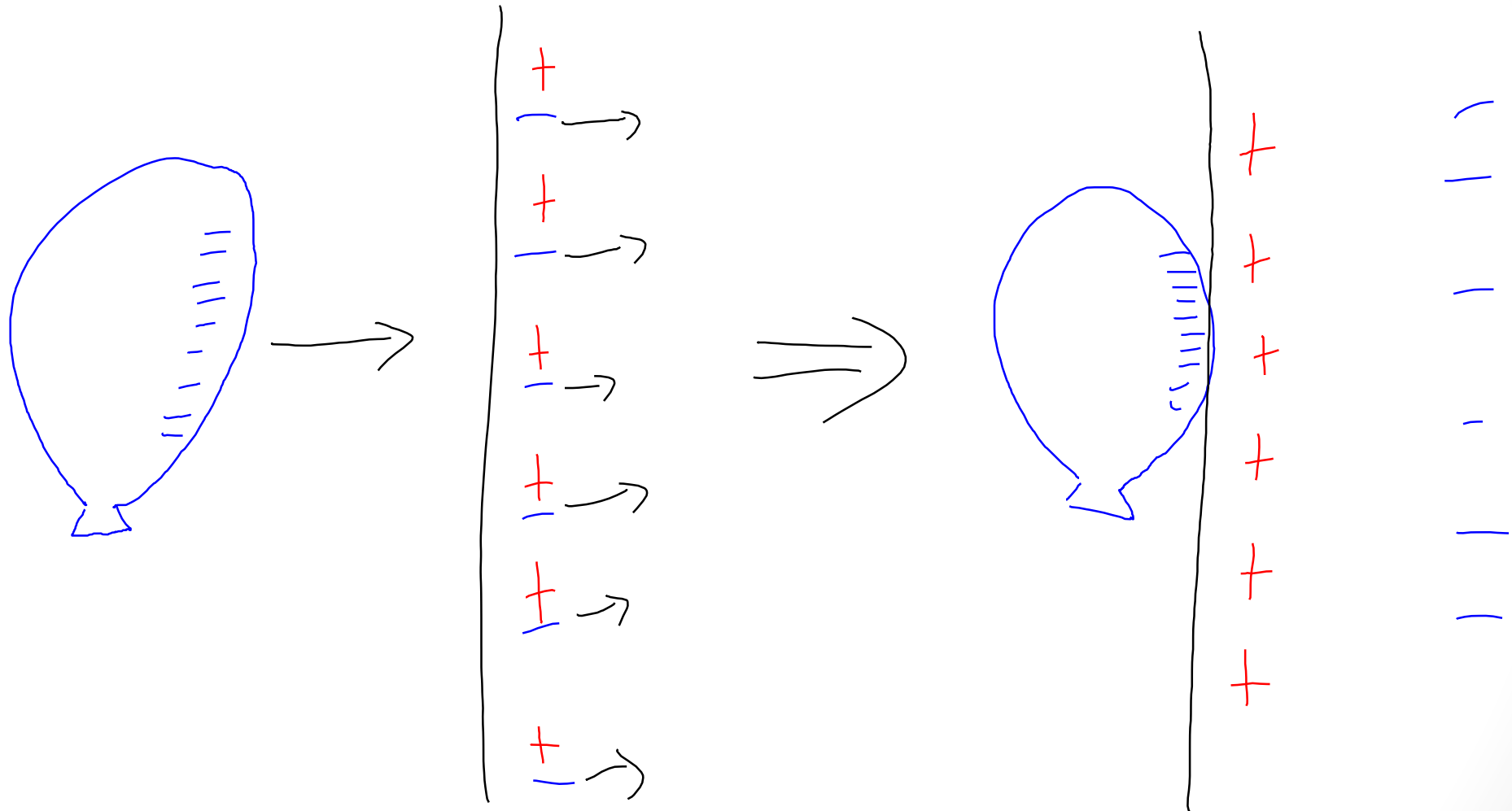
3. INDUCTION:

- When you bring a charged object **NEAR** a neutral object, you can **INDUCE** the **OPPOSITE** charge on the neutral object.
- Induction is a **TEMPORARY** charge. If the charged object is removed, everything goes back to **NORMAL**.



Methods of Charging...

Why does a balloon stick to a wall after you rub it on your head?

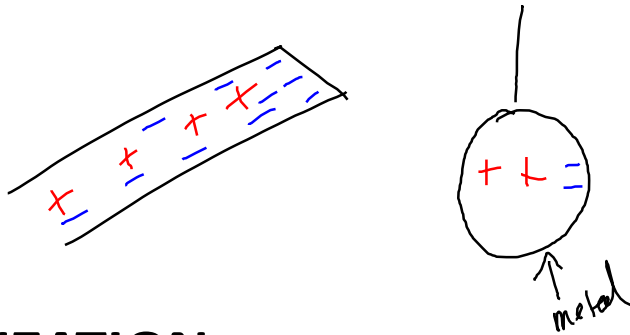


Methods of Charging...

There are 2 types of INDUCTION:

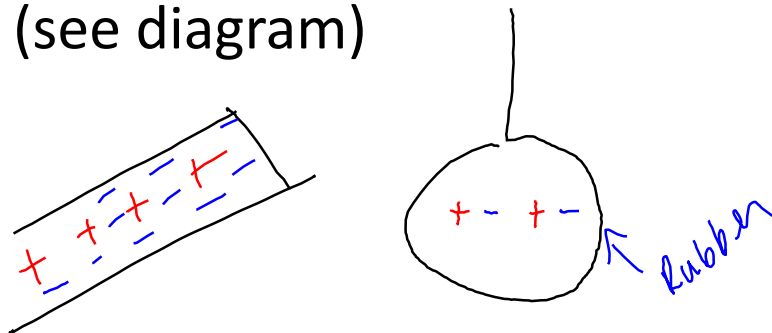
CHARGE SEPARATION:

- Occurs in CONDUCTORS since they allow electrons to flow easily, they are able to move FURTHER APART (separate).



CHARGE POLARIZATION:

- Occurs in INSULATORS, since their electrons are not able to move very far so they POLARIZE (see diagram)



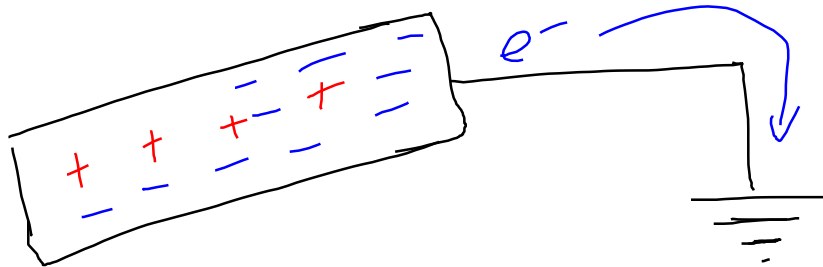
Methods of Charging...

Grounding:

Grounding is a method to neutralize a charged object by connecting it to the earth (or a much larger object).

→ If a **NEGATIVE** object is grounded:

- *Electrons flow from the object to the ground*



→ If a **POSITIVE** object is grounded:

- *Electrons flow from the ground to the object*

