

Electrical Grounding

Producing Static Charge	Methods
Producing Static Charge	Removing Static Charge
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Grounding

- ...is the *process* of **removing** excess charges from an object, by providing contact with a large, neutral object (for example, the Earth).
- the Earth remains neutral, because it is so large
 - can donate or receive extra electrons, without affecting its overall charge
- the *physical connection* to the Earth is also called a "ground" (noun).

Draw the **symbol** for an electrical ground:

Using a Ground to Make an Induced Charge Permanent

- Induced charge separations are usually temporary.
- The induced charge can be made permanent, if the object is grounded.

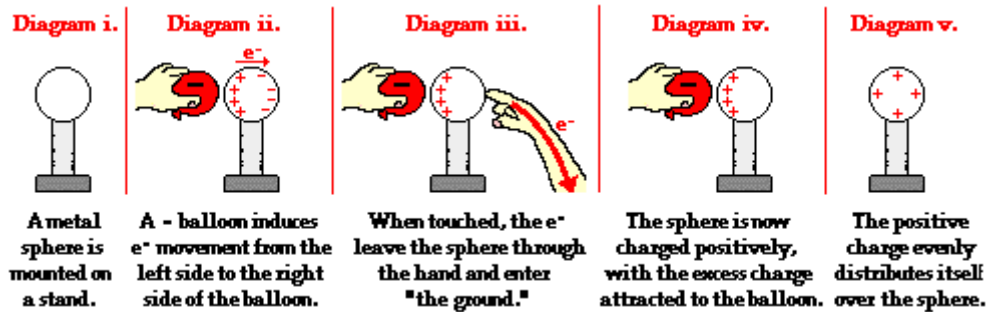


Figure 1. Positively Charging a Sphere by Induction

- a) Refer to Figure 1. In Diagram ii, why did the electrons move to the right side of the sphere?

- b) What happens to the electrons, when the sphere is grounded? _____
- c) What charge does the sphere have, after the ground (the hand) is removed? _____

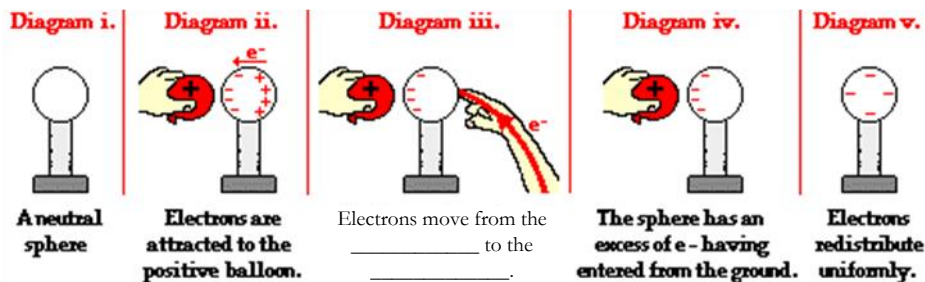
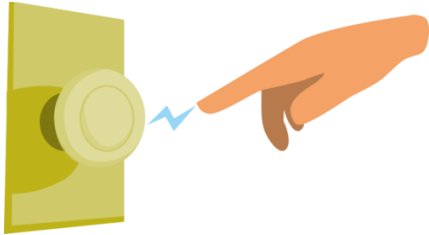


Figure 2. Negatively Charging a Sphere by Induction

Electric Discharge

- occurs when statically-charged objects lose their charge
 - electrons move from the object that has more electrons, to the object with less
- may be slow and gradual, or sudden (as with an electric shock)



Suppose your hand has a negative charge.

How is a shock produced when you reach for a door knob?

1. The negative hand approaches the door knob.
2. A _____ charge is induced on the door knob.
3. The electrons flow through the air from the _____ to the _____.

a) You can also experience a spark if your hand has a positive charge. What will be different in that case?

Some Applications of Grounding

Build-up of static charge can be dangerous, especially around the following:

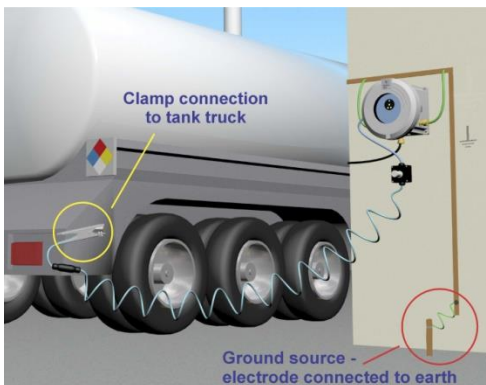
- explosive substances (gasoline, surgical anaesthetics)
- electronic devices - sparks can damage electronics



Anti-static wrist bands

- worn by people who fix computers or work on electronics
- the wrist band is connected to a ground

a) *How does the wrist band protect the electronics from static charge?*



Tanker truck grounding systems

- As tires roll over the pavement, static charge builds up.
- This excess charge can get transferred to the metal body of the car.
- Tanker trucks must be grounded before they are filled with fuel.

a) *Why is it possible for rubber tires to carry a static charge?*

b) *What method (friction, contact, induction) charges the tires?*

Question

Pg. 410, #8) Why is the flooring in an operating room made of a conducting material?
