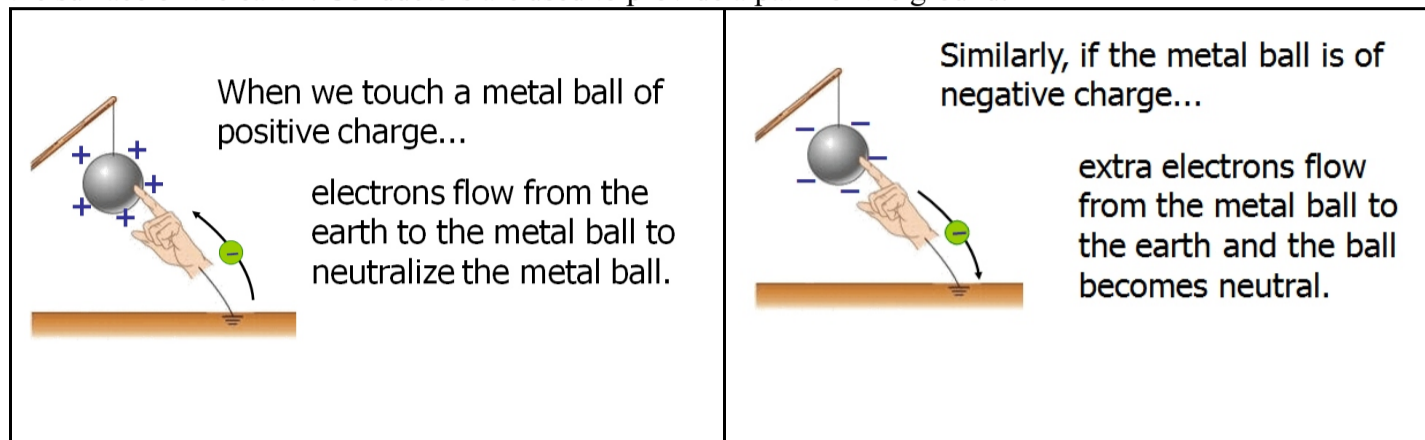


Science 9
Unit 3: Static Electricity
Worksheet 4: Grounding and Electric Discharge



Ground: refers to a pathway that allows electric charge to follow. Usually the charge flows to the surface of the earth. Conductors are used to provide a path for the ground.



Electric Discharge (ESD) refers to the removal of electric charge from an object. The negative charges will jump from the places where there are the most number to where there are the least.

Dangers of Electric Discharge:

- Trucks that deliver fuel to your local gas station or that refuel airplanes must get rid of all static charge before they begin pumping the fuel. A spark caused by a build-up of static charge could cause an explosion
- Lightning is the Granddaddy of electric discharge. Each year lightning kills approximately 10 Canadians and injures approximately 100 to 150 others.

Why do gasoline tankers usually have metal chains at the back?

When cars run, their tires and bodies are usually charged by _____. For gasoline tankers, if the accumulated charge is large enough, _____ can be produced and _____ will occur if gasoline vapor is ignited. Those metal chains conduct the charge on the bodies of tankers to the _____ and avoid the danger.

Safety In a Lighting Storm:

If you are inside:

- Stay inside.
- Monitor local radio stations.
- Stay away from windows, doors, fireplaces, radiators, stoves, sinks, bathtubs, plugged-in appliances, metal pipes, telephones and other materials that conduct electricity.
- Unplug radios, televisions and other electrical appliances. Lightning can follow wires leading to electrical equipment.
- Do not go outside to remove laundry from the clothesline as clotheslines can conduct electricity.
- Do not use a phone unless it is a cellular phone.

If you are outside:

- Take shelter in a building or in a low-lying or depressed area such as a ditch or culvert. Never take shelter under a tree.
- If you are caught in the open, crouch down with your feet close together and your head down. Do not lie flat on the ground. By minimizing your contact with the ground, you reduce the risk of being electrocuted by a ground charge.
- If swimming or in a boat, get back to shore immediately.
- Keep away from power lines, fences, trees and hilltops.
- Get off bicycles, motorcycles and tractors. Do not use metal shovels or golf clubs. All of these things conduct electricity.

PART A: MULTIPLE CHOICE

1. What does the term “ground” mean in electricity?
 - (A) Providing a pathway for electrons to move
 - (B) Providing a pathway for protons to move
 - (C) Providing a pathway for neutrons to move
 - (D) A method of charging an object

2. Which of the following would describe the process of moving electrons from making contact with it?
 - (A) Grounding
 - (B) Electric Discharge
 - (C) Electroscope
 - (D) Lightning

3. Would people provide a good ground?
 - (A) True
 - (B) False

4. Which of the following substance would be a good ground?
 - (A) Plastic
 - (B) Dry piece of wood
 - (C) Copper wire
 - (D) Plastic

5. Which form of electric discharge appears in nature?
 - (A) rain
 - (B) ocean currents
 - (C) lightning
 - (D) volcanoes

6. What does “ESD” stand for?
 - (A) “Devices Sensitive to Electricity”
 - (B) “Electrostatic Discharge”
 - (C) “Electricity Should Discharge”
 - (D) “Electrical Overstress

7. How can you tell when static electricity has been discharged?
 - (A) Heat is released that can be felt.
 - (B) Light is released and you can feel a shock.
 - (C) Static electricity gives off many different colors
 - (D) The object begins to spin rapidly when it is shocked.

8. Lightning does NOT involve:
 - (A) movement of electrons between clouds and the ground.
 - (B) movement of protons from the clouds to the ground
 - (C) movement of electrons away from the cloud in the ground
 - (D) movement of charges within the cloud to separate them

9. Why does lightning hit buildings and homes?
 - (A) they are the closest point to thunder clouds
 - (B) they are good insulators
 - (C) lightning clouds tend to form over buildings
 - (D) homes are better connected to the ground than trees

10. Of the following, the worst place to be in a thunder storm is:

- (A) in a car
- (B) crouched in an open field, away from trees
- (C) on the telephone
- (D) inside a metal roofed building in a valley

PART B: WRITTEN RESPONSE

1. What is grounding?

2. Why do fuel trucks and airplanes need to be grounded before pumping fuel?

3. When you touch a charged object with your hand, the object becomes neutral. Explain what has happened to the charge in this process.

4. Explain why a person can get a shock by walking across a carpet and then touching a metal object such as a doorknob.
