Name: _____ Class: _____ Date: _____

Current or Static Electricity

Learner Outcomes:

- Distinguish between static and current electricity, and identify example evidence of each.

Key Terms:

Electrical energy	Neutral	Charge induction
Static electricity	Charge separation	Electrical discharge
Protons	Attract	Electrical current
Electrons	Repel	Circuit

Background Information: Everything is made of atoms. An atom has a nucleus containing protons and neutrons. Since protons are positive and neutrons have no charge, the nucleus is positive. Negatively charged electrons, orbit around the nucleus. Usually, there are an equal number of protons and electrons making the atoms stable. When two different objects rub together, electrons are transferred from one object to the other, resulting in a charge induction that causes two objects to attract or repel. Sometimes the buildup of electrical charge on an object can become so great that the electrons suddenly "jump" to a neutral or positively charged object in an electrical discharge, creating a shock or a bolt of lightning.

In other substances, electrons, or other charged particles continuously flow. They move through a conducting material in a pathway called a circuit, creating an electrical current.

Research Question: What are the similarities and differences between current and static electricity?

This investigation / activity has been adapted from:
Mah K, Martha J, McClelland L, et al. *Science in Action 9.* Toronto, ON: Addison Wesley.

Hypothesis:

Materials:

Dry cell	Lab stand	Fluorescent tube light bulb
5 Wires	Clear plastic container with lid	
2 light bulbs		
Van de Graaf Generator	Styrofoam 'peanuts'	
	Metal rod	

Procedure:

Part A – Static electricity

1. Place both hands on the Van de Graff generator (VDG) and observe and record what happens.
2. Touch a second student after touching the VDG. Observe and record your findings.
3. Make a human chain of at least 2 people by joining hands and have the first person touch the VDG. Observe and record your findings.
4. Place a clear plastic container full of Styrofoam 'peanuts' on the VDG. Observe and record your findings.
5. Make a human chain of at least 2 people, but connect 2 people to each other using the fluorescent light bulb. Be sure to touch the metal ends of the bulb with your hands. Observe and record your findings.

Part B – Current electricity

6. Create a circuit connecting the battery and one light bulb with the wires provided. Observe and record your findings.
7. Create a circuit using two light bulbs, placed one after another in a single circuit. Observe and record your findings.
8. Unscrew one light bulb and observe what happens to the second one.

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Observations:

Analysis:

1. What effect did the VDG have on the objects that touched it?

2. What type of electricity does the VDG make? How did you know?

3. What was the energy **source** for the VDG? Is this current or static electricity?

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4. What type of electricity did the battery produce? How did you know?

5. What impact did the battery have on the light bulbs?

6. What happened when you connected a second bulb? Why?

Conclusion: Summarize the characteristics of static and current electricity using a mind map or a concept map, and give at least 2 examples of each.

Extension:

1. Identify and describe one situation where we depend upon or use current electricity and one situation where we depend upon or use static electricity. Identify and describe one situation where we must control current electricity and where we control static electricity and describe how we control each.

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