Electricity and Magnetism

TITLE: Electric Currents
GRADE LEVEL: 4th Grade
SUBJECT: Science

PURPOSE: This lesson is the second in a sequence of lessons designed to teach students about electricity and magnetism. This lesson will introduce students to the concepts that relate to electric currents.

OBJECTIVES/GOALS:

Students will:

1. Identify the difference between static electricity and electric current; (static electricity doesn't move, electric currents flow through a circuit)
2. List the parts and their function of a simple circuit; (insulators, conductors, resistors, electric cells)
3. Construct simple, series, and parallel circuits.

KEY VOCABULARY:

- electric current
- conductor
- insulator
- resistor
- electric cell
- circuit
- series circuit
- parallel circuit

RESOURCES/MATERIALS:

For teacher:

1. 1. Group materials listed below
2. 2. Safety rules transparency
3. 3. Vocabulary Graphic Organizer transparency

- Each group will have:
  1. 1 C-cell battery
  2. 1 battery holder with a wire attached from each end
  3. 1 light 6.3 volt light bulb
  4. 1 light bulb holder with wires attached
  5. 4 holiday lights

- Each student will have a science journal that includes:
  1. Assigned roles of each group member
  2. Important Safety Rules about Electric Currents
  3. Vocabulary graphic organizer
  4. Instructions for the investigations
  5. "Electric Currents Wrap-Up" worksheet.

Into

***Review safety rules before starting this lesson.**

1. Ask students what happened when they held a negatively charged plastic comb near a small stream of water (homework from last week). Use this to review what they learned about static electricity last week. Remind them that static electricity is the charge that stays on an object.

2. Now ask them for some examples of electricity that they use in their home. Write their responses on the board. If no examples are given for things powered by batteries (i.e. flashlight), bring that up. Tell students that this type of electricity is different from static electricity because it is a moving charge, or "electric current." Have students write this vocabulary word in their Vocabulary Graphic Organizer and state the definition again.

3. To illustrate the difference between static electricity and electric current, give students an example of a static charge that becomes a moving charge (electric shock when touching something metal) by "flowing" through a path (hand to metal). Tell students that an electric current is a flow of electric charges but static electricity stays on an object until it has a path away from the object, at which point it becomes electric current.

4. Point to the first learning objective (written on chart paper) and chorally state the difference between static electricity and electric current.

Through

1. If not already in their groups, assign students into groups of 4 or 5 students. Each student should have a pre-assigned role that is recorded in their science journal. Pass out the materials to the material managers

2. Have the material manager pass out a holiday light to each member of the group. Use the holiday lights to define the terms "conductor", "insulator", and "resistor". Tell students to write these terms and definitions in their Vocabulary Graphic Organizer. As a class, come up with an illustration for each term.

3. Ask the materials manager to take out the battery from their supplies. Have another group member connect their holiday light to the battery so the bulb will light up. Ask the speaker to raise their hand when the bulb is lit. Let the class know that a battery is an example of an electric cell and have them write this word in their Vocabulary Graphic Organizer. Ask if anyone can define the term "electric cell".

4. Tell students that they have just made a complete circuit. Ask the speakers to trace the path of the circuit with their finger. Have them raise their hand when they can identify the shape of the circuit. Define and illustrate the term "circuit." Emphasize the importance of closed

circuit. Ask students, "If you know that it takes a complete (closed) circuit to light up a bulb, how do you think a switch works?"

5. Have students start Investigation #1. Go over the questions on the bottom of the page.

6. Explain a series circuit to the students and go over how to set it up, but don't hook it up all the way. Have students start Investigation #2. Have speakers from each group share their results.

7. Explain a parallel circuit to the students. Again, go over how to set it up, but don't hook it up all the way. Have students start Investigation #3. Have speakers from each group share their results.

Beyond

1. Depending on your assessment of their understanding, have the students complete the electric currents worksheet as a whole group, in their small groups, or individually.

2. To wrap up the lesson, show a video clip from www.unitedstreaming.com to connect what they learned today about electric circuits to the electricity we get from a power plant.

CONTENT STANDARDS:

Subject – Science, Grade – Four, Area – Physical Science:

Sub-Strand 1. Electricity and magnetism are related effects that have many useful applications in everyday life. As a basis for understanding this concept:

Standard a: Students design and build simple series and parallel circuits.

Standard g: Students know electrical energy can be converted to heat, light, and motion.

Subject – Science, Grade – Four, Area – Investigation and Experimentation:

Sub-Strand 6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

Standard f: Follow a set of written instructions for a scientific investigation.