Electricity

Grade Level or Special Area: Eighth Grade Science
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Length of Unit: Twelve lessons (approximately 12 days; one day = 50 minutes)

I. ABSTRACT

In this unit students will investigate electricity. Through lecture, note-taking, demonstrations, and laboratory investigations, the students will learn about static electricity and electric discharge and the role they play in everyday life. They will learn about conductors and insulators, parallel and series circuits, and how batteries work. This will give them an understanding of electricity; what is it and how it works.

II. OVERVIEW

A. Concept Objectives
   1. Develop an awareness of measuring quantities associated with energy forms (for example: electrical charge, current, voltage), comparing series and parallel circuits, using various materials in a simple circuit and showing the difference between conductors and insulators (adapted from *Colorado Science Model Content Standards, Standard 2.2*)

B. Content from the *Core Knowledge Sequence*
   1. 8th Grade Science: Electricity (p. 199)
      a. Basic terms and concepts (review from grade 4):
         i. Electricity is the flow of electrons in a conductor.
         ii. Opposite charges attract, like charges repel.
         iii. Conductors and insulators
         iv. Open and closed circuits
         v. Short circuit: sudden surge in amperage due to the reduction of resistance in a circuit; protection from short circuits is achieved by fuses and circuit breakers
         vi. Electrical safety
      b. Electricity as the flow of electrons
         i. Electrons carry negative charge; protons carry positive charge
         ii. Conductors: materials like metals that easily give up electrons
         iii. Insulators: materials like glass that do not easily give up electrons
      c. Static Electricity
         i. A static charge (excel or deficiency) creates an electric field.
         ii. Electric energy can be stored in capacitors (typically two metal plates, one charged positive and one charged negative, separated by an insulating barrier). Capacitor discharges can release fatal levels of energy.
         iii. Grounding drains an excess or makes up a deficiency of electrons, because the earth is a huge reservoir of electrons. Your body is a ground when you get a shock of static electricity.
         iv. Lightning is a grounding of static electricity from the clouds.
      d. Flowing electricity
         i. Electric potential is measured in volts.
         ii. Electric flow or current is measured in amperes: 1 ampere = flow of 1 coulomb of charge per second (1 coulomb = the charge of 6.25 billion billion electrons).