Lesson Title	The Physics of Electricity: Real or Magic?
Length of Lesson	One (50 minute) class period
Created By	Will McBryde, Rob Thornton
Subject	General Science
Grade Level	8th grade
State Standards	8th: 1b, d (Inquiry); 2d (Physical Science)
DOK Level	DOK 3
DOK Application	Identify, Predict, Participate, Draw Conclusions
National Standards	5-8: A (Inquiry); B (Physical Science)
Graduate Research Element	This lesson has demonstrations of concepts of geology and meteorology with respect to energy creation.

Student Learning Goal:

MS 8th Grade:

1(b) Distinguish between qualitative and quantitative observations make inferences based on observations. The students will accomplish this through the demonstrations and questions asked. (d) Analyze evidence that is used to form explanations and draw conclusions. The students will do this by explaining what they see and making conclusions. 2(d) Relate how electrical energy transfers through electric circuits, generators, and power grids, including the importance of contributions from Mississippi companies. This will be achieved through the demonstrations and the concepts involved with them.

National Science Education Standards of Content 5-8:

A: Inquiry: Abilities necessary to do scientific inquiry, Understandings about scientific inquiry.

B: Physical Science: Transfer of energy.

Materials Needed (supplies, hand-outs, resources):

Van de Graff Generator, Hand-Crank Generator, Electric Pickle, Parallel and Series Circuits, Eddy Currents in Pipe Due to falling Magnet, LED's on Pipe Lighted by Falling Magnet, Jumping Ring-Heated Ring. Demonstrations like these and their explanations can be found at http://physics.msstate.edu/demos/ . Look under the "Electricity and Magnetism" heading on the website. (Note: The author realizes that such resources may not be available or may have to be constructed. Obviously for those with limited electrical knowledge, it is advised to have someone help with the construction that is well versed in electricity).

Lesson Performance Task/Assessment:

The demonstrations will visually display the concepts normally covered in a textbook or lecture. The instructor can assess students' comprehension of the concepts by asking

them questions about each demonstration. Student comprehension of the concepts is also reinforced by their participation in the demonstrations. Therefore, instead of the instructor just standing before the class and demonstrating, the instructor can call on students to participate.

Lesson Relevance to Performance Task and Students:
The demonstrations will help reinforce concepts previously covered in a lecture or even concepts yet to be covered. This is a hands-on approach and actually lets the students "see" the concepts in action.

Anticipatory Set/Capture Interest:
This whole lesson can be considered under the "Capture Interest" category.

Guided Practice:
The instructor will guide the class through each demonstration and ask questions about each pertinent concept.

Independent Practice:
Students will answer questions asked by the instructor. They will also participate in the demonstrations. For example, in the series and parallel circuit demonstration, one group of students can be given the series circuit and the other group the parallel circuit. The instructor will have each group draw a conclusion as to what kind of circuit they inspected.

Remediation and/or Enrichment:
Remediation- Individual IEP; Make demonstration materials available to resource teacher; Enrichment – Ask students to research and come up with other examples of demonstrations related to electricity.

Check(s) for Understanding:
Observe students during demonstrations. Ask students questions about the concepts the demonstrations are conveying.

Closure:
Question 1: What kind of circuits do many Christmas tree light strands use?

Question 2: Is the spark seen when demonstrating the Van de Graff generator similar to lightning? If so, then how is it?

Possible Alternate Subject Integrations:
Math, Physics

Teacher Notes:

This lesson could be used as an introduction to a unit on electricity or it could be used to conclude a unit on electricity. The instructor could also use one or two of the demonstrations as an anticipatory set to capture interest for a lecture lesson.
An additional website for demonstrations…
http://sprott.physics.wisc.edu/demobook/intro.htm