Lesson Eight

Predicting Conductors and Insulators

Grade: Fourth Grade

Time: 30-45 Minutes (w/small group accommodations, prediction, and writing support)

Materials: Five bins containing the following items: popsicle stick, eraser, cardboard, penny, toothpick, chalk, plastic penny, pen cap, tin foil, a single non-coated paperclip, a chain of three non-coated paperclips, piece of yarn, a wooden ruler w/out the metal edge, metal spoon, plastic fork, and a thin piece of concrete (gravel). 25 prediction tables, and pencils for the class.

Objective: Students will make predictions based on their previously learned knowledge of conductors and insulators. They will predict weather an object may be a conductor as well as an insulator. They will use their knowledge of data tables and record their predictions on a table as well as write an explanation for their reasoning.

Standards: NYS/National Standards

New York State Standards: Standard One: Analysis, inquiry, and design.

- Scientific Inquiry: Key Idea One, The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing creative process. **S1.1** Ask "why" questions in attempts to seek greater understanding concerning objects and events they have observed and heard about. **S1.1a** Observe and discuss objects and events and record observations. **S1.3** Develop relationships among observations to construct descriptions of objects and events and to form their own tentative explanations of what they have observed**. S1.3a** Clearly expresses a tentative explanation or description, which can be tested.

National Standards:

NS.K-4.2 Physical Science

- As a result of the activities in grades K-4, all students should develop an understanding of the following: properties of objects and materials, position and motion of objects, and light, heat, electricity, and magnetism. Utilized to build an electrical circuit as well as being able to understand electricity and its path traveled.

NS.K-4.1 Science Inquiry

- As a result of the activities in grades K-4, all students should develop abilities necessary to do scientific inquiry, and understanding about scientific inquiry.

Lesson Eight (cont.)

Procedure:

1.) The teacher will arrange the students in five groups with the bin of materials, pencils/erasers, and their prediction tables.
2.) The teacher will then orally review the previously learned information recorded on the K-W-L. This will include discussing the definitions of what insulators and conductors are. The teacher will then pose a series of inquiry questions to students allowing an open class discussion to occur. These questions are: Do you need conductors to complete circuits? What would happen if an insulator was placed within a circuit? Looking at the power lines outside the classroom window and wires traveling to the houses, which objects that we see are conductors? What do you think the conductors must be made of? What are insulators possibly made of ?
3.) The teacher will direct students to begin analyzing the items found in their bins, they are to talk amongst one another and predict weather each object is a conductor or an insulator (15-20). Students are required to record their own individual prediction on their own prediction table.
4.) The teacher will also direct students to record what they believe the object is made off (material) on the table. Material choices will be provided to differentiate for students.
5.) When the students have completed this task of conversing, predicting, and recording amongst their group, the teacher will direct students to the two final short answer questions. The students must answer each question in a complete sentence. The first question will require students to state why they believe the objects they chose as conductors will be an electrical conductor. In the second question they will have to answer why they believe the objects they chose are insulators to electricity.

Conclusion: The teacher concludes this lesson with a class discussion. The teacher will ask students to share their responses with the class, while interjecting to have students to raise their hand if they share a common prediction. The teacher will also allow students with a difference of opinion an opportunity to discuss why they believe their answer is correct.

- The teacher will then staple the students' data tables into their journals, or place in their science folders. The teacher will then explain to the class that each of the objects they made predictions about today are either insulators or conductors. The teacher states that the next class each student will use their science skills, strategies, previously learned knowledge regarding electricity, as well as following science rules to test each item.
- The teacher double checks each student's paper to assure that there is a prediction for each, as well as assuring their responses to the short answer questions are quality and supported with their current knowledge. The teacher will continue pullout to support students.