

## Lesson Nine

### Testing Predictions and Formative Assessment

**Grade:** Fourth Grade

**Time:** 30-45 Minutes (w/small group accommodations, prediction, and writing support. The teacher will assist any students having difficulties with the circuit or its components)

**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 test their predictions by using an electrical circuit to check if each item is either an insulator or a conductor. They will record their findings on the prediction table. They will use their data to infer the makeup of a conductor as well as an insulator.

**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.
- **Key Idea 3:** Observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena. **S3.2** Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships. **S3.2a**, state orally and in writing, any inferences or generalizations indicated by the data collected.

#### 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 Nine (cont.)

### Procedure:

- 1.) The teacher will have room previously set up in the same groups students were in during the previous lesson. The bins with materials will be placed at each group. Each student will have an assembled working circuit.
- 2.) The teacher will inform the students that today they will be using the items they made previous predictions about to test on an actual circuit. The teacher states that by testing each item in the circuit you will identify whether it is a conductor or an insulator.
- 3.) The teacher takes a few moments to review the science rules and procedures (recorded on a poster in an earlier lesson) with the students.
- 4.) The teacher will model testing an item using the alligator clamps. The item the teacher tests will be one that is not in the bin (a dry erase marker). The teacher models the procedure of testing as well as the process of recording the finding on the data table.
- 5.) The teacher will then direct each student to take one item out of the bin (each will have a different item in a group of five). The teacher directs the students to locate the item on their data table. The teacher then directs the students to adhere the alligator clips without touching them together to the object.
- 6.) The teacher then tells students to observe the light. The teacher asks: if the light is lit the item is a? conductor/insulator. If the light is not lit the item is a? conductor/insulator. The teacher clarifies any misunderstanding.
- 7.) The teacher states that each of the students will have to take turns because you will each be testing every item and recording the results on their data tables.
- 8.) The teacher will work with students in need of support while directing students to follow the procedures and test the rest of the items. The teacher will set the timer for approximately 20 minutes.
- 9.) Formative Assessment: The teacher will be using the data table created with previous predictions as well as the written answers to assess the students understanding of the conductors and insulators. The teacher will determine if each response is correct and return the data tables to each student. The teacher will also be checking for clear explanation for the short answer questions. Any misunderstandings will be retaught in small group to clarify understanding and even retest the items.

**Conclusion:** The teacher will conclude this lesson by asking students if their predictions were correct, incorrect, or varied as the experiment went on. The teacher will refer students to the materials/ makeup of each object. The teacher will ask students to discuss the following question for a moment in their groups, what material are the conductors made of. The teacher will then ask students to reflect upon the insulators and their varied makeup. The teacher will then direct students to the two assessment questions on the back of the prediction table handout. The teacher will then ask each student to answer each question in a complete sentence using the data to support their answer.

- The teacher will conclude the lesson by having students orally state as well as having a volunteer record any new information regarding electricity on the classroom K-W-L.