

Lesson Fourteen

Are Magnets Conductors? And Formative Assessment

Grade: Fourth Grade

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

Materials: 25 assembled circuits, students arranged in their working stations (groups of five), each group has a bag of five magnets (different colors and shapes if possible), a small bag containing five metal screws, and 25 data tracking sheets.

Objective: Students will reflect on the previously learned fact that electricity can be made by using magnets in power plants. Students will predict whether or not their magnets are conductors or insulators, and students will test the magnets to determine whether they actually are insulators or conductors.

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 Fourteen (cont.)

Procedure:

- 1.) The teacher will direct students to choose one of the colored objects from the bag in their group. The teacher will ask students to make oral predictions of what they think this object is and what it is made out of. Many students will claim it is metal, as well as a magnet.
- 2.) The teacher will direct students to choose a screw from the bag and to hold the colored object near it. The students will notice that the metal screw is attracted to it, confirming their prediction that it is a magnet.
- 3.) The teacher will then have students predict whether they believe their colored object is a conductor or an insulator. The teacher will reflect on the previous learned material from the website that Magnets are used in power plants to create electricity.
- 4.) With this point being brought up many students will assume that it is a conductor.
- 5.) The teacher will direct students to put their name and date on the top of their data table. The teacher will then review science safety rules with the students.
- 6.) The teacher will direct students to test their item, record their outcome using their own circuit, and then trade with a neighbor at your group. The teacher directs them to do this until they have tested all five items.

Conclusion/formative:

The teacher will then have an inquiry discussion with the class. The teacher prompts students to tell whether the objects are conductors or insulators. Students reply that they are insulators. The teacher replies, knowing they magnets are used in the production of electricity how is it that it cannot be a conductor? Is it possible to have a conductor and a magnet? Is it the magnetic force that throws the electrical path off?

The teacher then concludes the lesson by stating that it we cannot have both a magnet and a conductor, and the magnetic force throws the electrical path off.

The teacher then passes out the half page questionnaire for students to answer, collects it, reviews it, and reteaches the material to any students that have misconceptions.