

# Electromagnetism Grade 4 Evaluation

## Teacher Section

**Overview** Kids will demonstrate how well they understand important key concepts from this section.

**Suggested Time** 45-60 minutes

**Objectives** Students will be tested on the key concepts of electromagnetism:

1. Electric currents produce magnetic fields.
2. Magnetic fields create electrical currents.
3. The role of electromagnets in the construction of electric motors, electric generators, and simple devices such as doorbells and earphones.

Students will also demonstrate these principles:

4. How to build a simple electromagnet.
5. How two magnetic fields interact to cause motion.

### Materials (one set for entire class)

- AA battery case
- 2 AA batteries
- Alligator clip leads
- Plain nail (not wrapped in wire)
- Electromagnet (nail already wrapped in wire), ends *not* sanded
- Electromagnet (nail already wrapped in wire), ends sanded down
- Paper clips
- 9-18 VDC motor
- LED

### Lab Preparation

1. Print out copies of the student worksheets, lab practical, and quiz.
2. Have a tub of the materials in front of you at your desk. Kids will come up when called and demonstrate their knowledge using these materials.

**Lesson** The students are taking two tests today: the quiz and the lab practical. The quiz takes about 20 minutes, and you'll find the answer key to make it easy to grade.

**Lab Practical** Students will demonstrate individually that they know how to wire up a circuit and explain how electrical energy can be converted to heat, light, and/or motion. While other kids are waiting for their turn, they have a choice of three different homework assignments to get started on.

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## Student Worksheet

**Overview:** Today, you're going to take two different tests: the quiz and the lab practical. You're going to take the written quiz first, and the lab practical at the end of this lab. The lab practical isn't a paper test – it's where you get to show your teacher that you know how to do something.

### Lab Test & Homework

1. Your teacher will call you up so you can share how much you understand about electromagnetism and how it works. Since science is so much more than just reading a book or circling the right answer, this is an important part of the test to find out what you really understand.
2. While you are waiting for your turn to show your teacher how much of this stuff you already know, you get to get started on your homework assignment. The assignment is due next week, and half the credit is for creativity and the other half is for content, so really let your imagination fly as you work through it.

Here it is: Your classroom is going to be converted into an interactive science museum next week. You will be in charge of one of the stations. Your audience knows nothing about magnetism. Your job is to design and build an experiment that teaches the students in lower levels an important concept in one of the following areas: magnetism or electromagnetism. You will get to explain to your students what's going on as you demonstrate your experiment. You can have them watch or actively do something at your station. You will be graded based on content and creativity, so really let your mind go wild. (Hint: If you were the audience, what would *you* want to learn about most?)