

Activity 5: Electromagnets and Buzzers

Name _____

Date _____

Class _____

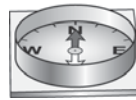
Key Question

Explore Your Ideas

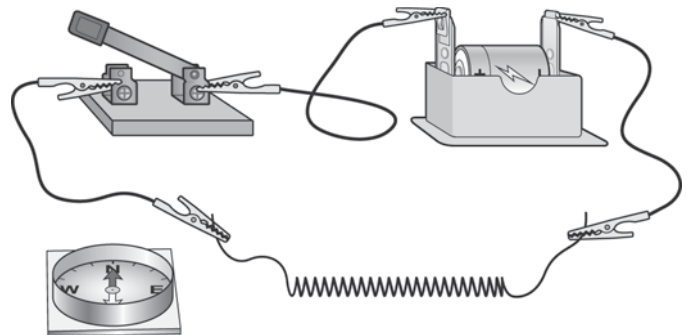
Explore the Electromagnet

Experiment 1: Under what circumstances will a coil of wire interact with a magnet?

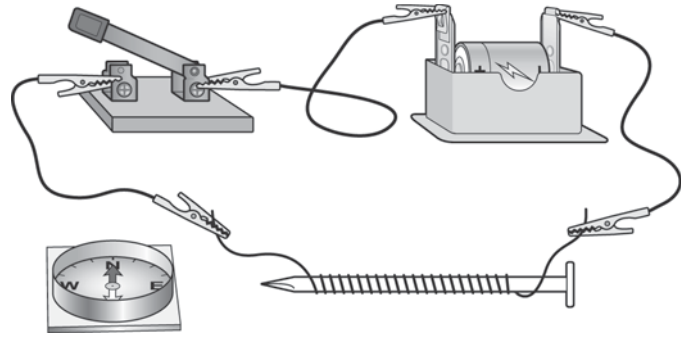
1. Is the colored part of the compass needle *attracted to the coil, repelled from the coil, or is there no effect?*



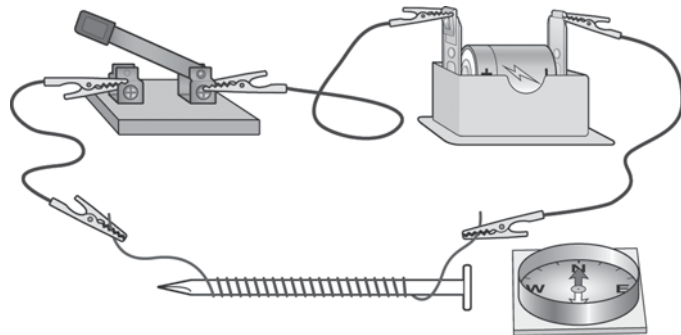
2. Is the colored part of the compass needle *attracted to the coil, repelled from the coil, or is there no effect?*



3. Is the colored part of the compass needle *attracted to the coil/nail, repelled from it, or is there no effect?*



4. How does the deflection (rotation) of the colored part of the compass needle compare to when there was no iron nail inside the coil?



5. Is the colored part of the compass needle *attracted to the coil/nail, repelled from it, or is there no effect?*

6. How does the deflection (rotation) of the *colored* part of the compass needle compare to when the compass was near the other side of the coil/nail?

7. What is the evidence that the electromagnet interacts with another magnet?

8. Does an electromagnet behave like a magnetic material or like another magnet? What is your evidence?

Experiment 2: How can you make an electromagnet stronger?

9. How did you make your electromagnet strong enough to lift the washer?
(If it was already strong enough, write that it was strong enough.)

10. What happens to the washer?

11. Why do you think this happened?

12. What two different ways did you find that work?

First way: _____

Second way: _____

Make Sense of Your Ideas

Make Sense of the Electromagnet

1. What are *two* variables that can influence the strength of the magnetic interaction between an electromagnet and a magnetic material (steel washer)?

2. How does each variable influence the strength of the electromagnetic interaction?
Complete the following statements:

For the first variable: As the _____ (*write the variable*) increases, the strength of the magnetic interaction between the electromagnet and the magnetic material _____ .
(increases, decreases)

For the second variable: As the _____ (*write the variable*) increases, the strength of the magnetic interaction between the electromagnet and the magnetic material _____ .
(increases, decreases)

Explore Your Ideas

Explore the Buzzer

Experiment: How is a sound produced?

1. What is the ruler doing while the sound is produced?

2. What is the rubber band doing while the sound is produced?

3. What do you think is happening inside the buzzer to make that sound?

Make Sense of Your Ideas

1. Choose the words/phrases from the list below that complete the story. Each word or phrase is used only once.

- electromagnet
- over and over again
- vibrate
- open
- armature
- magnetic
- electric circuit

All sounds are produced by vibrating objects. In the buzzer, the _____ moves rapidly back and forth to produce the “buzzing” sound. What makes it _____? When the contact is “made,” there is an electric-circuit interaction between the cell and the coil. (See the diagram in your student book.) This _____ interaction creates an electric current in the coil, and the coil becomes a(n) _____. There is then a(n) _____ interaction between the electromagnet and the armature (made of iron). This interaction pulls the armature toward the coil. When this happens, however, the circuit becomes _____ (contact “broken,” no electric current), the electromagnet loses its strength, and the armature returns to its original position (contact “made”). The circuit is again closed and the process repeats itself _____, causing the armature to vibrate.