Curiosity Guide #509
Electromagnetism

Accompanies Curious Crew, Season 5, Episode 9 (#509)

Repulsive Electrons

Investigation #6

Description

May the force be with you when you do this investigation!

Materials

- Large ceramic magnet
- 6 small ceramic magnets

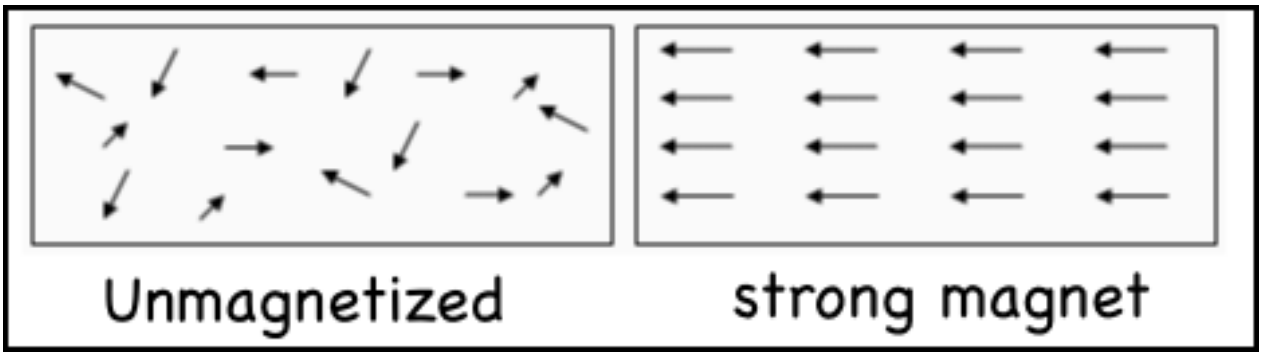
Procedure

1) Place the large ceramic magnet face down on the table.
2) Place a small ceramic magnet next to the large one so their edges attract. If they don't, flip over the small magnet and try again.
3) Repeat the process with the remaining magnets.
4) While holding the center of the large magnet down on the table, tap on one of the smaller magnets.
5) What do you notice?

My Results

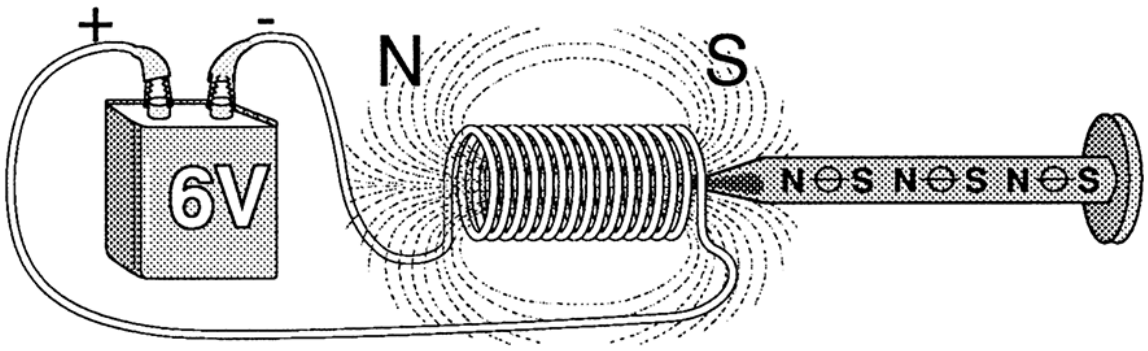
Explanation

Disc magnets like these have one pole facing up and one facing down. Assuming the large magnet's north pole is facing up, then the small magnets will have their south poles facing up. Because each one is the same, they repel one another. You might have noticed that each time you added a small magnet to the larger one, the little magnets moved and kept equally spaced apart. As soon as one magnet gets tapped and approaches the next, the magnets all shift to maintain their distance from one another. This is what happens in the wire during an electrical current. The little magnets are like electrons spaced apart all along the copper wire, which all repel because of their negative charge. However, when a new electron enters the wire from a power source, all the electrons shift over to maintain space, and that movement is the electrical current. It is that flow that produces a magnetic field.



Think about this! When an iron nail is wrapped in a wire carrying electricity, it turns into a temporary magnet. Imagine if we could see the direction that each of those atoms were spinning in that nail.

At first, we would notice that the atoms would be spinning in different directions in little areas that we call domains. Because each atom has spinning charged particles, they behave like little magnets. Once the wire is electrified, the nail atoms start spinning the same way. The nail might even act like a magnet for a short time when the power is off; that is, until all those atoms start spinning in different directions again!



Parents and Educators: use #CuriousCrew #CuriosityGuide to share what your Curious Crew learned!

Curious Crew is a production of Michigan State University.
Learn more at WKAR.org.