Levitating Magnets

Overview

Magnets can certainly push and pull on each other, but can they push hard enough to levitate? As you may have guessed from the title of this activity, the answer is 'yes', and it's pretty great.

Doing the activity

Arrange your ring magnets on the dowel so that all the magnets push each other apart. We've had good luck getting this set up by holding the bottom end of the dowel and dropping the magnets down from the top end, but figure out what works best for you! Once you have the magnets in place, give the top magnet a quick downward push. What happens to the other magnets? Take some time to experiment and explore!

Necessary materials:

- ring magnets
- dowel

What's happening

As we discussed in the *Refrigerator Magnets* activity, all magnets have two *poles*: "north" and "south". The poles are places where the the magnetic field gets all scrunched together (check out the *Magnetic Sleuth* activity for more details on magnetic fields). However, the field scrunches in opposite ways at north and south poles — by convention, we say the field goes "out of" a north pole and "into" a south pole. Since the field is strong (due to the scrunching) and has a particular orientation at each magnetic pole, there is an attractive force between north and south poles (opposite poles get pulled together), but a repulsive force between north and north or south and south poles (similar poles get pushed apart).

The ring magnets have a north pole on one wide flat side and a south pole on the other wide flat side. To make the magnets levitate, you arranged them so that the north pole of one magnet was facing the north pole of the magnet above it, and then the south pole of that magnet was facing the south pole of the magnet above it, and so on. You probably noticed that if you flip one of the magnets, it sticks to the magnet below it; flipping the magnet would put its north pole next to the south pole of the magnet below it (or vice-versa). That leads to an attractive force rather than a repulsive one.

Summing up

Magnetic poles are a way of understanding why magnets stick together in certain orientations and push each other apart in other orientations. To investigate further, try combining this activity with the *Magnetic Sleuth* and *Refrigerator Magnets* activities!

For more information

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