Title

Magnetic Flyer

Activity Overview

Description: Participants will learn about magnetism and apply the concepts in order to suspend their flyer inside a plastic cup.

Topic Area(s) Engineering

Grade Level: 1-4 **Duration:** 30-45 minutes

Learning Outcomes:

- Learn about the positive and negative poles of a magnet
- Use their critical thinking skills to figure out how to suspend their flyer in the air
- Learn about the strength of magnetic field

Hook

Using the powers of magnetism we will make a cool jet plane or butterfly suspend itself inside a clear plastic cup!

Background Information

Permanent magnet – an object whose magnetic domains are permanently aligned and that is always magnetic

Temporary magnet – an object whose magnetic domains have temporarily been aligned, turning it into a magnet. Temporary magnets can be changed back into non-magnets.

We've all used fridge magnets to hold up our grocery lists and memos but how do they work? Magnetism has to do with the interaction between two possible poles: North and South. Each permanent magnet has a north and a south pole. When two of the same pole interact with one another they repel, whereas when two different poles interact they attract! All objects have what are called magnetic domains which are like mini magnets that point in all different directions. When these domains line up and point the same way we get the creation of a magnet!
Permanent magnets are all made of at least one of three specific kinds of metal: Iron, Nickel or Cobalt. An object will not be a permanent magnet unless it contains one of these three kinds of

metals. Temporary magnets are typically metallic, and can be made from a number of possible compounds including steel. When a permanent magnet comes in close proximity to a metal object, it forces the magnetic domains in the metal to align side by side. This creates a magnetic north pole and a magnetic south pole in the object, which in turn is attracted back to the magnet. Creating the magnetic flyer will allow us to be able to see the magnetic field created by the magnet.

Materials

Per student:

- Magnet (at least one per camper)
- 1 Clear Plastic Cup
- Thin string
- 1 Small Paper Clip
- 1 skewer
- Tape
- Paper
- Scissors

Safety Considerations

Don't swallow the magnets!

Procedure

Part 1:

1. Instructors will pass out paper for campers to cut out the shape they want their flyer to be. Make sure it is made clear that it has to be small enough to fit inside the cup. Campers may want to color or decorate their flyer

2. Cut a piece of string and tape one end to the skewer. Tie the other end of the string to the paper clip.

3. Tape the magnet to the inside bottom of the cup. Poke the paper clip through the flyer.

4. Place the skewer at the opening of the cup, and roll it so that the string becomes shorter. When the paper clip is no longer touching the magnet, but the force is still acting on it. Turn it upside down and the flyer should be suspended in the cup.

Wrap-Up/Debrief

- Group discussion points:
- Why does the flyer suspend in the air?
- What would happen if we used a stronger magnet? (Think about magnetic fields)
- These are non-contact forces, what force keeps the flyer suspended?

- What force is acting against the magnet?