EXPLORING MAGNETIC FORCE

Set a course for the moon! Students use a pair of magnets to launch and propel a rocket ship through space.

Objective
Students will explore the push and pull forces of magnets.

Standards
NGSS
3-PS2-3 Determine relationships of magnetic interactions between objects not in contact
3-5-ETS1.C Optimizing by testing different approaches

Time
20 minutes

Materials
- Fly to the Moon! activity sheet
- Two disc or bar magnets and one clear plastic sheet protector per student pair
- Tape, markers
- Optional: Scientists in Space reading passage (online)

Get the reading passage + more activity PDFs at scholastic.com/overthemoon.

Remote Ready

1 **Ask** your students to share what they know about rocket launches. Prompt for ideas like countdowns, noise, smoke, heat, fire, light, and excitement.

2 **Explain** that rockets are launched with the help of rocket fuel and a chemical reaction called combustion, which creates a lot of heat, light, and energy—enough to propel (push) a rocket off the ground and into space.

3 **Explain** that some scientists and engineers have different ideas about how to create enough energy to launch a rocket.

4 **Pair** up students and distribute the Fly to the Moon activity sheet, pairs of magnets, and a plastic sheet protector.

Fridge magnets found around the house work well for this activity too! For students without magnets at home, share a video recording of the experiment and invite students to use their observations to complete the activity.

5 **Direct** pairs to designate one magnet as their rocket ship and place it flat inside the sheet protector. (The sheet protector helps the rocket ship to move more smoothly and keep from flipping over. Students can cut paper to size, then draw and tape a rocket ship to this magnet for added effect.)

6 **Have** students place the sheet protector on top of their activity sheet, which includes an illustrated space scene. Students should follow the experiment instructions to "launch" and "guide" their rocket ships using the forces of attraction and propulsion, or the pull and push forces between magnets.

7 As students steer the ship, **challenge** them to note and refine their steering technique. What distance or angle of the steering magnet gives them finer control over the "rocket ship"'s motion and ability to move around the obstacles?

8 **Wrap up** the magnet activity with a discussion of student findings.

Extension Read the inspiring profiles in the Scientists in Space reading passage; use as a read-aloud or solicit volunteers. Point out that scientists must use their imagination, not just technical skills, to solve problems. Ask: *How do these scientists use creativity in their jobs?*

Activity Sheet Answer Key

1. Magnets are famous for snapping together, but magnets also push apart. The opposite poles of magnets attract and the like poles of magnets repel.
2. Varied student input; the repel force pushes and the attract force pulls.
3. Varied student input; likely the push felt trickier to guide the rocket in the desired direction, whereas the pull guided the rocket ship more easily.
4. Varied student input.

Name _____

FLY TO THE MOON!

Launch your rocket and land on the moon! Challenge yourself to try to get there without letting your magnets touch each other.

1. Place your **rocket magnet** on the launch pad.
2. Use your **second magnet** to launch your rocket into outer space using the **push (repel)** force.
3. Then use the **pull (attract)** force to guide your rocket through the stars to the moon. Be careful to avoid the space junk too!

Use a separate sheet to answer the questions.

1. Do magnets always stick together? Explain your thinking.
2. Explain how you launched your rocket and how you steered your rocket. How are the forces that repel and attract different?
3. Brainstorm how you could use magnets to tidy up space junk (the metal left behind from missions in space). Which magnetic forces would your solution use? Sketch or explain your idea on a separate sheet of paper.