MAGNETIC MOTION

BENCHMARKS and TASK

SC.C.1.1.2 The student knows that there is a relationship between force and motion.
SC.C.2.1.1 The student knows that one way to change how something is moving is to give it a push or a pull.

- The student demonstrates that magnets attract and repel each other.

KEY QUESTION

What happens when magnets come near each other?

BACKGROUND INFORMATION

Magnets usually have two poles – north-seeking and south-seeking. Like poles **repel** and unlike poles **attract** each other. Bar magnets have poles at each end. Horseshoe magnets are bar magnets that have been bent into that shape. The poles of ring magnets are on their flat sides. Magnets are strongest at their poles and weakest midway between them. Permanent magnets are made of steel (hard iron) or magnetic alloys. Iron, nickel, and cobalt are attracted to magnets. Alloys such as steel and alnico are also attracted to magnets.

MATERIALS

Teacher

2 magnets
string

Per pair of students

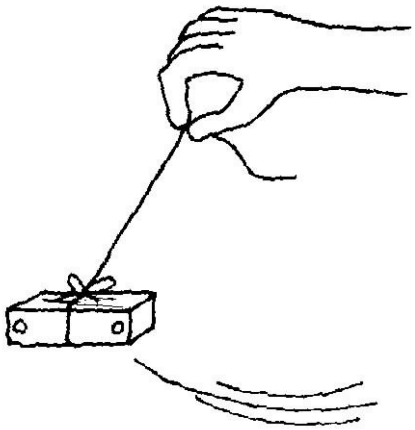
2 strong bar magnets with the north and south poles marked as directed in the **Teaching Tips** below
1 styrofoam tray, file folder, or tag board

TEACHING TIPS

Label each bar magnet with a red dot on the north pole and a blue dot on the south pole.

ENGAGE

Suspend a magnet so that it is allowed to swing freely as shown in the illustration. (The magnet should be labeled with the red and blue dot as directed in **Teaching Tips**.) Bring a second magnet near the swinging magnet and ask students to observe what happens. Discuss what will happen to the swinging magnet when the red end of the second magnet is placed near the red end of the swinging magnet. Repeat by bringing the red end of the magnet to the blue end of the swinging magnet. Have students observe and describe the action of the magnets.



EXPLORE

1. Have students work in pairs. Give each pair two bar magnets and one tray, folder or tag board. Direct the students to hold the flat surface of the tray in one hand with a magnet resting on top.
2. Demonstrate how to hold a second magnet under the flat tray (with the other hand) to make the magnet on the tray move without actually touching it. Challenge students to move the magnet in as many ways as possible without touching it.

EXPLAIN

1. Give each pair an opportunity to share ways they moved the magnet by demonstrating to the rest of the class.

   Ask:

   Why do you think the magnet on the surface moved without the other magnet actually touching it?

   What happened when the blue ends of both magnets came near each other?

   What happened when the red ends of both magnets came near each other?

   What happened when the red end of one magnet came near the blue end of the other magnet?

2. At this time introduce the terms ***repel*** **and** ***attract***.
3. Using two magnets, have several students demonstrate repelling and attracting.

   Ask:

   When two magnets attract each other, what kind of force do we call that? (pull)

   When two magnets repel each other, what kind of force do we call that? (push)

EXTEND/APPLY

Direct students to draw a maze on the styrofoam tray, file folder, or tag board. Then try to move a magnet placed on the tray around the maze by using a second magnet under the tray.

ASSESSMENT

Ask and discuss:

You are in the driveway with your brother and drop a box of small nails. You need to pick them up quickly before someone drives in the driveway. What is the fastest way to pick up the nails?

1. *sweep them up*
2. *wave a magnet close to the magnets*
3. *pick them up by hand*