

SUPER

LER 2064



3041

LAB

# Activity Guide

CHOKING HAZARD-Small parts. Toy contains a marble. Not for children under 3 years. MAGNETS-This product contains small magnets. Swallowed magnets can stick together across intestines causing serious infections and death. Seek immediate medical attention if magnets are swallowed or inhaled.

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Welcome to the wonderful world of magnets! This kit is designed to help fill your children's minds and imaginations with all the possibilities of using magnets. Children will explore magnetic fields, forces of attraction and repulsion, how magnets are used in everyday items, and other exciting characteristics about magnets.

The Super Magnet Lab (LER 2064) includes all the tools you will need to start exciting discoveries about magnets. The kit includes: a set of seven magnetic wands, two bar magnets, two ring magnets, two small metal horseshoe magnets, one 5-inch (12.7 cm) plastic horseshoe magnet, 10 magnetic marbles, and 100 magnetic chips.

Please note that all activities are geared towards a classroom setting. Can be adapted for individual use.

#### FUN FACTS:

- Natural magnets are made from iron, nickel, and cobalt.
- A shepherd named Magnes who lived in a Greek town named Magnesia is believed to have discovered magnets about four thousand years ago. His discovery was actually an accident. It happened one day when he was walking and the nails in his shoes and the tip of his metal staff became stuck on the large black rock he was standing on. The rock was named Magnetite either after Magnes or the town Magnesia.
- Magnets used to be so mysterious that they were believed to be able to heal, drive away evil spirits, and possess magical powers.
- In the 1600s, William Gilbert discovered that Earth is a giant magnet.
- Some roller coasters use magnets to help accelerate and slow down the cars on the track.
- Sometimes magnets are used in the medical field to help reduce pain and speed up healing of some injuries, such as a sprained ankle or arthritis.
- If a magnet is broken in half, a new pole will form on either end of the magnet creating two new, separate magnets.
- It is impossible to have a magnet with only one pole.

#### ACTIVITY I: MAGNETIC HUNT

**What you will need:** 7 magnetic wands, 5-inch (12.7 cm) plastic horseshoe, 2 metal horseshoes, 2 bar magnets, and 2 ring magnets.

**Purpose:** Students will learn about and discover what items around the classroom are magnetic. (Be sure to instruct students not to test things like videotapes, cassette tapes, and computer monitors.)

- 1. Divide the children into 14 groups and give each group one magnet.
- 2. Have the students predict what items are magnetic by looking around the classroom and making a list.
- 3. Then have the groups test their ideas with the magnets to see what items on their list are magnetic.
- 4. Have students continue testing objects around the classroom. Students should write down what they tested and which items were magnetic and which items were not.
- 5. Give students a chance to compare their results with other groups.

**Application:** Were you surprised with any of the findings? What do all the magnetic items have in common?

#### ACTIVITY 2:

ATTRACTION ACTION

**What you will need:** 8 rulers, 2 magnetic wands, 2 ring magnets, 2 bar magnets, 2 metal horseshoe magnets, 8 magnetic marbles, 8 magnetic chips.

**Purpose:** Students will learn how the type of magnet has an effect on the strength of the magnet's magnetic pull.

 Separate the students into two groups and divide the tools from "What you will need" (above) evenly between the two groups.

- 2. Have each group place a magnetic marble at one end on the zero value and one of the magnets (wand, ring, bar, or horseshoe) at the other end. Slowly move the magnet towards the marble. When the marble rolls to meet the magnet, stop moving the magnet and record where the magnet was stopped.
- 3. Do this three times with the marble, and three times with the magnetic chips. Be sure to record all values.
- 4. Repeat this procedure until every magnet (wand, ring, bar, and horseshoe) has been tested.
- 5. Allow students time to compare their results with the other group.

**Application:** Did both groups come up with similar values for each type of magnet? Which magnet seemed to be the strongest? Which was the weakest? What do you think affects the strength of the magnetic pull?

#### ACTIVITY 3:

A SWINGING GOOD TIME

**What you will need:** 3 pieces of string each 12-inches (30.48 cm) in length, 2 ring magnets, 2 bar magnets, and 2 metal horseshoe magnets.

**Purpose:** Students will learn how the poles of magnets attract and repel each other.

- 1. Ask for 6 volunteers to do a demonstration with the magnets in front of the classroom.
- 2. Hand 3 students each a different magnet with a string attached to it and the other 3 students the magnets without string. (Each type of magnet should have one with a string and one without.)
- 3. Explain how each magnet has a north and south pole.
- 4. Ask the remaining students to predict what will happen when two like poles come together and two unlike poles come together.

- 5. Have the students that possess magnets without string try to touch the north pole of the string magnet with the north pole on their magnet. Repeat this for the unlike poles as well.
- 6. Have the students discuss what they observed.

(This activity may be done in small groups as well. Have the students make predictions and then test their results using the method above.)

**Application:** Were your predictions about the poles correct? Why do you think unlike poles attract and like poles repel? Explain to the students that like poles attract and unlike poles repel.

#### **ACTIVITY 4:**

CAN THE FORCE BE STOPPED?

**What you will need:** 7 magnetic wands, 5-inch (12.7 cm) plastic horseshoe, 2 metal horseshoes, 2 bar magnets, 2 ring magnets, magnetic chips, and objects like a piece of paper, plastic lid, piece of cardboard, thin piece of plywood, etc.

**Purpose:** Students will discover that a magnet's force can pass through objects and is also weakened when going through objects.

- Separate the students into small groups making sure to give each group at least one magnet and some magnetic chips. Each group should receive the same objects through which to test the magnetic force.
- 2. Have the students first test their magnet to see how many paper clips or magnetic chips they can pick up with the magnet. Have them try this three times and record their results.
- 3. Next, have the students conduct the same test, but this time putting an object—for example, a piece of paper—between the magnet and the magnetic chips. Have the students test this also three times and record their results.
- 4. The students should continue the above process until all objects have been tested.

**Application:** Were you surprised that the magnet was able to attract even through an object? Did you notice any decrease in the magnet's force? Was there any object that blocked the magnet's force? Why do you think the magnet's force was blocked?

### **ACTIVITY 5:**

**100-CHIP PICKUP** 

What you will need: 7 magnetic wands, and 100 magnetic chips.

**Purpose:** Students will use their new knowledge on magnets to hypothesize the strength of a magnet's pull.

- 1. Divide students into 7 teams, giving each team a magnetic wand.
- 2. Place all the magnetic chips in a pile on a table.
- 3. Have the first team come up to the table and pull the amount of magnetic chips out of the pile that they think the wand will pick up.
- 4. The students should then wave the wand over the new pile and see if they can pick up every chip.
- 5. Have the students count up the number of chips they picked up and announce that number to the class; that will be their team's score.
- 6. Those students should return all the chips to one pile.
- 7. The students from the next group should then come up and repeat the same procedure.
- 8. The team with the most points at the end wins the game and becomes the magnetic-chip champion.

(As a variation of this game, the students, after their first pickup, may try to add more chips onto the magnet. These would then be included in the total score.)

**Application:** Was there anything that helped in picking up more chips (i.e., rotating the wand to use both sides)? What knowledge about magnets did your team use in order to determine the amount of chips your team picked up?

#### **GLOSSARY**:

attract: to pull to or draw toward itself bar magnet: a magnet that is shaped as a straight line horseshoe magnet: a magnet in the shape of a horseshoe magnet: a piece of iron, which attracts iron or steel towards it magnetic: the power of a magnet to attract iron or steel magnetic force: the pushing or pulling effect of a magnet magnetic field: the region where a magnetic force can be detected

- **poles:** the north and south ends of a magnet, which has the greatest magnetic force
- **repel:** to pull away from ring magnet: a magnet in the shape of a circle

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