

**Learning Objectives**

- 1) Know that magnetism is an invisible force that can push or pull objects.
- 2) Understand that magnets can pick up metals including iron, steel, cobalt, and nickel. Some other metals like copper cannot be picked up by magnets. Other objects like paper, glass, wood, and leather also cannot be picked up by magnets.
- 3) Realize that rubbing a permanent magnet over magnetic metal many times in one direction can make a magnet. Also, metals can be magnets for a short period of time when linked to a magnet.
- 4) Know that magnets have forces that push or pull in two directions. These directions are called poles. All magnets have a North and South pole. In addition, poles that are alike push apart, and poles that are different pull together.
- 5) Understand how magnets work. All objects are composed of very small bits of matter called atoms. An atom is the smallest part of an object. Each atom has a North and South Pole. Every atom in iron, steel, nickel, or cobalt has magnetic power, but not much because the poles of the atoms are not lined up in one direction. Since the poles of the atoms that make up magnets are lined up in the same direction, magnets have a strong pulling and pushing power. The atoms of permanent magnets always stay in this lined up state.
- 6) Know that the pulling power of magnets is strongest at the ends (the north and south poles of the magnets).
- 7) Realize that the earth is very similar to a giant magnet. It has a magnetic North and South pole. A compass shows the earth's North or South pole because the needle of a compass is attracted to the magnetic poles of the earth.
- 8) Understand that magnets have lines of force. One can see these lines of force by placing a magnet under iron filings. The filings will form a pattern that shows the lines of force.

- 9) Realize that magnets come in many sizes and shapes. There are bar magnets, horseshoe magnets, disk magnets, and even magnetic tape.
- 10) Know that the word magnet originates from a province of Greece known as Magnesia. Magnesia is where loadstones, which are natural magnets, were discovered.
- 11) Appreciate that magnets do work for us. Some magnets hold notes to the refrigerator, while others allow motors to work, and still others are used to pick up objects, and move them to another location.
- 12) Realize that magnets can pull through objects, like wood, paper, and glass.

**Suggested Activities**

- 1) Before viewing the video:
  - a) Anticipatory Set: Use two strong magnets for all ideas on this sheet. Dip a magnet into a can of nails, pins, and paper clips. Let the children observe. Put the other magnet opposite of it and see what happens. Discuss what the magnet picked up and how those objects reacted when the other magnet was close to it. View the video.
- 2) After viewing the video:
  - a) See what happens to the two magnets when you: 1. Put two ends together. (Will attract or repel) 2. Turn one around so different ends meet. (Will do the opposite) 3. Try to push repelling ends together. (Can feel the repelling force) 4. Put one magnet under the table and pull it below the other magnet (or a pin) on the table. (Top object will move if the table is not too thick.) 5. Have magnets "chase" each other. (Will push away – or flip over and stick together.)
  - b) Rub a pin or a blunt needle in the same direction about 80 or more times on a magnet. Be certain your pins are steel and not aluminum. (A magnet will not pick up aluminum.) A temporary magnet will be created. Try to pick up the other pins. Be sure to try both ends of the temporary magnets, as one end may be repelling.

- c) Hang a pin from a magnet. See how many other pins you can hang from original pin while it is still attached to the magnet. The number will depend on the strength of the magnet. All the pins will eventually fall off. Why? (The pin is only a temporary magnet.)
- d) Get two (or more) round magnets with holes in them (ring magnets). Put a pencil into a ball of clay so it will stand-alone. Drop one ring magnet on the pencil. Drop the second magnet. If it sticks to the other magnet, remove the second magnet and turn it over. Drop it on the pencil again. The top magnet will remain suspended in the air. Use 3 or 4 magnets to make an even more impressive example of how magnets repel.

**Vocabulary**

**Atom** – an atom is the smallest part of an object.

**Magnetism** – an invisible force that can push or pull objects.

**Magnet** – a piece of material that is able to pick up iron, steel, cobalt, and nickel.

**Permanent Magnet** – a magnet in which the poles of the atoms are always lined up, giving the magnet permanent magnetic power.

**Poles** – are the ends of the magnet in which the force is strongest.

