
TEKS 1.6 Force, motion, and energy. The student knows that force, motion, and energy are related and are a part of everyday life. The student is expected to:

(B) predict and describe how a magnet can be used to push or pull an object.

Background Knowledge

Magnets come in all shapes and sizes, like bar magnets, horseshoe magnets, and disk (donut) magnets. These are known as permanent magnets. A permanent magnet retains its magnetic properties for a long period of time. Temporary magnets are those in which the magnetic force can be turned on and off by removing the energy source that causes the item to become magnetic. Electromagnets are examples of temporary magnets. Dropping, heating, and cooling permanent magnets can cause them to lose their power.

All magnets have two opposite poles—one north and one south. Every magnet has a magnetic field. This is an area surrounding the magnet where their effects can be felt. When magnets are near other magnets, their magnetic forces affect each other. The forces between magnets are based upon the position of their poles. When you have two unlike poles, the magnets will attract each other. When there are two like poles, they will repel each other.

Making sure students have a good understanding between magnetism and magnets is a key point to ensuring a depth of understanding. Here is a simple rule to keep in mind: Magnets exert a force of attraction on anything made of iron, meaning anything made of iron will be attracted or pulled toward a magnet. The Earth exerts a magnetic force that can be detected using a compass, which is also a magnet. Magnetism is a force all around us. It cannot be seen but its effects can be observed.

By the end of the lesson, the student should be able to predict the effect a magnet has on a metal object, and describe what happens to the metal object when either pole of a magnet is used. Some metals, like aluminum, are not attracted to magnets, and will not be pushed or pulled by a magnet. Students need to experience this as well as the pull of attraction between unlike poles of two magnets, and the push of repelling between like poles of two magnets. Magnets are like “magic glue” that can be used to stick objects together, or to hold objects in place on a metal surface. They can be found all around the house and school, holding things together and in place.

****Never place a magnet near a computer, computer screen, or television.**

Essential Questions

What does attract mean?
(Attract describes a pulling force.)

What does repel mean?
(Repel describes a pushing force.)

How many poles do magnets have?
(Magnets have two poles, a north pole, and a south pole.)

What must an object contain in order to be attracted by a magnet?
(Objects that contain the metal iron are attracted to a magnet. Steel is a metal that contains iron.)

Mighty Magnet Exploration

Objectives:

To investigate properties of magnets, and to sort and classify materials which are magnetic.

To predict and describe how a magnet can be used to push or pull an object.

Materials:

Tub with various objects that are both magnetic and nonmagnetic, such as:

- Metal can
- Piece of cloth
- Sponge
- Block of wood
- Paper clips
- Rubber bands
- Plastic buttons
- Crayons, etc.

How to Conduct:

- Provide several different types of magnets for the students to explore with, including bar magnets, horseshoe magnets, refrigerator magnets, flat disc magnets. Be sure the magnets are of varying size and strength.
- Allow students time to explore with the different magnets, testing the various objects to determine if they are magnetic.
- Once students have had time to explore and to draw conclusions about the magnets and objects, encourage students to share their observations.
- Make a list recording the students' feedback, and then have students help you sort through the list and group things in various ways. Ask, "What properties of the objects might help predict which things will stick to the magnet and which will not? Do magnets only stick to round things? Does color make a difference?" Sorting, categorizing, predicting, and collecting data are important science skills.

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Fishing With Magnets

Objectives:

To gain an understanding that certain materials are attracted to magnets and some are not.

To predict and describe how a magnet can be used to push or pull an object.

Materials:

- Large tub filled with sand, rice, or other fine matter.
- Large paper clips, small ball bearings, other metal objects that can be lifted with a magnet.
- Several doughnut-shaped magnets tied to a string.

How to Conduct:

- Encourage students to go “fishing” for magnetic objects. Students use the strong, circular magnet on the end of the string to sift objects from the sand.
- Have students conclude if the sand or rice affected the magnets ability to sift metal objects from the tub.

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Measuring A Magnet's Strength

Objectives:

To measure the strength of a magnet and graph how the strength changes as the distance from the magnet increases.

To predict and describe how a magnet can be used to push or pull an object.

Materials:

- Several magnets of varying size and strength.
- Materials to test with, such as paper clips, metal washers, pieces of paper, etc.
- For extension add money to the mix to use as an enquiry extension.

How to Conduct:

- Magnets come in many shapes and sizes—the strength of the various magnets also differs. Have the students figure out ways to measure a magnet's strength.
- Encourage the students to see how many items (like paper clips or washers) the magnet can hold at once or how many pieces of paper can be placed between the magnet and the item and still allow them to stick together.
- Chart the information concluded from these experiments in a graph form for students to observe and make conclusions.

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