



4th - 8th Grade

4-H PROJECT

LESSON

PLANS:

4-H Helps

YOUTH

into the

21st Century

Series **1**

"Magnet Mania"

LSU
AgCenter
Research & Extension

Dear Project Helper,

This lesson is part of an effort by the 4-H Youth Development Division of the LSU AgCenter to provide teaching activities that are fun as well as educational. We are pleased you have agreed to work with youth as they learn and grow. You will help them learn scientific concepts they will use for many years.

These lessons address Louisiana Content Standards science benchmarks; therefore, what you do with this activity should help strengthen students for LEAP testing. We appreciate your being part of this effort.



Learning Activity: "Magnet Mania"

Key Concepts:

1. A magnet is an object made of materials that attract iron and produce a magnetic field.
2. A magnet has a magnetic field with the strongest forces at its poles, its north pole and its south pole.
3. Like poles repel each other, and opposite poles attract each other.
4. Magnets are a part of things we use every day.

How can members apply this information?

1. Locate north and south poles of a magnet.
2. Use a compass to find direction.
3. Place magnets away from items that might be negatively affected by their magnetic field.
4. Teach others what they have learned.

Getting Ready:

1. Gather all supplies needed.
2. Read lesson and be thoroughly prepared.
3. Gather enough bar magnets and shoestrings for each pair of participants.
4. Gather additional kinds of magnets for demonstration (horseshoe, round, bar, etc.)
5. Gather compass for demonstration.

Track:
 Science

Life Skills:
 Observing and experimenting

Character Focus:
 Responsibility

Project Skill:
 Determine the north and south poles of magnets

Louisiana Content Standards

Benchmarks:
 SI-M-A6, SI-M-A7, SI-M-A8,
 PS-M-B2, ELA-4-M2, ELA-4-M6, ELA-7-M2

Delivery Mode:
 4-H Club Meeting, Science Class
 and School Enrichment

Time Allotted:
 30-45 minutes

Number of Participants:
 10-30

What You Need for the Lesson:

1. 1 bar magnet for each participant
2. 1 lightweight shoestring or a piece of medium weight string for each participant
3. Compass
4. Other types of magnets (bar, circle, horseshoe)
5. Items containing magnets (Etch-A-Sketch, radio) to share with group

4th-8th Grade "Magnet Mania"

What You Say:	What You Show or Do:	What Participants Do:
<p>The ancient Greeks and Chinese discovered that certain rare stones, called lodestones, were natural magnets. These stones could attract small pieces of iron in a magical way, and they were found always to point in the same direction when allowed to swing freely suspended by a piece of string. The name comes from Magnesia, a district in Thessaly, Greece. Scientists from the 1600s to today have greatly increased our understanding of magnets and their properties.</p> <p>A magnet is an object made of certain materials that create a magnetic field. Every magnet has at least one north pole and one south pole. If you take a bar magnet and break it into two pieces, each piece will again have a north pole and a south pole. If you take one of those pieces and break it into two, each of the smaller pieces will have a north pole and a south pole. No matter how small the pieces of the magnet become, each piece will have a north pole and a south pole. It has not been shown to be possible to end up with a single north pole or a single south pole. On some magnets, the poles will be marked. On others, they will not.</p>	<p>Hold up a large magnet.</p>	<p>Listen and observe.</p>
<p>(Experience) Today's activity will allow you to discover some unusual things about magnets. You will determine the north and south poles of two magnets by performing several experiments. Choose a partner. I will give each group two shoestrings and</p>	<p>Help participants choose partners. Give each group two shoestrings and two bar magnets.</p>	<p>Choose partners and tie the bar magnets in the center on one end of shoestrings. Hold the other end of the shoestrings and let magnets dangle.</p>

4th-8th Grade "Magnet Mania"

What You Say:	What You Show or Do:	What Participants Do:
<p>two bar magnets. Each partner should tie the center of a magnet to one end of a shoestring. Then each should hold his or her shoestring by one end and let the bar magnet hang freely from the other.</p>		
<p>What happened when the magnets dangled freely? Did they seem to move in any one direction? (Possible answers: Depends on the direction the magnets were pointing when they first dangled the magnets. The magnet turned in another direction; did not notice any turning.)</p> <p>I am holding a compass. What do compasses do? (Answer: Help us find directions by pointing north.) Will someone volunteer to use the compass and find the north wall of this classroom? Point out the north wall of the classroom. Ask how many of the magnets turned to point in that direction.</p>	<p>Allow time for discussion and responses. Hold up compass. Choose a volunteer.</p>	<p>Discuss and respond.</p>
<p>One end of the magnet will face north. Turn your body to face in the opposite direction, which is south. What happens to the end (pole) that was facing north? (Answer: It turned/remained to point north.)</p> <p>Using a pencil, mark the end of the magnet that faces north with an "N." Mark the side or end opposite the one marked "N" with a "S."</p>	<p>Allow time for discussion and responses.</p>	<p>Participants discuss and respond.</p>

4th-8th Grade "Magnet Mania"

What You Say:	What You Show or Do:	What Participants Do:
<p>Bring the two magnets close so that the two ends you marked with an "N" are next to each other. Can you feel the magnetic force? Are the magnets trying to pull together or push apart? (Answer: Push apart.)</p> <p>Put an "N" and an "S" together. Can you feel the magnetic force? Are the magnets trying to pull together or push apart? (Answer: Pull together.)</p>	<p>Demonstrate matching like poles and opposite poles. Allow time for discussion and responses.</p>	<p>Match like ends; match opposite ends. Discuss and respond.</p>
<p>(Share)</p> <p>How did you find the north poles of the magnets?</p> <p>(Possible Answers: Used a compass to locate north and see which end of the magnet turned north.)</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and respond.</p>
<p>(Process)</p> <p>Do you own anything that has a magnet in it or on it?</p> <p>(Possible answers: Refrigerator magnets, radios, telephones, other electronic devices)</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and respond.</p>
<p>(Generalize)</p> <p>Who have you seen using a magnet and what was the product, tool or object?</p> <p>(Possible answers: Child, a toy such as Etch-A-Sketch; father or home repairman, screwdriver with magnetic tip; coin collector, metal detector; hiker, compass; etc.)</p>	<p>Show objects you have brought from home. Allow time for discussion.</p>	<p>Discuss and respond.</p>
<p>(Apply)</p> <p>How can magnets keep you from getting lost when you hike or travel?</p> <p>(Possible answers: a compass uses magnetic force to point north. Check the direction you need to follow as you hike or travel and use the compass to determine your direction.)</p>	<p>Allow time for discussion.</p>	<p>Discuss and respond.</p>

4th-8th Grade "Magnet Mania"

What You Say:	What You Show or Do:	What Participants Do:
<p>A part of responsibility is taking control of your own life and being prepared for whatever you are doing. A responsible hiker will carry a compass to keep going in the right direction, check the compass often to avoid getting into an area that is unsafe and offer help when someone else may lose direction. It is the hiker's responsibility to maintain all equipment and other items that are required for the hike to be safe and fun. Accept responsibility for yourself. Do not ask someone else to do for you what you are capable of doing for yourself.</p>		
<p>There are some precautions to use when using strong magnets, stronger than the ones we used in today's activity and the ones we use to attach paper messages to our refrigerator doors. Be a responsible person. When using strong magnets, be careful where you place these strong magnets.</p> <p>Remember:</p> <ul style="list-style-type: none"> • If placed close to a video tape, portions of the tape may be erased or messed up. • If placed close to an audio tape, portions of the tape will be erased or messed up. • If placed close to credit cards, the magnetic strip on the back of the card will be erased or messed up. • If placed close to a floppy disk, large portions of the disk may be erased or corrupted. • If they are placed close to a mechanical watch, the watch can be damaged. 		

Ways to Help Members Learn More

1. Compare the strength of the two poles of a magnet. Say, "Do you think one part of the magnet is stronger than the other parts of the magnet?" "Which part do you think will be stronger?" Spread paper clips on the table. Place the magnet on top of the paper clips, and then lift. "What parts of the magnet are the paper clips attracted to?" Count how many paper clips are stuck to each pole of the magnet. "Are there different amounts?" "What part of the magnet had fewer paper clips stuck to it?" "Does this tell you anything about the magnet?"
2. Gather several types of metals, such as aluminum, copper and iron. Give magnets to participants and allow time for them to experiment with the metals to discover to which metals the magnets will be attracted. Research to find the reason the iron attaches itself to the magnet.
3. Help members plan and present to younger students a demonstration of how magnets attract.
4. Demonstrate how a magnet will erase or distort a cassette.
5. Demonstrate the effect of a magnet on a compass.
6. Visit a sporting goods store and find as many items as you can that contain a magnet.



Resources:
<http://www.lessonplanspage.com/>

<http://www.teachers.net/lessons/posts/1.html>

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Louisiana Content Standards, published by Louisiana State Department of Education.
4-H to Go, "How Does a Magnet Work?" and "Exploring Ring Magnets."

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