Lesson Plan for
Basic Magnetism

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Updated by: Science for Kids

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Lesson Summary

Lesson name	Basic Magnetism
Audience	Fourth grade students

Fourth Grade AZ standard(s) applied	• Strand 1, Concept 1, PO 1: Differentiate inferences from observations
	• Strand 1, Concept 1, PO 3: Formulate predictions in the realm of science based on observed cause and effect relationships
	• Strand 1, Concept 2, PO 1: Demonstrate safe behavior and appropriate procedures in all science inquiry
	• Strand 1, Concept 2, PO 3: Conduct controlled investigations physical sciences
	• Strand 1, Concept 2, PO 5: Record data in an organized and appropriate format
	• Strand 1, Concept 3, PO 1: Analyze data obtained in a scientific investigation to identify trends
	• Strand 1, Concept 3, PO 2: Formulate conclusions based upon identified trends in data
	• Strand 1, Concept 3, PO 3: Determine that data collected is consistent with the formulated question
	• Strand 1, Concept 3, PO 4: Determine whether the data supports the prediction for an investigation
	• Strand 1, Concept 4, PO 1: Communicate verbally or in writing the results of an inquiry
	• Strand 1, Concept 4, PO 2: Choose an appropriate graphic representation for collected data:
	  • bar graph
	  • line graph
	  • Venn diagram
	  • model
	• Strand 1, Concept 4, PO 3: Communicate with other groups or individuals to compare the results of a common investigation
	• Strand 5, Concept 3, PO 4: Investigate the characteristics of magnets

Lesson objective(s)*	• The students will demonstrate knowledge of magnetism by discussing the properties of magnets • The students will demonstrate analysis of the properties of magnets by classifying objects as magnetic or non-magnetic • The students demonstrate evaluation of magnetic properties by predicting and verifying experimental outcomes
Lesson duration	45 minutes
Lesson materials (per	• 3 small bar magnets

group)	• 1 box paper clips • Ziplock bags filled with variety of materials for the students to test magnetism characteristics (paper, wood, cloth) • Pencils and string and small circular magnets • Paper, pencils, easels and markers • Compasses • Optional Teacher demonstration o Bar magnet o Iron filings in a plastic box
Group size	Recommended 3-4 students

*Written in the following format: The students will demonstrate (Bloom's level) of (content) by (verb).

Introductory Activity #1 – Magnetism Fishing

This activity would be conducted as an introduction to the slide presentation.

Student Groups of 2-4

Materials Needed & Distributed to each group:
Fishing Poles made with Pencils, String & Magnets
Ziplock Bags filled with about 10-12 items (metal, paper, wood, cloth, etc)
Paper & Pencils, Easel & Markers

Question:
"What is a magnet?", "Where have you seen magnets?", "Do they come in one size or shape?", "Do we need magnets?"

Directions:
Fold paper in half lengthwise
One side titled Magnet Will Pick Up, and the other, Magnet Will Not Pick Up.

Lay out the items in ziplock bag, study and have each group predict which ones will be able to picked up with the magnet, and which ones, won't. List under the appropriate column

With the magnet fishing pole the groups try to pick up each item. Write Y after each item that was able to be picked up and N after the ones that weren't.

Each group will select a representative to write their findings on the easel for all to see.

When all groups have completed their task, a representative from each group will state their predictions and their findings and the similarities of the items that they were able to pick up with the magnet.

Have students bring 2 magnet fishing poles close together. They may have done this on their own by none.

What happened?

Lesson Information

How will the concepts will be introduced, what information will be presented to the students? Include an outline of information and a link to any presentations that will be used.

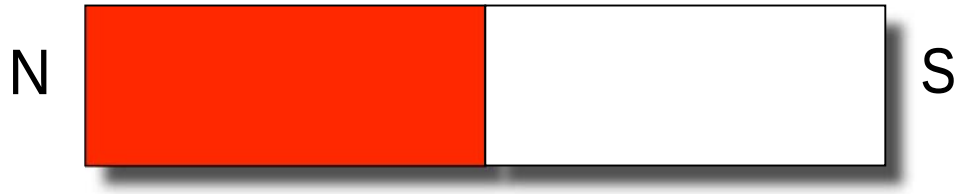
Information from the presentation slides:

1. *What is a Magnet?*

- Any material that attracts iron or steel
- Can be permanent or temporary

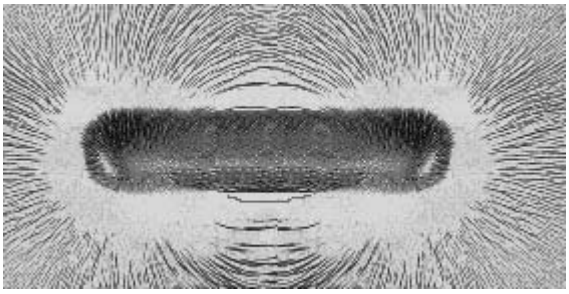
Teacher Notes: Permanent magnets always display characteristics of magnetism; temporary magnets can be turned on and off

2. *Magnetism Basics*



- Magnets can be made in a variety of shapes, but all magnets have 2 poles, North and South
- Opposite poles attract (notes (optional): demonstrate the field of attraction using the iron filings, below is a picture of this demonstration.)

This shows the magnetic fields of a bar magnet – it's 3-dimensional around the magnet.



- Like poles repel (notes: demonstrate to the students attract and repel using 2 magnets)

3. *Where does it come from?*

- Nature

- Man-made materials from:
    - Ceramic
    - Alnico (aluminum, nickel, & cobalt)
    - Flexible rubber-like material

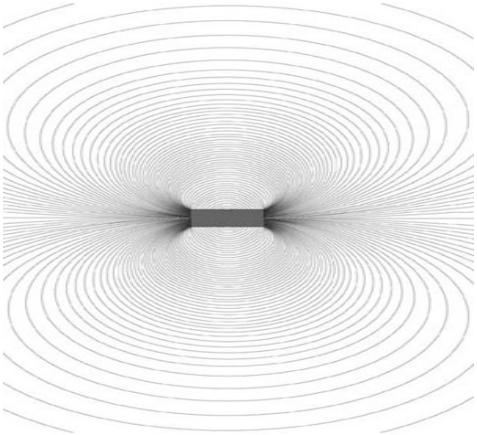
- Created using current (electricity)

4. *What are the characteristics?*

- North and south poles
    - “di”-poles
    - Break the magnet in half, the poles realign into north and south

- 3 dimensional field of attraction

- Transfer magnetic properties



This picture is an example of magnetic fields around a magnet; it shows the attractive force between the two poles.

5. Uses for Magnets in everyday life
- Cars
    - Power locks
- Homes
    - Door bells
    - Microwaves
    - TV’s
    - Refrigerators
    - Earrings
    - Electricity
- Schools
    - Whiteboards

Activity Discussions and Descriptions

Describe the step by step procedures for the activities; if possible use visual pictures to demonstrate the steps. Also include what inquiry activities will be included, such as having the students make hypothesis or discuss what they might know about the topic. List all discussion questions and appropriate discussion points.

Activity 2: Tracking the Lines of Flux

1. Review basic magnetism characteristics from the presentation slides with class.
    a. Optional demonstration: the teacher can demonstrate the magnetic fields using the iron filings and a strong magnet.

This activity will be conducted after the power point presentation of the Lines of Flux.

Students: Group or Individual

Materials Need: Paper, Magnets with North and South poles identified, Compasses, Pencils

Present the lesson on the lines of flux using the power point presentation.

Afterwards, these activities will be conducted in order to reinforce the concepts.

- Have students demonstrate the North/South pole attraction by having one student slowly bring the North Pole of his magnet to a nearby student's South Pole of his magnet.

- Have the students slowly bring together North Pole to North Pole and South Pole to South Pole to experience them repel.

- Direct the students to lay the magnet on a sheet of paper and draw the lines of flux as illustrated on the slide.

- Have the students move the compass over the lines of flux. "What happens?"

Optional:

- Styrofoam ball example from Electricity Lesson
- Each kid gets a sign "N" or "S". They walk around (randomly) until the teacher/instructor yells "Magnetize!" (or something like that) and each kid has to put matching signs up to another kid with the opposite sign and freeze. They can do this for 4 or 5 times.

Activity 3:

1. Each group has 3 magnets and a box of paper clips. Have the students use one magnet and see how many paper clips they can pick up.
2. After they have recorded the number they picked up, ask them to predict the number of paper clips they could pick up with 2 magnets.
3. Have the students write down their prediction and then perform the activity.
4. Discuss the findings with the class and then have them repeat for the third magnet.
5. Have the students record their predictions and then perform adding the third magnet.
6. Discuss the findings with the class. Have students create graph

Evaluation Measures

How will the student's progress be measured? Include any worksheets or assessment activities within the lesson plan

Have the students complete the following worksheets as record of the group's involvement.

Student Names:

_____

_____

_____

_____

Magnetism Activity 1:

1. Predict which objects will be attracted to the magnet. Then do the experiment and record which objects were able to be picked up by the magnet.

Name of Object	**Material of Object**	**Will be attracted to magnet?**		**Was attracted to magnet.**	
		YES	**NO**	**YES**	**NO**

2. What did this investigation tell you about magnets?

_____

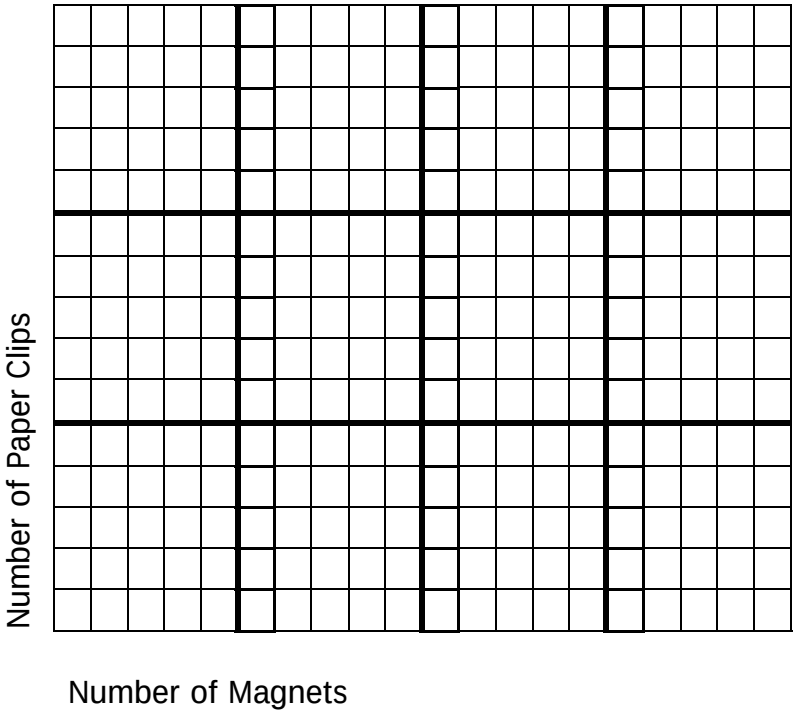
_____

_____

Magnetism Activity 2:

	# of Paper Clips ***Prediction***	# of Paper Clips ***Test Results***
1 Magnet		
2 Magnets		
3 Magnets		

Graph your results below:



1. How did your predictions compare to the test results?

_____

_____

_____

_____

2. Were you surprised by the results? Please explain.

_____

_____

_____

_____

3. What did this investigation tell you about magnets?

_____

_____

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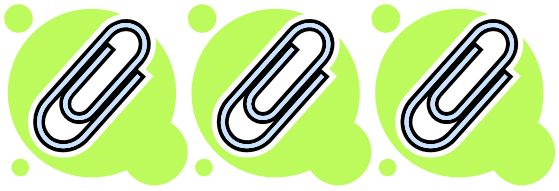

Extensions

If available include additional topic information, materials or contact information

More information available at:

http://www.ndt-ed.org/EducationResources/CommunityCollege/MagParticle/Physics/Magnetism.htm