

Magnets Rock!

Grade Level: Kindergarten

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Length of Unit: 5 Lessons

I. ABSTRACT

- A. This unit presents an exciting, hands-on approach to the study of magnets. Math skills and science skills are interwoven throughout five fun lessons. Each includes a meaningful assessment to monitor the students' understanding of magnetism. Engaging activities include Magnet Mayhem Day in which the students make their own magnets and a take-home booklet. The culminating activity is an educational and enjoyable fishing game, easily adaptable to meet individual students' needs, in which the students get to fish with a magnetic pole and answer questions about what they have learned about magnets.

II. OVERVIEW

- A. Concept Objectives
1. Develop knowledge and understanding that science is based on the assumption that the environment is understandable and predictable (NM Science I K.2A, K.3B)
 2. Understand that instruments can provide more information than can be obtained only through the senses (NM Science VI K.2)
 3. Understand and use mathematics in reasoning (NM Math III K.16 A-B)
- B. Content from the *Core Knowledge Sequence*
1. Introduction to Magnetism, identify familiar everyday uses of magnets (p. 20 in *Core Knowledge Sequence* by Core Knowledge Foundation)
 2. Introduction to Magnetism, classify materials according to whether they are or are not attracted by a magnet (p. 20 in *Core Knowledge Sequence* by Core Knowledge Foundation)
 3. Patterns and Classification, establish concepts of likeness and difference by sorting and classifying objects according to various attributes (p. 17 in *Core Knowledge Sequence* by Core Knowledge Foundation)
 4. Numbers and Number Sense, interpret simple pictorial graphs (p. 17 in *Core Knowledge Sequence* by Core Knowledge Foundation)
- C. Skill Objectives
1. The student will identify four kinds of magnets. (bar, ring, rod and horseshoe)
 2. The student will identify the properties of objects and materials. (NM Science VII K.3B)
 3. The student will identify and classify whether or not an object is attracted to a magnet. (Hobbs Municipal Schools, Science K.3B and Math K.2B1)
 4. The student will interpret a pictorial graph. (Hobbs Municipal Schools, Math K.5A2)
 5. The student will be able to compare relative strength of magnets.
 6. The student will identify the two poles of a magnet. (north and south)

7. The student will be able to demonstrate that like poles repel and opposite poles attract.
8. The student will create a temporary magnet and a permanent magnet to take home.

III. BACKGROUND KNOWLEDGE

- A. For Teachers
 1. A basic knowledge of magnets (Reading this unit beforehand will suffice)
 2. NOTE: Be aware of the possible damages magnets can cause to electrical equipment, such as computers
- B. For Students
 1. Ability to count to 20 is helpful, however is not mandatory

IV. RESOURCES

- A. Barufaldi, James, Ladd, George, Moses, Alice. *Heath Science* Lexington, Mass: P.C. Heath Company Publishing, 1981 ISBN 0-669-03173-9
- B. Hirsch, E.D. Jr. *What Your Kindergartner Needs To Know* New York: Dell Publishing, 1997 ISBN 0-385-31987-8
- C. Hoover, Evalyn, Mercier, Sheryl, Larimer, Howard, Deal, Debby, Kahn, Gale, Sipkovich, Vincent. *Mostly Magnets* Fresno, California: AIMS Education Printing, 1981 ISBN 1-881431-29-0
- D. Scarry, Richard. *Mr. Fixits Magnet Machine* New York: Simon & Schuster Children's Publishing Division. 1998 ISBN 1-881431-29-0

V. LESSONS

Lesson One: Introduction to Magnets

- A. *Daily Objectives*
 1. Concept Objectives
 - a. Develop knowledge and understanding that science is based on the assumption that the environment is understandable and predictable (NM Science I K.2A, K.3B)
 - b. Understand that instruments can provide more information than can be obtained only through the senses (NM Science VI K.2)
 2. Lesson Content
 - a. Classify objects according to whether they are or are not attracted by a magnet
 3. Skill Objectives
 - a. The student will identify the four kinds of magnets (bar, ring, rod and horseshoe).
 - b. The student will identify the properties of objects and materials. (NM Science VII K.3B)
 - c. The student will classify a variety of objects according to whether or not they are attracted by a magnet. (Hobbs Municipal Schools, Science K.3B)
- B. *Materials*
 1. One teacher copy of History of Magnets (Appendix A)
 2. One magnet per child (any type)
 3. "Magnets Rock!" song (Appendix B)

4. Chart paper
 5. One of each type of magnet for the teacher (bar, ring, rod and horseshoe)
 6. Kinds of Magnets worksheet (Appendix C), one per child
 7. Individual copies of Parent Letter (Appendix D), one per child
 8. Individual copies of Home Magnet Sheet (Appendix E), one per child
- C. *Key Vocabulary*
1. Magnet: Something that sticks to certain metals
 2. Bar magnet: Magnet that is shaped like a solid rectangle
 3. Ring magnet: Magnet that is shaped like a donut
 4. Rod magnet: Magnet that is shaped like a solid straw
 5. Horseshoe magnet: Magnet that is shaped like a horseshoe
- D. *Procedures/Activities*
1. Read the History of Magnets (Appendix A). Lead class discussion about magnets.
 2. Give each student a magnet with which to explore. (You can call this a Magnet Adventure, or any other catchy title you find appropriate.) They will walk around the classroom and determine some things that the magnet will and will not stick to. **IMPORTANT:** Remind the students to stay away from all computers.
 3. Briefly discuss and demonstrate the four types of magnets (bar, ring, rod, and horseshoe).
 4. (**NOTE:** Keep all copies of the magnet worksheets for this unit. They will be used to make a booklet during Lesson 5.) The students will draw a line to match the different types of magnets (Appendix B). The students will draw something in the room that has the same shape as one of the different types of magnets if time permits.
 5. Each student will receive a copy of the Parent Letter (Appendix D). The teacher will encourage students to bring a magnet for Magnet Mayhem activity for Lesson 5.
- E. *Assessment/Evaluation*
1. Each student will complete the Kinds of Magnets worksheet (Appendix C).
 2. Each student will name at least one kind of magnet.
 3. Each student will name one object from the classroom that the magnet is attracted to and one object that it is not attracted to. This can be done as a circle activity. The teacher will chart the results.

Lesson Two: Magnetic Attraction

- A. *Daily Objectives*
1. Concept Objectives
 - a. Develop knowledge and understanding that science is based on the assumption that the environment is understandable and predictable (NM Science I K.2A, K.3B)
 - b. Understand that instruments can provide more information than can be obtained only through the senses (NM Science VI K.2)
 - c. Understand and use mathematics in reasoning (NM Math III K.16 A-B)
 2. Lesson Content

- a. Classify objects according to whether they are or are not attracted by a magnet
 - b. Establish concepts of likeness and difference by sorting and classifying objects according to function
 - c. Interpret simple pictorial graphs
3. Skill Objectives
- a. The student will identify and classify whether or not an object is attracted to a magnet. (Hobbs Municipal Schools, Science K.3B and Math K.2B1)
 - b. The student will complete a pictorial graph.
 - c. The student will interpret a pictorial graph. (Hobbs Municipal Schools, Math K.5A2)
- B. *Materials*
- 1. One magnet per child (any type)
 - 2. Individual copies of What Does a Magnet Attract? (Appendix F), one per child
 - 3. One of each item from Appendix F – paper clip, cork, key, nail, crayon, scissors, feather, and rubber band
 - 4. Individual copies of Magnet Attraction Graph (Appendix G), one per child
 - 5. One teacher copy of *Mr. Fixits Magnet Machine* by Richard Scarry
 - 6. Chart from previous magnet attraction activity
- C. *Key Vocabulary*
- 1. Attraction: When two things want to stick together
- D. *Procedures/Activities*
- 1. Divide the students into two small groups of equal number.
 - 2. One group will be read the story of *Mr. Fixits Magnet Machine* by Richard Scarry. (This can be done by the teacher or a volunteer.)
 - 3. Have a table set up with the items from Appendix F. Also have one magnet per child available at this table.
 - 4. The other group will discover what objects are and are not attracted to a magnet. They will do this by using a magnet to test the individual items for magnetic attraction. They will circle items that are attracted to the magnet on What Does a Magnet Attract? (Appendix F). They will place an X on any item that is not attracted to the magnet. (This can be done independently or with teacher assistance.)
 - 5. Switch the two groups when they have completed their assignments.
 - 6. Gather the class as a large group to complete the yes/no boxes on the Magnet Attraction Graph (Appendix G).
 - 7. The students will put a happy face in the appropriate box if the object is attracted to the magnet. The students will put a sad face in the appropriate box if the object is not attracted to the magnet. The students will then count the number of happy face (yes) and sad face (no) boxes. They will write the number in the line provided at the bottom of the graph.
 - 8. The teacher will lead a class discussion about the results of this pictorial graph as compared to classroom graph from previous magnet activity.
- E. *Assessment/Evaluation*

1. Each student will complete the What Does a Magnet Attract? Worksheet (Appendix F).
2. Each student will complete the Magnet Attraction Graph (Appendix G).

Lesson Three: Mighty Magnets

A. *Daily Objectives*

1. **Concept Objectives**
 - a. Develop knowledge and understanding that science is based on the assumption that the environment is understandable and predictable (NM Science I K.2A, K.3B)
 - b. Understand that instruments can provide more information than can be obtained only through the senses (NM Science VI K.2)
 - c. Understand and use mathematics in reasoning (NM Math III K.16 A-B)
2. **Lesson Content**
 - a. Establish concepts of likeness and difference by sorting and classifying objects according to strength of various magnets
3. **Skill Objective**
 - a. The student will be able to compare relative strength of magnets.

B. *Materials*

1. One of each type of magnet (bar, ring, rod and horseshoe)
2. 4 boxes of paper clips
3. Mighty Magnet Strength (Appendix H)

C. *Key Vocabulary*

1. **Strength:** How much power something has

D. *Procedures/Activities*

1. Begin a class discussion about the strength of magnets by asking questions. Some suggested questions are: Do all magnets have the same strength? Are some magnets stronger than other magnets? Are bigger magnets always stronger? How can we find out?
2. Divide the class into four smaller groups. Each group will be given one kind of magnet. The groups will tell which kind of magnet they have.
3. Each group will test the strength of their magnet by seeing how many paper clips will stick to the end of their magnets. One child from each group will write the number of clips on Mighty Magnet Strength worksheet (Appendix H).
4. Gather the students back into a large group to analyze and draw conclusions based on data collected on the Mighty Magnet Strength worksheet (Appendix H). Engage the students in a class discussion about the results of the data. Some suggested questions are: Were all of the magnets equal in strength? Which magnet held the most paper clips? Which magnet held the least paper clips? Was the largest magnet the strongest? Was the smallest magnet the weakest? (Results will vary)
5. Switch the magnets for each group so that they may experiment with a new magnet. Do the same experiment with the new magnets. Engage the students in a similar class discussion. Have the students determine if the results were the same or different. Discuss some possible explanations for this.
6. **OPTIONAL/EXTENSION ACTIVITY IDEA**

Based upon the results of the magnet experiment, each group will be given one of the strongest magnets. The groups will use this magnet to determine what items the magnet can attract through; such as paper, plastic, wood, aluminum foil, etc. Discuss the various results.

- E. *Assessment/Evaluation*
1. The teacher will closely monitor individual student participation in the collecting and analyzing portion of Mighty Magnet Strength worksheet (Appendix H) to ensure individual learning.

Lesson Four: Magnet Magic

A. *Daily Objectives*

1. Concept Objectives
 - a. Develop knowledge and understanding that science is based on the assumption that the environment is understandable and predictable (NM Science I K.2A, K.3B)
 - b. Understand that instruments can provide more information than can be obtained only through the senses (NM Science VI K.2)
 - c. Understand and use mathematics in reasoning (NM Math III K.16 A-B)
2. Lesson Content
 - a. Establish concepts of likeness and difference by sorting and classifying objects according to strength of various parts of magnets
3. Skill Objectives
 - a. The student will identify the two poles of a magnet (north and south).
 - b. The student will be able to demonstrate that like poles repel and opposite poles attract.

B. *Materials*

1. Metal paper clips
2. Several bar magnets or magnet wands
3. Individual copies of Magnetic Poles worksheet (Appendix I), one per child
4. Teacher copy of “Magnets Rock!” song (Appendix B)

C. *Key Vocabulary*

1. Magnetic Poles: The two ends of the magnet, where the forces are the strongest (north-seeking and south-seeking poles on each magnet)
2. Repel: Push away from each other

D. *Procedures/Activities*

1. Divide the students into 2-4 small groups.
2. Give each group two bar magnets or magnet wands and a box of paper clips.
3. The students will hold the magnet in the air and place paper clips on the left end of a magnet (it does not matter if it is the north-seeking or south-seeking pole). They will count how many paper clips the magnet can attract and hold (teacher will assist as necessary). The paper clips should not be connected to each other. The clips must hold by magnetic force only. They will record this number on the board.

4. Now the students will hold the magnet in the air and place paper clips on the middle of a magnet. They will again count how many paper clips the magnet can attract and hold, as before (teacher will assist as necessary). They will record this number on the board. The teacher will then lead a class discussion about how the middle of the magnet did not attract and hold as many paper clips. This happens because the two poles at the ends of the magnet are always stronger than the middle of the magnet.
 5. The students will now hold the magnet in the air and place paper clips on the right side of the magnet (again it does not matter if it is the north-seeking or the south-seeking pole). They will count how many paper clips the magnet can attract and hold (teacher will assist as necessary). They will record this number on the board. The teacher will lead a class discussion about how both ends of the magnet can attract and hold more clips than the middle. The teacher will explain that magnets have two poles. The poles are the strongest parts of a magnet. The magnet has a north-seeking pole and a south-seeking pole.
 6. The students will now explore with two magnets. They will move the magnets in different directions until they can make the two magnets stick together. Discuss how easily the magnets stick together at times. Remind the students that magnets have a north-seeking pole and a south-seeking pole. Opposite poles are naturally attracted to each other. This is why the magnets stick together so easily.
 7. The students will then turn one of the magnets around and try to push the magnets together. Remind the students that the magnets have north-seeking and south-seeking poles. Like poles repel each other. This is why the magnets will not stick together.
 8. The students will complete the Magnetic Poles worksheet (Appendix I). This may be done as an individual activity or a group activity depending on the ability level of your class.
 9. Sing the entire Magnets Rock song, adding the second verse this time.
- E. *Assessment/Evaluation*
1. Each student will complete the Magnetic Poles worksheet (Appendix I). The teacher will check for accuracy, and have the students make necessary changes. The teacher will re-teach as needed.

**Lesson Five: Magnet Mayhem Day
(Plan for extended time period)**

- A. *Daily Objectives*
1. Concept Objectives
 - a. Develop knowledge and understanding that science is based on the assumption that the environment is understandable and predictable (NM Science I K.2A, K.3B)
 - b. Understand that instruments can provide more information than can be obtained only through the senses (NM Science VI K.2)
 2. Lesson Content
 - a. Identify familiar everyday uses of magnets
 3. Skill Objectives
 - a. The student will demonstrate knowledge of some everyday uses of magnets.

- b. The student will create a temporary magnet and a permanent magnet to take home.

B. *Materials*

1. Returned copies of Home Magnet sheet (Appendix E)
2. Magnets from home (as available)
3. Several bar magnets
4. Metal paper clips
5. Loose staples or metal tacks (or other small metal objects)
6. Magnetic strips, one per child
7. Decorations for take home magnet (Some ideas are clothespins with pictures of students, small art projects from class, etc.)
8. Cover page for booklet cover (Appendix J)
9. Copies of completed magnet worksheets from the previous lessons (Appendices C, D, E, F, G, H, I and J)

C. *Key Vocabulary*

1. Temporary: Not long lasting
2. Permanent: Very long lasting

D. *Procedures/Activities*

1. Each student will get out their returned copy of the Home Magnet sheet (Appendix E). The students will take turns sharing the information they have gathered at home. The teacher can determine how much information the children should share at this time. (Ex: Where did you find the magnets? How do you use the magnet to help at your house?)
2. Now the students will display their magnets from home. Each child will get to look at the magnet display. They can talk about similarities and differences in the magnets.
3. The teacher will give a definition for the term “temporary”.
4. Then the students will make their own temporary magnet using a metal paper clip and a bar magnet. The students will attempt to use the paper clip to pick up the staple or tack. It will not work. Then each student will stroke their paper clip in one direction against the bar magnet 20 times or more. Now they will try to use the paper clip to pick up the staple or tack. It should now pick up the staple or tack. If it does not, then try to rub the paper clip more times against the bar magnet and retry the experiment until it works. The teacher will explain that this is only a temporary condition. Later the paper clip will no longer be magnetized.
5. The teacher will introduce the term “permanent”.
6. The students will be given a magnet strip to glue on the back of a clothes pin. The students will test to see if these magnets will pick up a staple or tack. The teacher will explain that these are permanent magnets. Next, the students will glue a decoration on the front of the clothespin. They will get to take these magnets home.
7. Pass out copies of Booklet Cover (Appendix J). The students will color the cover any way they wish. This will then be stapled to the front of the other magnet worksheets from this unit to form a booklet. Each child will take home this booklet to share with their families.

E. *Assessment/Evaluation*

1. Each student will name at least one magnet they observed at home and tell its use. They can refer to their completed Home Magnet sheet (Appendix E).
2. Each student will make a temporary magnet and conduct the experiment to attract staples or tacks.
3. Each student will make a permanent magnet to take home.

VI. CULMINATING ACTIVITY

- A. The students will make a magnetic fishing game. Each student will be given a copy of the Fish Pattern (Appendix K). The students will then color and cut out the four fish from Appendix K. The students will tape a paper clip to the mouth of each fish. NOTE: The teacher may write on the fish before or after coloring to reinforce any curricular activities (Ex. Color words, number words, capital and lower case letters, etc.). The teacher will make and provide magnetic fishing poles. These can easily be made with dowel rods, string, and ring or horseshoe magnet. The students will get to go fishing with the magnet rods. As the students catch a fish, they will answer a question about magnets.

Some suggested questions could be:

1. What does attract mean?
2. What does repel mean?
3. Name the two poles of a magnet.
4. What is a temporary magnet?
5. What is a permanent magnet?
6. Does everything stick to a magnet?
7. What does a magnet do?
8. Can you make your own magnet?
9. Which part of a magnet is strongest?
10. Which part of a magnet is weakest?

This magnetic fishing concept can easily be adapted to use throughout the year during independent center times.

VII. HANDOUTS/WORKSHEETS

- A. Appendix A – History of Magnets
- B. Appendix B – Magnets Rock! Song
- C. Appendix C – Kinds of Magnets
- D. Appendix D – Parent Letter
- E. Appendix E – Home Magnet Sheet
- F. Appendix F – What Does a Magnet Attract
- G. Appendix G – Magnet Attraction Graph
- H. Appendix H – Mighty Magnet Strength
- I. Appendix I – Magnetic Poles
- J. Appendix J – Booklet Cover
- K. Appendix K – Fish Pattern

VIII. BIBLIOGRAPHY

- A. Adler, David. *Amazing Magnets* New Jersey: Troll and Associates Publishing, 1983 ISBN 0-89375-895-7
- B. Barufaldi, James, Ladd, George, Moses, Alice. *Heath Science* Lexington, Mass: P.C. Health Company Publishing, 1981 ISBN 0-669-03173-9

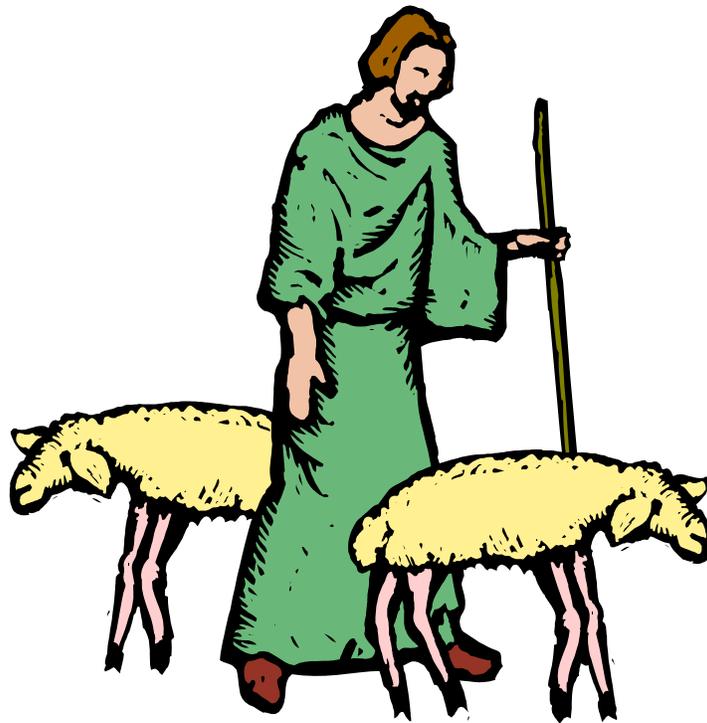
- C. Core Knowledge Foundation. *Core Knowledge Sequence* Virginia: Core Knowledge Foundation. 1999 ISBN 1-890517-20-8
- D. Hirsch, E.D. Jr. *What Your Kindergartner Needs To Know* New York: Dell Publishing, 1997 ISBN 0-385-31987-8
- E. Hoover, Evalyn, Mercier, Sheryl, Larimer, Howard, Deal, Debby, Kahn, Gale, Sipkovich, Vincent. *Mostly Magnets* Fresno, California: Aims Education Printing, 1981 ISBN 1-881431-29-0
- F. Scarry, Richard. *Mr. Fixits Magnet Machine* New York: Simon & Schuster Children's Publishing Division. 1998 ISBN 1-881431-29-0

Magnets Rock
Appendix A: History of Magnets

A long time ago in ancient Greece, shepherds watched over their sheep in the rocky fields.

One shepherd noticed that as he walked along, certain rocks seemed to pull the iron tip of the pole and hold it in place to the rock.

These rocks were different from other stones. They were black and seemed to be magical. They named these rocks lodestone or magnets because the shepherd lived in Magnesia. Another story that has been told was that name of magnets came from the name of the shepherd that discovered this. His name was Magnes.



Adapted from "Amazing Magnets" by David Adler

Magnets Rock!
Appendix B: Magnets Rock Song

Magnets Rock !

(to the tune of “Skip to my Lou”)

Chorus

M-A-G-N-E-T-S
M-A-G-N-E-T-S
M-A-G-N-E-T-S
Magnets really rock!

Magnets attract iron and steel
Magnets attract iron and steel
Magnets attract iron and steel
Magnets really rock!

Chorus

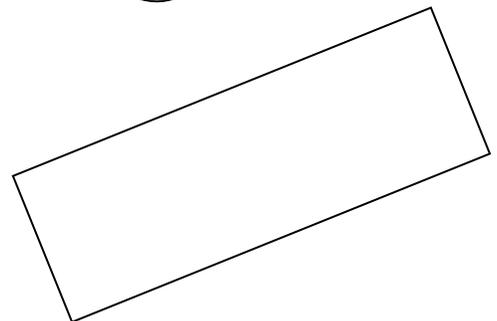
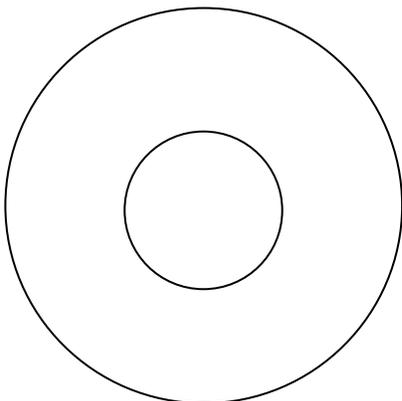
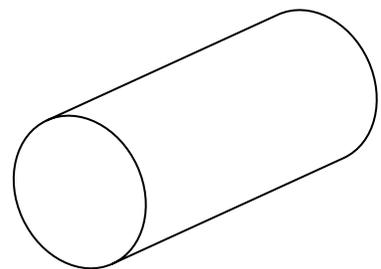
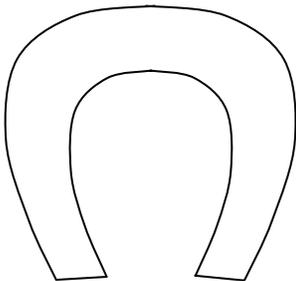
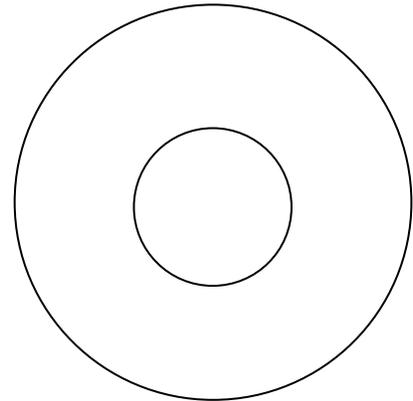
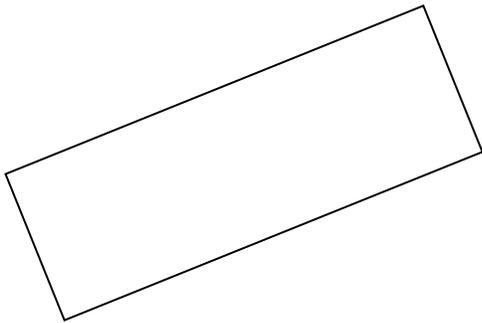
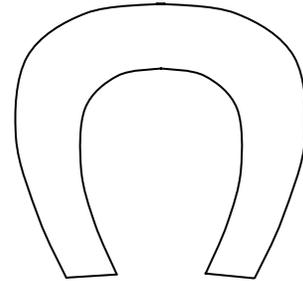
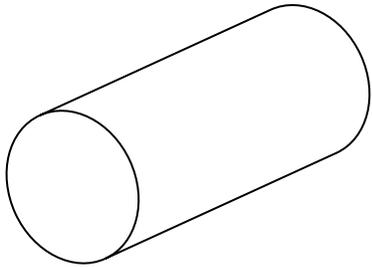
M-A-G-N-E-T-S
M-A-G-N-E-T-S
M-A-G-N-E-T-S
Magnets really rock!

Magnets have north and south poles
Magnets have north and south poles
Magnets have north and south poles
Magnets really rock!

Magnets Rock
Appendix C: Kinds of Magnets

Name: _____

Draw a line to match the magnets that look the same. If you have time draw something from the classroom that looks like one of the different kinds of magnets.



Magnets Rock
Appendix D: Parent Letter

Dear Parents/Guardian,

Soon our class will begin a Core Knowledge Science unit on magnets. Sounds like fun? It will be, with many hands-on activities to help us explore this part of our wonderful world. These physical science lessons combine math with science processing skills. We hope that this unit helps students to learn, but we also hope it increases their enthusiasm for learning about math, science, and other areas. We hope you see some of this enthusiasm at home.

We will be warning students to use magnets carefully. Remember that placing magnets near computer discs, television sets, wind-up watches, or credit cards may cause damage.

Our activities require a variety of magnets. If you have any unused magnets, we would be happy to have them to use in this unit. Do not send any with great value, but if you want to help, label the magnets with your student's name and send them on Friday.

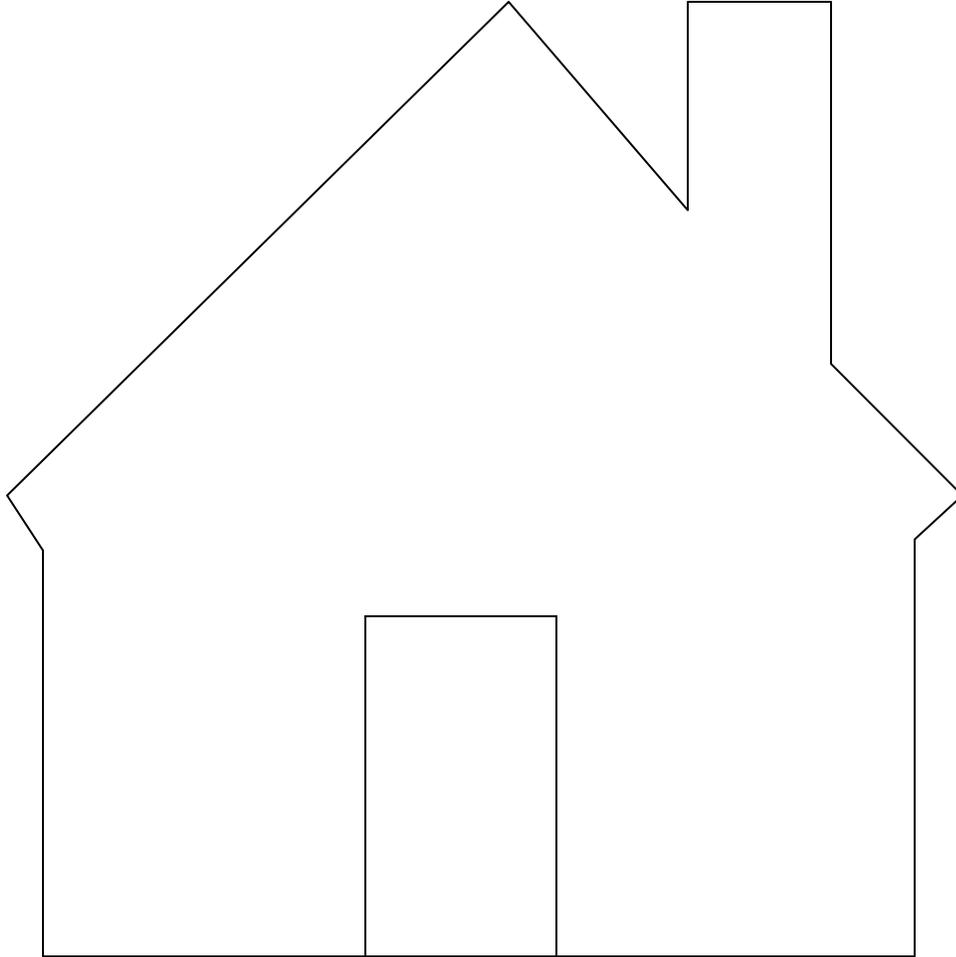
On Friday we will also have a Magnet Mayhem Day. Please help your child look for magnets throughout your home and draw them on the house paper attached. Return the paper to school on Friday.



Thank you,

Teacher

NAME _____



Magnets Help Us at Home

Look for things at home that have magnets.
Draw pictures of them on the back of this page.
Write their names.

Parent: Help your child find items in your home that have magnets. Possibilities include refrigerator magnets, cupboard latches, electric can openers, and the tips of some screwdrivers.

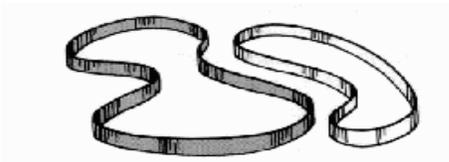
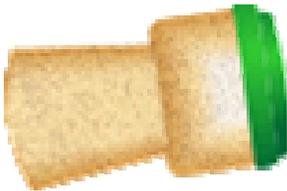
Magnets Rock
Appendix F: What Does a Magnet Attract?

Name _____

What Does a Magnet Attract?

Circle the things a magnet will attract.

Put an X on the things a magnet will not attract.



Magnets Rock
Appendix G – Magnet Attraction Graph

Name _____

**If the magnet will attract an object, draw a happy face in the yes box.
If the magnet will not attract an object, draw a sad face in the no box.**

Magnet Attraction Graph

| | |
|--|--|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Paper Clip



Cork



Keys



Nails



Crayon



Scissors



Feather



Rubber Band



_____ **YES:**



NO: _____

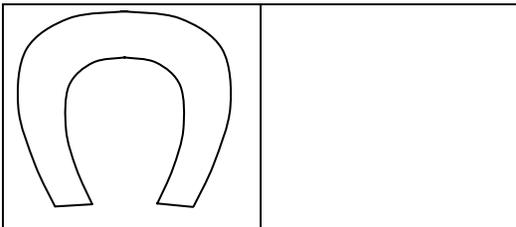
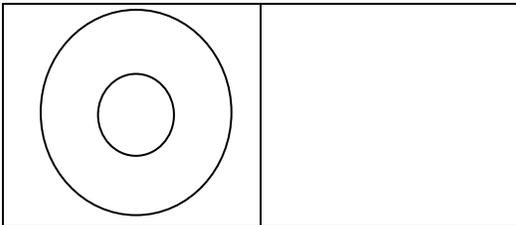
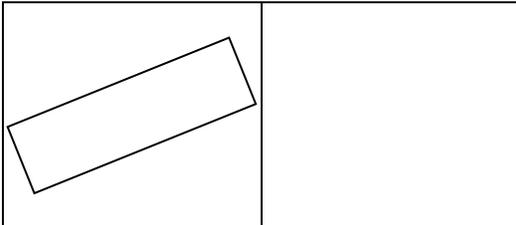
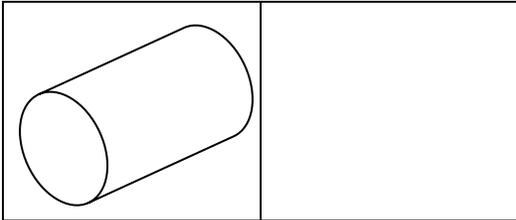


Magnets Rock
Appendix H: Mighty Magnet Strength

Name _____

How many paper clips will a magnet hold?

Test result

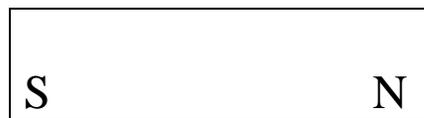
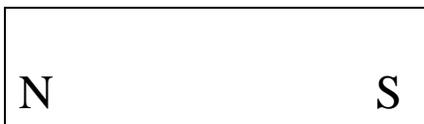
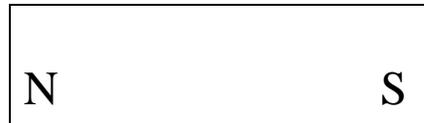
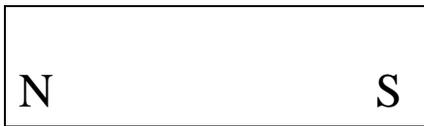


Magnets Rock
Appendix I: Magnetic Poles

Name _____

If the two magnets attract each other color the magnet pair green.

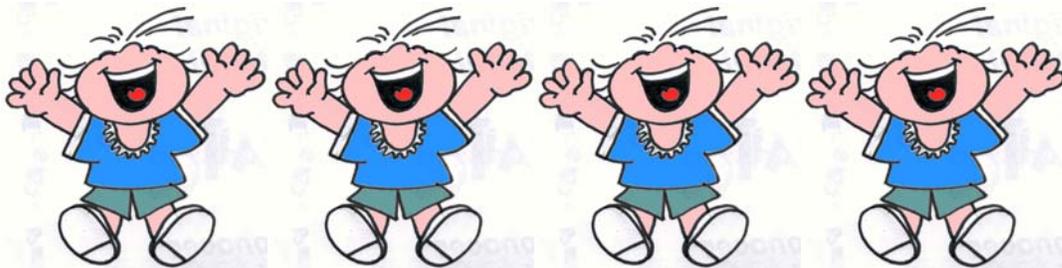
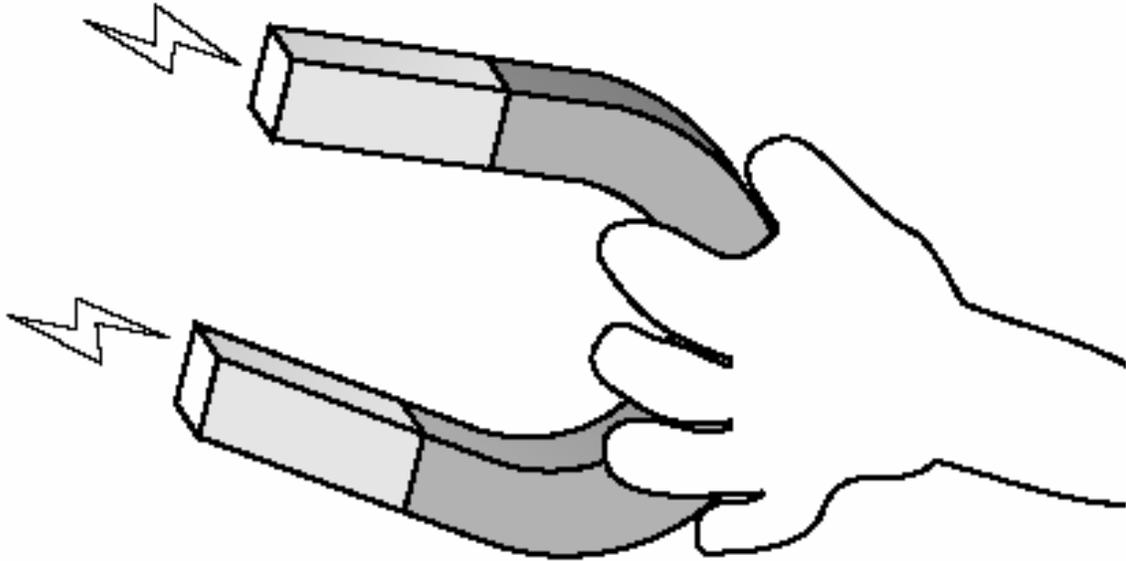
If the two magnets repel each other color the magnet pair red.



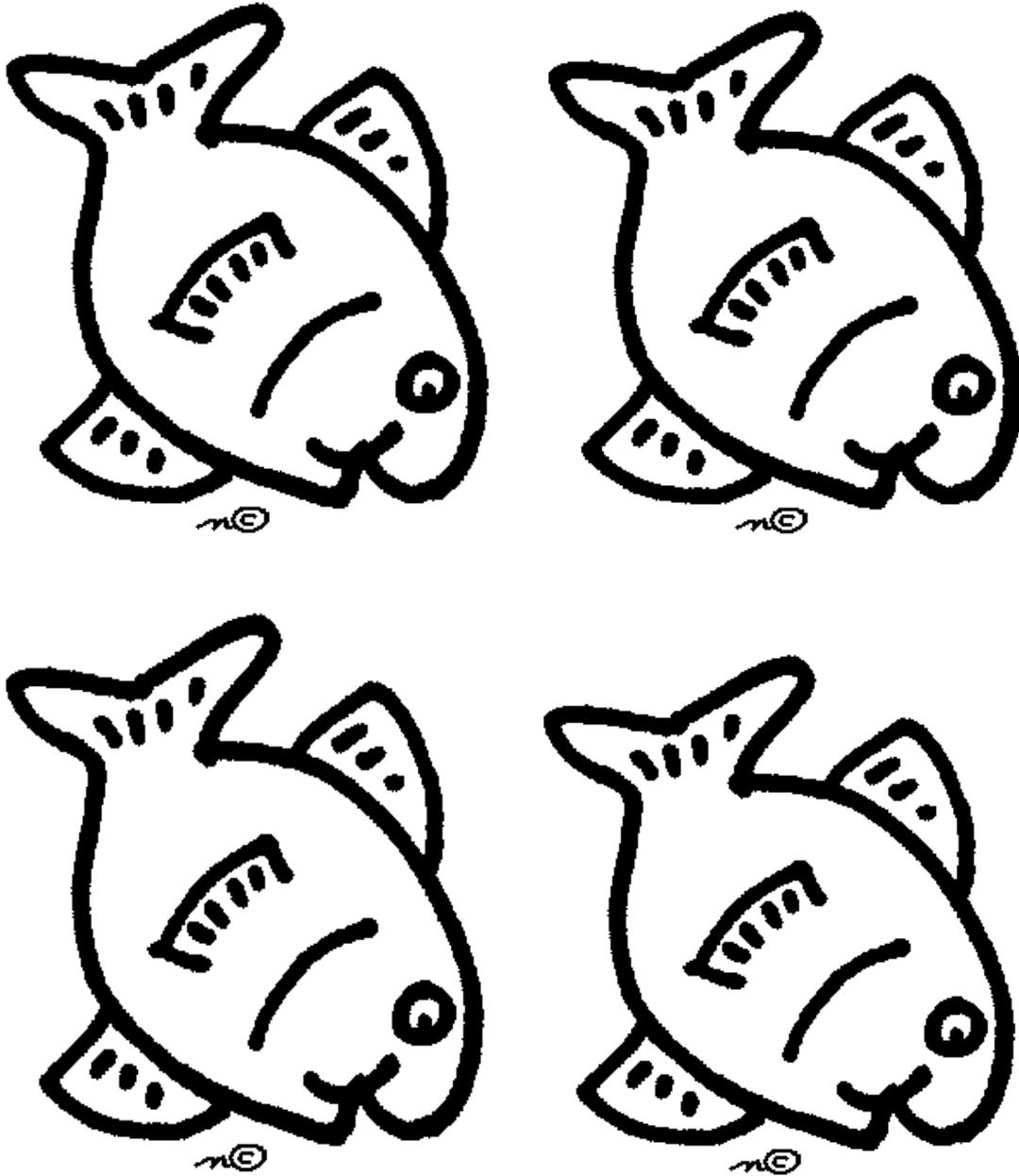
N = North-Seeking Pole
S = South-Seeking Pole

Core Knowledge Science

Magnets Rock!



Magnets Rock
Appendix K: Fish Pattern



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