

MAGNET LITERACY IDEAS

Written by Carol Whittaker

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Standard 3 Students will understand that magnetism can be observed when there is an interaction between the magnetic fields of magnets or between a magnet and materials made of iron.

DAY 1

Objective 1 Investigate and compare the behavior of magnetism using magnets.

- a. Compare various types of magnets (e.g., permanent, temporary, and natural magnets) and their abilities to push or pull iron objects they are not touching.

(EXPERIMENT: TRB Investigation 1 or **Magnets Activity**)

Magnet LITERACY ACTIVITIES AND STRATEGIES

A. Strategy: *Fact or fiction... you decide*

Texts: Magic School Bus Chapter Book Amazing Magnetism History of Magnets; Page 11. The Attractive story of Magnetism with Max Axiom; Page 6-7. What makes a magnet Page 24.

Student copies of <http://www.whoguides.com/who-discovered-magnets> Article by Sam Reese or any other differing texts

Procedure: Give students a 3 column summary sheet. Read texts above together, or use different accounts from the inter-net. (see article below). Have students write a summary of three different accounts.

SCIENCE

An article by [Sam Reese](#)

Who discovered magnets

Who discovered magnets

As to who discovered magnets first, it looks like the ancient Greeks are the strongest contenders. It is said the Greeks first observed that lodestone attracted iron bits. Another version of the story goes that the Greeks discovered magnetite in Turkey. Thales is widely accepted as the first human to study magnets. He lived in Greece around 600 BC. He studied how two magnetic objects attract each other, including a resin called amber.

On the other hand, ancient Chinese had been known to use magnetic stones around that time, too. Historians say the ancient Chinese used magnetic stones for making a compass. Another story is told about an ancient place in Macedonia called Magnesia, where magnets appeared to have begun. But the Vikings, who sailed across many oceans, invented the first magnetic compass.

***Note from Mrs. Whittaker: The earliest known raids of the Vikings were about 800 AD**

B. Strategy: Discussion: Could scientists take the information from your lists and call it *facts*, *hypotheses*, or *theories*? Use the following definitions:

Scientific Fact – any observation that has been repeatedly confirmed and accepted as true. (Have students explain their thoughts)

Scientific Hypothesis – a scientifically educated guess that must be testable and it must be falsifiable. [Able to test and able to be proven false]

Scientific Theory – a scientifically best guess. A well tested series of hypotheses that have been repeatedly confirmed and not proven false to date.

A final definition might be helpful during the discussion:

Speculation – contemplation or consideration of a subject, a conclusion, *opinion*, or idea reached by conjecture.

Discuss why there are so many different accounts about who discovered magnets. Lead students to speculate that many different civilizations used magnets and they were discovered so long ago that no one knows for sure who discovered them first. All accounts probably are based on some factual information. But they can not be proven as fact.

C Strategy: Respond in Kind

Procedure: Students write their own account (fiction) of who discovered magnets. Accounts may be a new creative story or just an original rewrite of an idea already read.

Possible title for response: John's Version: THE HISTORY OF MAGNETS (Tell students they may read stories to each other the next day)

D. Strategy

Texts: Magic School Bus page 8,10, text boxes; Max Axiom page 7,9 test boxes; Or Student literacy pages in TRB

Procedure. Give students 90 seconds to list as many facts as they can about magnets: Note: Students often draw conclusions from the morning activity that they assume are facts. Example: The cow magnet is the strongest magnet.

Discuss again with students what makes a fact? How do scientists decide what is a fact and what is not? Read Facts from books. Have students correct their lists.

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DAY 2

Objective 1 Investigate and compare the behavior of magnetism using magnets.

- b. Investigate how magnets will both attract and repel other magnets.

MORNING EXPERIMENT ACTIVITY: TRB Investigation 2 or The Great Maze Magnet Race

The Great Maze Magnet Race

SUPPLIES: Classroom set of donut magnets (two per group)
large paperclips,
rulers/ tape measures
cardstock
Markers
Individual White boards

Directions: On the cardstock provided make a maze using the following directions:

1. Place a start line in the bottom right hand corner
2. Place a finish line in the top left hand corner
3. Make a path the width of your ruler so that a donut magnet can pass through it
4. Add curves or turns to your maze. The route must be exactly 24 inches long.

Paired students have 20-30 minutes to create a maze in which to race their magnets. When they are complete they pair up and measure each maze to make sure they are to specification.

First Race:

Using a paperclip; place the magnet under a whiteboard with the maze on top of it and **pull** the paperclip through the track to see who will win. Trade mazes and play a second time. Chart the results

Second Race

Using a magnet; place the second magnet close to it in a way that will **push** the first magnet along the paper. Each time the magnets connect together, the magnets are pulling not pushing and the contestant must start again. Chart the winner. Trade. Chart your final results.

The Great Maze Magnet Race Grade Guide

My Maze has a start line [bottom right] and a finish line [top left] Possible Pts.
20 _____

My Maze is at least 1 inch thick Possible Pts.
20 _____

My Maze is exactly 24 inches long Possible Pts.
20 _____

I played at least four games with my partner Possible Pts.
40 _____

Total Points earned _____

RESULTS

	Paperclip race	Magnet race
1 st trial		
2 nd trial		
3 rd trial		

AFTERNOON LITERACY ACTIVITIES AND STRATEGIES

A Strategy: Humpty Dumpty if not done before in class

Volunteers take turns reading '*My Version of the discovery of magnets*'

B Strategy: *Show me your parts (of speech) please*

Text: Grammar Book pages on prepositions and interjections

Procedure: Have a mini lesson on parts of speech. Then together make class lists of magnet nouns, past tense verbs, prepositions, and interjections. Assign students 2 or 3 words from each category and have them make up movement patterns to illustrate **See the 2minute demonstration video:** [you need sticky notes for assignments] Give students half an hour to create, then take turns watching and guessing group words

C Strategy: Contrast and compare; Venn diagram

Texts: *When Jessie Came Across the Sea* by Amy Hest; *The Memory Coat* by Elvira Woodruff

Procedure: Read both books anytime during Day One or Two. Before reading tell student that the books are about two similar groups of immigrants, but one was **pushed**, and one was **pulled** to America. Use Venn diagram to Compare and contrast stories. Question: Why would we read these stories while we are talking about magnets?

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DAY 3

Objective 1 Investigate and compare the behavior of magnetism using magnets.

- c. Compare permanent magnets and electromagnets.
- d. Research and report the use of magnets that is supported by sound scientific principles.

MORNING EXPERIMENT ACTIVITY: TRB Investigation #3 or **ELECTROMAGNET Demonstration, or MAKE AN ELECTROMAGNET.** Use only one idea.

AFTERNOON LITERACY ACTIVITIES AND STRATEGIES

A. Strategy: Similarities and Differences T-Chart

Text: Activity sheets and info from previous days

Procedure: Have students consider permanent magnets and electromagnets. Put down similarities and differences in a t-chart

B. Strategy: 2, 4, Special

Text: Student T-charts

Procedure: Have 2 students meet together and share charts. If they have different ideas they may choose to share and add. Two groups of 2 students meet together and share charts. Again if they have different ideas they may choose to share and add.

C. Strategy: 2-3 minute research pass

Text: Enough *different* library books on magnets that everyone in class

can have one. A list of the books for each child (*see example below*)

Procedure: Explain that students get to write a class report on THE USES OF MAGNETS. They will make up a title but the report has to have something about the many ways we use magnets. Pass out the report grade guide. Right before you begin this strategy, give each student a list of titles. Pass out the books. Explain that each student will be given 3 minutes [If students seem restless change it to 2 minutes] to look through a book. THEY MAY NOT WRITE NOTES. However, if they see something they want, to use, they may write a page number down by the title. Every 2-3 minutes they must pass their book and get a new one.

Magnet Books

1. All aboard Science Reader – Magnets Pages_____
2. Amazing Magnets Magic School House Pages_____
3. Attract and Repel: Boothroyd Pages_____
4. Attractive Story of Magnetism- Max Axiom Pages_____
5. Electricity & Magnetism FUNdamentals Pages_____
6. Experiments with Magnets Bryan Pages _____
7. First Science Experiments Magnet Power Pages_____
8. First Science Magnets: Murray Pages_____
9. Investigating Magnetism: Walker Pages_____
10. Magnet Book: Johnston Pages_____
11. Magnets: Olien Pages_____
12. Magnetic and Non Magnetic Pages_____
13. Magnetism – It’s Sooo Attractive shared reading _____
14. Magnets in Medicine Pages _____
15. Playing with Magnets: Gibson Pages_____
16. Push and Pull: Vogel Pages _____
17. Science Factory: Magnetism and Magnets Pages _____

18. Science Investigations Magnetism an Inv.	Pages _____
19. What Makes a Magnet?: Kelly	Pages _____
20. What's the Attraction?	Pages _____
21. Young Scientist... Magnets: Parker	Pages _____

D. Strategy: summarizing – note-taking skills

Text: Magnet statements of fact

Procedure: Demonstrate and then have students practice rewriting sentences into phrases.

After students have practiced this skill, have them go back to the books. Using their note taking skills they write notes about uses of magnets - Big Ideas and details. They should write one idea or detail per sticky note.

*Possible extension last half hour: show AIMS magnet movie. It has a wonderful section on the uses of magnet

Ten Facts About Magnets

1. The North poles of a magnet always point north, and the south poles of a magnet always point south.
2. Two like poles of a magnet will repel or push apart, unlike poles, for instance a north pole and a south pole will attract.
3. Magnetic forces attract only magnetic materials like iron, steel, cobalt, and nickel. Other non magnetic metals are not attracted to magnets.
4. The magnetic forces of Earth can act at a distance. Which is why compasses work.
5. While they are magnetized, temporary magnets, like electro-magnets act like permanent magnets.
6. A coil of wire with an electric current flowing through it becomes an electromagnet.
7. Putting iron inside a current-carrying coil increases the strength of the electromagnet.
8. Natural magnets are sometimes called magnetite.
9. The north pointer of a compass is the north seeking (north side) of a magnet)
10. Cow, bar, disc, domino, donut magnets are all considered permanent magnets.

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DAY 4 continued from Day 3

Objective 1 Investigate and compare the behavior of magnetism using magnets.

- c. Compare permanent magnets and electromagnets.
- d. **Research and report the use of magnets that is supported by sound scientific principles.**

MORNING EXPERIMENT ACTIVITY: TRB Investigation 4 Electricity and Magnets - simple motors

AFTERNOON LITERACY ACTIVITIES AND STRATEGIES

Strategy: Demonstrating outlines and reports

Text: All aboard science Reader Magnets pages 42-47 Magnets in medicine page 3 Grade guide for report (Or just ask student to volunteer their notes)

Procedure: Read above pages. Then read from the sticky notes you have pre-made which correspond to the written material. Have students help you organize them into big ideas and details.

Next use your projector to show a computer blank document page. With student's suggestions, type up a 5-paragraph report. Work together with the class. Explain to students that their reports may be similar, because this is a practice report. Also explain that they will be hand writing their reports. They must turn them in, along with their notes at the end of today's class period. A few students have trouble finishing. Print out copies of the class report, and let them take example and their reports home to finish. (*depending on class this may take two days*)

Uses of Magnets: 5 Paragraph Report
GRADE GUIDE

	Pts. Possible	Pts. Earned
Report begins with a title centered at the top of the page.	5	_____
Name clearly written, top right hand corner	5	_____
Clear opening paragraph with a strong thesis statement	15	_____
Second paragraph makes a clear statement from thesis and uses supporting details.	15	_____
Third paragraph makes a clear statement from thesis and uses supporting details.	15	_____
Fourth paragraph makes a clear statement from thesis and uses supporting details.	15	_____
The concluding paragraph restates the main idea in an Interesting summary.	15	_____
The report is written in best cursive and has complete sentences with capitals and periods.	15	_____
	Points Possible: 100	_____

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DAY 5

Objective 2: Describe how the magnetic field of Earth and a magnet are similar

a. Compare the magnetic fields of various types of magnets (e.g., bar magnet, disk magnet, horseshoe magnet).

MORNING EXPERIMENT ACTIVITY: TRB Investigation #5
Discovering Magnetic Fields

AFTERNOON LITERACY ACTIVITIES AND STRATEGIES

A Strategy: Description Game

Text: Notes from morning experiment; an example sheet for each child. On the back of each sheet, write one name of a magnet that was used in the morning experiment: alternate horseshoe, bar, domino, donut, disc,

Procedure: Give students ten minutes to write a detailed description of the magnetic field of one of the magnets they were given. It must be explained so well that other students recognize which magnet belongs to that magnetic field.

WORDS THAT CAN'T BE USED: bar, horseshoe, domino, donut, magnetic, magnet. *Example follows:

After students have completed their description pair-share-switch to have students guess which magnet each describes.

When students have shared three times ask for volunteers that have received all correct guesses. Put up one description of each different magnet type and read together. Let students partner as they each fill out the contrast and compare magnet sheet

Magnetic field Description Sheet

EXAMPLE – The field of this item is strongest at the north and south poles. It spreads out in a curved pattern from one pole to the other, so that the pattern looks like a double oval. The force that curves around the item gets weaker and weaker as it gets farther from the poles. The item is in the shape of a cylinder and has all rounded edges. It is made of stainless steel. It produces a strong enough force to collect clipped off bits from wire if they pass close by. What is it? _____(*cow magnet*)

Look on the back. Now write your own description of that magnet and its magnetic field. Remember, you may not use the following words: magnet, magnetic, bar, horseshoe, donut, domino, or any other magnet name.

Contrast and Compare: Magnetic Field Description Sheets

Name_____

SIMILARITIES in bar, horseshoe, domino, and donut magnets

DIFFERENCES

Bar

Horseshoe

Domino

Donut

B. Strategy Shared Reading/ sticky note discussion

Text: The Bully Magnet by Deborah Connor

Procedure: Read book to class and end by discussing book. If students have not done sticky note discussion explain it to them. If conversation lags you might ask: *Is this book fact or fiction?*

C. Strategy: Silent Sustained Reading

Text: All library books on magnets

Procedure: Explain that several students have asked if they could borrow the books that came from the library to read at home. “Most of you didn’t have time yesterday to finish reading since you were finishing your reports. Since I can’t let you take them home you will have one half hour to choose a book from the back table and read. I will call on people one at a time to pick a book. You may read it any place in the room that you choose as long as you are reading quietly.”

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DAY 6

Objective 2: Describe how the magnetic field of Earth and a magnet are similar

b. Compare Earth’s magnetic field to the magnetic field of a magnet.

MORNING EXPERIMENT ACTIVITY: TRB Investigation 6

AFTERNOON LITERACY ACTIVITIES AND STRATEGIES

Strategy: RAFT

Texts: All Aboard Science Reader Magnets page 35 – 41; The Journey Stories of Migration Cynthia Rylant

Procedure: Explain to students the hypothesis of animal magnetism. You can read explanation in science reader. Next read *The Journey*. *Ideally get a classroom set*. Discuss the possibility of each animal using animal magnetism. Let students choose an animal to write a story about. Role = migrating animal; Audience = CNN news; Format = interview; T= Why you're migrating

Allow volunteers to read their stories to the class

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DAY 7

Objective 2: Describe how the magnetic field of Earth and a magnet are similar

c. Construct a compass and explain how it works.

d. Investigate the effects of magnets on the needle of a compass and compare this to the effects of Earth's magnetic field on the needle of a compass (e.g., magnets effect the needle only at close distances, Earth's magnetic field affects the needle at great distances, magnets close to a compass overrides the Earth's effect on the needle).

MORNING EXPERIMENT ACTIVITY: TRB Investigation #7 Making a Magnet Compass or Making a compass activity

AFTERNOON LITERACY STRATEGIES AND ACTIVITIES

A. Make a simple compass course that ends up in a specific place and allow students as a class to follow it. You can make different courses and group students or have students start a few minutes apart. When they report back successfully have students stay outside, write their own courses and exchange them.

B. Strategy: Reciprocal Questioning

Text: TRB Shared Reading student pages

Procedures: Remind students about what kind of questions are text based with short answers. Ask them to read first paragraph and let them know I will be calling on some of them randomly to answer a question. Next read the second paragraph and let them know that I will be calling on a random student to ask me a question. Mix it up.