

TITLE: Magnets- What Do They Attract?

AUTHOR:

TEAM MEMBERS:

DATE LESSON TO BE TAUGHT:

GRADE LEVEL: 4

CONCEPT(S): Scientists apply magnetism to determine the contents of different minerals. Magnetic devices are also used in the medical industry for examining patient's ailments.

OBJECTIVES The student will be able to:	Evaluation Question for each Objective
Sort objects that are attracted to magnets.	List three objects that will stick to a magnet. List three that will not. <i>Objects that stick</i> - - - <i>Objects that <u>don't</u> stick</i> - - -
Describe the properties of each item that is attracted to a magnet.	Paper clips are known to be attracted to magnets. Why does this occur? a. It is a metal b. It is made of steel. c. It is made of a small portion of iron. d. a and c e. b and c
Determine what types of metals are magnetic.	What type of material does a magnet usually stick to? a. cans b. iron objects c. magnetic rubber

TEKS: The student is expected to...

3.7A-B: gather information including temperature, magnetism, hardness, and mass using appropriate tools to identify physical properties of matter; and identify matter as solids, liquids, and gases.

4.2A-E: collect information to construct reasonable explanation from direct and indirect evidence; communicate valid conclusions;

4.7B: conduct tests, compare data, and draw conclusions about physical properties of matter

VOCABULARY:

Magnet: an object that possesses the ability to attract another object made with iron

Magnetism: strong attractive power

Iron: element Fe, used in making weights and objects containing steel.

Steel: a metal made primarily of iron, usually used to stiffen something or in weaponry

Aluminum: element Al, used in aluminum foil, Al_2O_3 , or cookware

Copper: element Cu, used in making pennies, and the Statue of Liberty

Brass: a metal consisting of copper and zinc, used in musical instruments and furniture

MATERIALS LIST and ADVANCED PREPARATIONS:

Brown paper bags (1 per group and 1 for the instructor)

Magnets (1 for each group of 3 to 4 students)

Bag of test objects (1 for each group)

Test-Objects Inventory sheet

Magnetic Observations sheet

SAFETY:

-The magnets students will be using are ceramic. They can break if dropped on a hard surface. Caution students to be careful and handle magnets with care.

-Warn students to keep magnets away from audio cassettes, videotapes, and computer-program disks. Magnets can seriously damage magnetic storage.

ENGAGEMENT: 10- 12 minutes		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Student Will Do
Play 10 questions with students using a magnet placed in a brown paper bag. Pass out "Guess What" worksheet for students to create questions.	I have an object in this brown paper bag. I won't tell you what it is, but you can ask questions about it in order to guess what it is. The game we're going to play is called "10 Questions". On the sheet in front of you, write down questions you would like to ask.	Students will work individually or in groups creating a list of questions to ask the instructor.

Allow students to ask questions about the mystery object.	Remember, you cannot ask what it is, but you ask questions about what it does, looks like, weight, etc. <i>Expected questions:</i> -Is it heavy? -What does it do? -What is its shape? -What color is it?	Students may ask about its: color, shape, texture, relative size, or weight.
Answer students' questions about the mystery object.	Would anyone like to ask a question about the mystery object?	Students are called on to ask questions.
Make a class list of attributes with the class on the board.	Let's create a list of the characteristics of the mystery object.	

TRANSITION

Physical properties, such as roughness, color, or boiling point aid scientists to discover important information about everyday items in our lives. Scientists constantly test the properties of elements and different compounds in order to determine an object's abilities or even create safety regulations. For example, a simple material like plastic is made from carbon-based compounds. Scientists must test the boiling point and melting point of these compounds to make sure they are safe for us to store our food or use as a sanitary area for hospitalized patients.

EXPLORATION: 5- 8 minutes

What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Student Will Do
Distribute brown paper bags containing a magnet. Tell students safety issues.	I challenge each of you to figure out something the object can do without opening your bag. Since we don't know exactly what it is, it would be safe to stay at our desks to experiment. To get you started, try and see if it makes a certain noise that could help you figure out what it is. Would any group like to	Students will work in groups to figure out different things the object can do.

Discuss with students about what the mystery object can do.	discuss what they discovered about the object? <i>The object stuck to my desk or other varying answers.</i> From this what would you guess from your observations, or hypothesize, the object is? <i>A Magnet.</i>	Students will participate in class discussion.
Once students agree that it will stick to something, tell them the object is a magnet.	What type of magnets have you seen? <i>I have seen magnets on my refrigerator, in cartoons, etc.</i>	Students will think of examples of magnets they have seen in everyday life.
Have students explore what the magnet sticks to around their desks. Remind them the magnets can break and to be careful.	What sticks to the magnet around your seat? For the next 2 minutes in your groups, figure out the types of objects your magnet will stick to.	In their groups, students will try and figure out what types of objects stick to the magnet.
Call on students to share results. When it's evident it sticks to metal, ask students what they all agreed magnets stick to.	What did your magnet stick to? <i>Students will share different objects at their desk that the magnet stuck to.</i>	Students will answer when called upon.

TRANSITION

Magnets appear to stick to metals, but does that include all metals? What do you think? (*Students will share their thoughts about the type of metals the magnet will stick to*). At your desks, create a list of possible hypotheses concerning the type of metals a magnet will stick to. (*Students will think of hypotheses of what magnets stick to*).

EXPLANATION: 5- 8 minutes

What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Student Will Do
Ask students to share their hypotheses.	Would anyone like to share their thoughts? <i>Students will provide varying answers.</i>	Students will share their hypotheses when called upon.
To test their hypotheses, tell students to put their magnets away and to open their test bags. They must guess which objects will	These bags contain objects that will and won't stick to the magnet. In your groups/partner, sort these objects into two piles:	Students will sort objects into two piles- items that stick to the magnet and objects that do not.

stick to the magnet and which ones do not.	things that stick and things that don't stick.	
Distribute the Magnetic Observations sheet to each student. As the students finish, allow them to use their magnets to test their hypotheses and record their results on the sheet.		Students will record their results on the Magnetic Observations sheet.
Tell students to put objects back in the bag once they are finished. Go over their results aloud.	<p>Which objects stuck to the magnet? Which did not?</p> <p>Were you surprised by any of the objects you tested? <i>The rock was surprisingly magnetic.</i></p> <p>What do the objects that stuck to the magnet have in common?</p> <p>The material that always sticks to magnets is iron. The rule is if a magnet sticks to an object there is iron or steel in it. Steel is magnetic because it is made mostly of iron.</p>	Students will provide answers to the instructor's questions.
Go over definitions with students on board or overhead.	<p>Let's first define the object we're experimenting with, a magnet. A magnet is <i>an object that possesses the ability to attract certain objects.</i> Magnetism is a <i>strong attractive force</i> exhibited by the magnet.</p> <p>Now we know magnets stick to objects made of iron. There is a term for the magnet sticking to an object, called attraction. To be attracted to something, in this case, means to be drawn to it by a pulling force.</p> <p>Iron, an <i>element</i> represented by <i>Fe</i>, sticks to magnets. You</p>	Students will follow along with the instructor to define terms.

	<p>can find iron in <i>weights and objects containing steel</i>. Steel is a metal made primarily of iron, and can be found in <i>door handles, staples, paper clips, and weaponry</i>.</p> <p>Other metals used in this lesson include aluminum: (<i>element Al, found in aluminum foil (Al₂O₃), cookware</i>), copper (<i>element C, found in pennies, the Statue of Liberty</i>), and brass (<i>a metal consisting of copper and zinc, and is used in musical instruments (brass instruments) and furniture</i>).</p> <p>Objects made from iron are attracted to magnets. Is aluminum attracted to a magnet? <i>No</i>. How about brass? <i>No</i>. Since they do not, we know that these metals do not contain iron.</p>	
Address why the rock was magnetic.	<p>Now that we know that generally objects stick to magnets when they contain iron, why do you think the rock stuck to the magnet? <i>The rock must contain iron.</i></p> <p>The rock is made up of a mineral which contains a large amount of iron. In fact the name of the rock is called magnetite, because it is magnetic.</p>	Students will suggest it contains iron.

TRANSITION

Now that we know that magnets identify iron in objects, I'm giving all of you a challenge as iron detectors.

ELABORATION: 10 minutes		
What the Teacher Will Do	Eliciting Questions/	What the Students Will

	Student Responses	Do
<p>Tell students they are now going to be iron detectors.</p> <p>Assign a section to each group to investigate. *Be sure to warn them to keep magnets away from audio cassettes, videotapes, and computer-program disks.</p>	<p>Your job is to find objects in the room that have iron in them.</p> <p>The magnet could erase data on disks and computers because their made with magnetic material. You will have 5 minutes to find objects that contain iron.</p>	<p>Students will wait for further instruction. In their groups, students will find objects in their section that contain iron using their magnet.</p> <p>Students will use magnets around the classroom in order to determine whether they contain iron.</p>
<p>Once students have found objects containing iron, hold a class discussion about the objects students determined contain iron.</p>	<p>What proves that these objects are made of steel or iron? <i>It stuck to the magnet.</i></p> <p>Were there any objects you thought had steel or iron and didn't? <i>Students will provide varying answers.</i></p>	<p>Students will share their results.</p>
<p>Depending on the availability of magnets, the groups will be issued another magnet or the teacher will perform two-magnet experiment. Challenge students to do different "tricks" with the magnets.</p>	<p>Experiment with what the magnets can do with each other. Make them talk, move one on the desk using the other under the desk, or thread magnets on a pencil.</p>	<p>Students will either try to find ways magnets interact and duplicate interactions done by other groups.</p>

EVALUATION: 10 minutes		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Student Will Do
Summative Assessment		Students will take a short exam.

Transparencies:



Guess what!

What is the mystery object in the brown bag?

The class will be allowed 10 questions to help guess what the object is.

WHAT can it do? [Part 1]

For the next **two minutes** try to figure out what this object does at your station.

***BE SURE TO NOT DROP THE OBJECT AND DO NOT PUT IT NEAR ELECTRICAL APPLIANCES!!!**

What is it?

A MAGNET!!!!

Vocabulary Terms

Attract: to be drawn to something by a pulling force such as magnetism

Repel: to move away from something by a pushing force

Magnet: an object that possesses the ability to attract certain objects

Magnetism: strong attractive power

*Iron: element Fe,
Ex: weights and objects containing steel.*

*Steel: a metal made primarily of iron
Ex: door handles, staples, paper clips weaponry*

*Aluminum: element Al
Ex: aluminum foil (Al_2O_3), cookware*

*Copper: element Cu
Ex: pennies, the Statue of Liberty*

Brass: *a metal consisting of copper and zinc*
Ex: *used in musical instruments (brass instruments) and furniture*

WHAT can it do? [Part II]

What type of objects does the magnet tend to stick to?

TEST and REFLECTION

At your tables you will be given an object test bag as well as a Magnetic Observations sheet. You are to test if each object is *attracted* to the magnet. Record your answers on the sheet provided.

Which objects stuck to the magnet?

What do they have in common?

IRON!!!

Become an IRON DETECTOR!!

YOUR job as an Iron Detector is to find out which objects in the room have iron.

Worksheets:

Name _____

Date _____



WHAT Can it Do? [part I]

Directions: At your desk, find out what this object can do **WITHOUT** removing it from the brown paper bag.

*Be sure not to drop the object. **DO NOT** bring it near electrical appliances.

Observations:

What did you find? Record your observations.

What do you think the mystery object is? Why?

Name _____

Date _____



WHAT Can it Do? [part II]

The mystery object is a **MAGNET!** What do magnets do? They stick to things. You will be given a bag of objects. You must find out which objects will stick to the magnet and which will not. Record your observations on the table below.

Objects that stick	Objects that do NOT stick

Vocabulary terms:

Magnet: an object that possesses the ability to attract another object made with iron



Magnetism: strong attractive power

Iron: element Fe, used in making weights and objects containing steel.

Steel: a metal made primarily of iron, usually used to stiffen something or in weaponry



Aluminum: element Al, used in aluminum foil, Al_2O_3 , or cookware

Copper: element Cu, used in making pennies, and the Statue of Liberty



Brass: a metal consisting of copper and zinc, used in musical instruments and furniture



Name _____

Date _____



Become an Iron Detector!

With all of the knowledge you've gained about magnets, you are now an iron detector. Your job is to locate objects in the classroom that contain iron using your magnet. Record your observations below. When you've found at least five (5) items, answer the questions at the end of the activity.

Objects that contain iron:



1. Were the objects that you thought would contain iron but did not? List these objects.
2. What objects were you surprised to discover contained iron?
3. What do the objects with iron have in common, if anything?