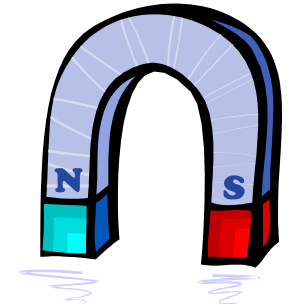


Magnet Motion



Background: Magnets can be used to create motion. They can pull something (attract) or push something (repel). Magnets attract or repel only certain metals.

Design Challenge: Design an object that can be pushed or pulled on a course by using magnets. You may not touch the object. You will present your work to the class.

Criteria:

- The object must have a path or a course to follow.
- Magnets must be used.
- The object must represent something, and the path must relate to the object.

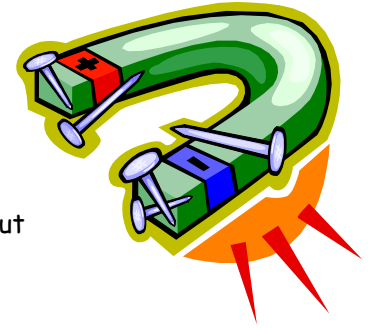
Materials: You may select from the items below.

- magnetic tape
- cardboard
- cardboard tubes
- scissors
- scrap paper
- scrap fabric
- construction paper
- tape
- small magnet rounds
- markers/crayons
- pencils
- glue

Targeted Standard of Learning: Science K.3
Supporting Standards of Learning: Science K.1, K.4, K.10
Mathematics K.12
English K.2, K.3, K.8, K.10, K.11

Targeted Standard for Technological Literacy: 16
Supporting Standards for Technological Literacy: 5, 8, 11, 12

Magnet Motion



Targeted Standard of Learning: Science K.3

- The student will investigate and understand that magnets have an effect on some materials, make some things move without touching them, and have useful applications.

Targeted Standard for Technological Literacy: Standard 16

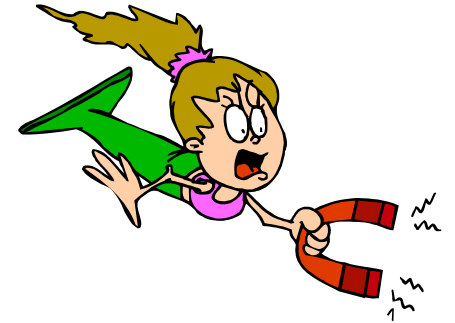
- Students will develop an understanding of and be able to select and use energy and power technologies.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Exposure to vocabulary: <i>repel, attract, push, pull, metal, nonmetal, attraction/non-attraction</i> • Exposure to magnet principles • Shared books on magnets 	<ul style="list-style-type: none"> • Magnets • Games using magnets • Use recyclables: cardboard, scraps, and fabrics • Check Design Brief for recommended materials. Teacher may substitute materials. 	<ul style="list-style-type: none"> • Use of scissors 	<ul style="list-style-type: none"> • Small groups of two to four • Materials can be placed in paper bags and labeled by groups so that work in progress and materials can all stay together. Clean up is easier, and less distribution time is required. 	<ul style="list-style-type: none"> • Design Brief • Guided portfolio (optional use) • Rubrics Assessment 	<ul style="list-style-type: none"> • Session 1: Introducing Design Brief • Sessions 2 & 3: Building • Session 4: Sharing and evaluating

Guided Portfolio—1

Name _____

Magnet Motion



Group Members: _____

1. **What is the problem?** State the problem in *your own words*.

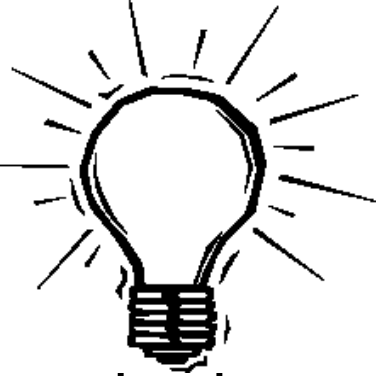
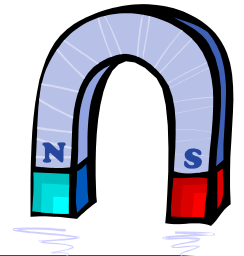
Targeted Standard of Learning: Science K.3
Supporting Standards of Learning: Science K.1, K.4, K.10
Mathematics K.12
English K.2, K.3, K.8, K.10, K.11

Targeted Standard for Technological Literacy: 16
Supporting Standards for Technological Literacy: 5, 8, 11, 12

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.



Name _____

4. Test your solution.

- Did your object move without being touched?
- Did you have a path or course for your object to follow?
- Did you use magnets?
- How many magnets did you use?

YES

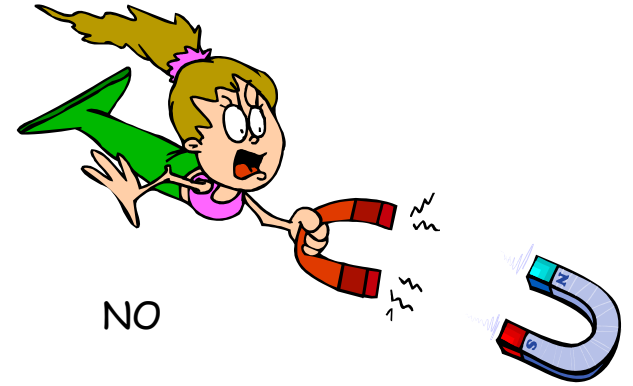
NO

YES

NO

YES

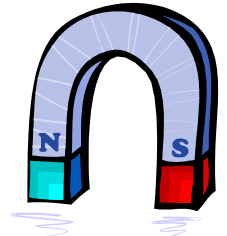
NO



Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



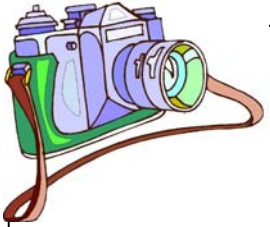
What would you have done differently?

Could you add to it to make it better? What would you add to it?

Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



A large, empty rounded rectangular box for drawing or pasting a photograph.

How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



A large, empty rounded rectangular box for drawing a picture showing improvements to the project.

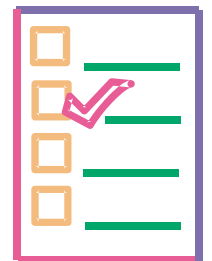
Rubric for *Magnet Motion*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student <ul style="list-style-type: none"> • used complete sentences • used descriptive words. 					
Guided Portfolio: The student <ul style="list-style-type: none"> • restated the problem • brainstormed solutions • created a solution • tested the solution • evaluated the solution. 					
Team Skills: The student <ul style="list-style-type: none"> • used appropriate voice • encouraged team members • listened to team members • was involved in all aspects of the project • respected team members. 					

Tested Criteria		
The student used magnets in project.	Yes	No
The student designed a course or path.	Yes	No
The student could move object without touching it.	Yes	No



Standards of Learning

English (2002)

Oral Language

- K.2 The student will use listening and speaking vocabularies.
- a) Use number words.
 - b) Use words to describe/name people, places, and things.
 - c) Use words to describe location, size, color, and shape.
 - d) Use words to describe actions.
 - e) Ask about words not understood.
 - f) Follow one-step and two-step directions.
 - g) Begin to ask how and why questions.
- K.3 The student will build oral communication skills.
- a) Begin to follow implicit rules for conversation, including taking turns and staying on topic.
 - b) Express ideas and needs in complete sentences.
 - c) Begin to use voice level, phrasing, and intonation appropriate for language situation.
 - d) Listen and speak in informal conversations with peers and adults.
 - e) Begin to initiate conversations.
 - f) Participate in discussions about books and specific topics.

Reading

- K.8 The student will demonstrate comprehension of fiction and nonfiction.
- a) Use pictures to make predictions about content.
 - b) Retell familiar stories using beginning, middle, and end.
 - c) Discuss characters, setting, and events.
 - d) Use story language in discussions and retellings.
 - e) Identify what an author does and what an illustrator does.
 - f) Identify the topics of nonfiction selections.

Writing

- K.10 The student will print his/her first and last names.
- K.11 The student will write to communicate ideas.
- a) Draw pictures and/or use letters and phonetically spelled words to write about experiences, stories, people, objects, or events.
 - b) Write left to right and top to bottom.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- K.1 The student will conduct investigations in which
- basic properties of objects are identified by direct observation;
 - observations are made from multiple positions to achieve different perspectives;
 - objects are described both pictorially and verbally;
 - a set of objects is sequenced according to size;
 - a set of objects is separated into two groups based on a single physical attribute;
 - nonstandard units are used to measure common objects;
 - a question is developed from one or more observations;
 - picture graphs are constructed using 10 or fewer units;
 - an unseen member in a sequence of objects is predicted; and
 - unusual or unexpected results in an activity are recognized.

Force, Motion, and Energy

- K.3 The student will investigate and understand that magnets have an effect on some materials, make some things move without touching them, and have useful applications. Key concepts include
- attraction/nonattraction, push/pull, attract/repel, and metal/nonmetal; and
 - useful applications (refrigerator magnet, can opener, magnetized screwdriver, and magnetic games).

Matter

- K.4 The student will investigate and understand that the position, motion, and physical properties of an object can be described. Key concepts include
- colors (red, orange, yellow, green, blue, purple), white, and black;
 - shapes (circle, triangle, square, and rectangle) and forms (flexible/stiff, straight/curved);
 - textures (rough/smooth) and feel (hard/soft);
 - relative size and weight (big/little, large/small, heavy/light, wide/thin, long/short); and
 - position (over/under, in/out, above/below, left/right) and speed (fast/slow).

Resources

- K.10 The student will investigate and understand that materials can be reused, recycled, and conserved. Key concepts include
- materials and objects that can be used over and over again;
 - everyday materials can be recycled; and
 - water and energy conservation at home and in school helps preserve resources for future use.

Mathematics (2001)

Geometry

- K.12 The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their position and orientation in space.

Standards for Technological Literacy

Standard 5: Students will develop an understanding of the effects of technology on the environment.

Standard 8: Students will develop an understanding of the attributes of design.

Standard 11: Students will develop the abilities to apply the design process.

Standard 12: Students will develop the abilities to use and maintain technological products and systems.

Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.