

Liquid • Solid • Gas



STEAM MODULE DESCRIPTION

In this series of STEAM activities, students will use drama to demonstrate an understanding of how magnets attract and repel. Students will dramatize different magnetic poles, as well as common objects that are magnetic and non-magnetic. Another activity in this module will integrate the visual arts. Students will apply prior knowledge of magnetic properties to create a painting, and use movement to illustrate their understanding of magnetic poles. Students will explore magnetism first-hand by painting and experimenting with different mediums, both magnetic and non-magnetic.

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Modules provide differentiated ideas and activities aligned to a sampling of standards. The modules do not necessarily imply mastery of standards, but are intended to inspire and equip educators.

Description	Learning Targets
<p>In this series of STEAM activities, students will use drama to demonstrate an understanding of how magnets attract and repel. Students will dramatize different magnetic poles, as well as common objects that are magnetic and non-magnetic. Another activity in this module will integrate the visual arts. Students will apply prior knowledge of magnetic properties to create a painting, and use movement to illustrate their understanding of magnetic poles. Students will explore magnetism first-hand by painting and experimenting with different mediums, both magnetic and non-magnetic.</p>	<p>“I Can...”</p> <ul style="list-style-type: none"> ● Identify why magnetic poles attract and repel ● Apply role playing strategies to dramatize the roles of the the magnetic poles ● Use drama to express how common objects, magnetic and non-magnetic, interact with one another ● Classify objects that are magnetic and non-magnetic ● Create a visual arts representation of magnetic forces based on the properties of magnetic and non-magnetic objects ● Sort objects by their magnetic properties ● Reflect on my findings and state reasons why certain objects were sorted into each category ● Compare and contrast magnetic poles ● Create choreography representing magnetic poles

ESSENTIAL QUESTION(S)

- Why do magnets attract and repel each other?
- What common objects are attracted to magnets?
- How can art help deepen our understanding of magnetic poles?

STANDARDS

Curriculum Standards	Arts Standards
<p><u>GA Performance Standards:</u> S1P2. Students will demonstrate effects of magnets on other magnets and other objects. a. Demonstrate how magnets attract and repel. b. Identify common objects that are attracted to a magnet. c. Identify objects and materials (air, water, wood, paper, your hand, etc.) that do not block magnetic force.</p> <p>ELAGSE1W3: Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.</p> <p>ELAGSE1SL1: Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.</p>	<p><u>GA Performance Standards:</u> TAES1.2 Developing scripts through improvisation and other theatrical methods. d. Uses the playwriting process: pre-writing/pre-play; preparation to write/dramatize; write/dramatize; evaluate and edit; re-write/re-dramatize.</p> <p>TAES1.3 Acting by developing, communicating, and sustaining roles within a variety of situations and environments. d. Collaborates and cooperates in theatre experiences. e. Assumes roles in a variety of dramatic forms such as narrated story, pantomime, puppetry and role play. f. Demonstrates skills of the mind: listening, observing, problem solving, imagining, concentrating.</p>

<p><u>National Standards:</u></p> <p>1.P.1.1. Explain the importance of a push or pull to changing the motion of an object.</p> <p>1P.1.2. Explain how some forces (pushes and pulls) can be used to make things move without touching them, such as magnets.</p> <p>1.P.1.3. Predict the effect of a given force on the motion of an object, including balanced forces.</p>	<p>VA1PR.2. Understands and applies media, techniques, and processes of two-dimensional works of art (drawing, painting, printmaking, mixed-media) using tools and materials in a safe and appropriate manner to develop skills.</p> <p>a. Creates drawings with a variety of media (e.g., pencils, crayons, pastels).</p> <p>b. Identifies lines and shapes in order to draw an object.</p> <p>c. Creates paintings with a variety of media (e.g., acrylic, tempera, watercolor).</p> <p>D1F.1. Identifies and demonstrates movement elements, skills, and terminology in dance.</p> <p>a. Recognizes and recalls terminology of creative movement elements and sub-elements (e.g., levels, pathways, directions, speed, rhythm, energy, qualities, shapes).</p> <p>b. Executes short sequences of basic locomotor movements (e.g., walk, run, hop, jump, gallop) in a variety of pathways, directions and levels.</p> <p>D1F.2. Understands and models dance etiquette as a classroom participant, performer, and observer.</p> <p>a. Demonstrates attentiveness, full participation and cooperation with others in the dance learning environment.</p> <p>b. Demonstrates focus and concentration in performance skills.</p> <p>c. Applies knowledge of appropriate behaviors and skills as an audience member and dance observer.</p> <p><u>National Standards:</u> Theater Arts</p> <p>TH:Pr5.1.1.a. Demonstrate the relationship between and among body, voice, and mind in a guided drama experience (e.g., process drama, story drama, creative drama).</p> <p>Visual Arts</p> <p>VA:Cr1.2.1a. Use observation and investigation in preparation for making a work of art.</p>
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KEY VOCABULARY

Content Vocabulary

- **Poles:** One of the two ends of a magnet
- **Attract:** To pull something
- **Repel:** To push away
- **Magnetize:** To give magnetic force to something a magnet attracts

- **Magnetic:** Capable of being magnetized or attracted by a magnet
- **Non-magnetic:** Not capable of being magnetized or attracted by a magnet
- **Opposite:** Arranged as one of a pair on either side of something
- **Magnet:** An object that pulls on some metal objects
- **Characteristic:** A distinguishing feature or quality
- **Iron:** A malleable ductile silvery-white metallic element used for structural and engineering purposes
- **Steel:** A modified form of iron, artificially produced, with qualities of hardness, elasticity, and strength
- **Magnetism:** The properties of attraction possessed by magnets
- **Bar magnet:** A bar-shaped, usually permanent, magnet
- **North pole:** The pole of a magnet that seeks the earth's north magnetic pole
- **South pole:** The pole of a magnet that seeks the earth's south magnetic pole
- **Position:** An object's location; where something is
- **Motion:** A change in position
- **Pull:** A force that moves an object closer to another object
- **Push:** A force that moves an object away from an another object

Arts Vocabulary

Theatre Arts

- **Character:** An actor or actress in a specified role
- **Collaboration:** Two or more people working together in a joint intellectual effort
- **Concentrations:** The ability of the actor/actress to be “in” character – that is, to be like the character s/he is portraying – in dialog, attitude, carriage, gait, etc.
- **Dialogue:** A conversation between two or more persons
- **Diction:** Using a “crisp and Clear” actor voice that can be understood by everyone watching and listening
- **Facial Expression:** Using your face to show emotion
- **Gesture:** An expressive movement of the body or limbs

Visual Arts

- **Aesthetics:** The term that refers to that which is beautiful and visually pleasing
- **Color:** An element of art with three properties: 1. hue, or the name of the color (e.g. red, yellow, etc.); 2. intensity, or the purity and strength of the color, such as brightness or dullness; and 3. value, or the lightness or darkness of a color
- **Media:** Refers to the tools and materials an artist uses

Dance Arts

- **Mirror:** To copy the movements of another while facing that individual
- **Pathway:** The designs traced on the floor as a dancer travels across space; the designs traced in the air as a dancer moves various body parts
- **Space:** An element of movement involving direction, level, size, focus, and pathway
- **Formation:** The placement of dancers in a performance space
- **Energy/Force:** Force propels or initiates movement, or causes changes in movement of body position

ASSESSMENTS

Formative	Summative
<ul style="list-style-type: none"> • Accuracy of concept present in dramatization • Evidence of writing and brainstorming for dramatization • Collaboration with peers • Teacher will monitor students through anecdotal notes while they are creating their paintings and sorting their materials 	<ul style="list-style-type: none"> • Written script with beginning, middle, and end (visually composed, if necessary) • Theatre Rubric (see Appendix) • Completed Video (optional) • Visual Arts Painting Rubric (see Appendix)

MATERIALS

Theatre Arts:

North and south magnet labels (These will be affixed to the magnet characters shoulders. North on one shoulder, south on the other shoulder.)

Pictures of other common objects that are magnetic and non-magnetic (paper clip, nail, safety pin, aluminum can, a plastic bottle)

iPad for videoing or other video device

Visual Arts:

Paper bags, containing: a small piece of wood, penny, paper clip, eraser, dime, screw, thumb tack, nail

Small bowls for sorting

Thick cardstock

Tempera paint, primary colors

Various sized paint brushes

Chalk pastels

Class sets of wand magnets

12 cookie sheets, small

THEATRE ARTS:

Activating Strategy

- Teacher will begin lesson by getting all students involved in the process of using their voice and body.
- Teacher can begin with the E-clap technique. The teacher will say "E" using different levels of voice and speed, while the students clap at that level and speed. The teacher can then clap, and have the students say "E" to the volume level and speed of the clap.

E-Clap

This game warms up students' body/mind coordination through ensemble rhythm and engagement. It also sets the tone for being able to mess up and stay in the exercise.

When I say "E," you CLAP.

When I CLAP, you say "E."

When I say "NOW," you say "WOW" (and do a 360 turn).

When I say "UH," you say (arms to the left and hop to the right) "UH."

When I say "Domo Choco Latte," you go (right arm up) "AH," (left arm up) "AH," (both arms into stomach and bend knees) "AH."

*Any other drama voice warm-up strategies would also be effective.

Main Activity

Part 1

- Teacher will use magnets to demonstrate how opposite poles attract and like poles repel.
- Teacher will then demonstrate dramatizing how opposite poles would attract and like poles would repel using voice and body movements.
- **Guiding Questions to get students thinking about characterization:**
 - 1) *If these opposite poles were people, how do you think they'd feel about each other?*
 - 2) *Let's make up a story about these magnets. What might they say as their poles pull them together?*
 - 3) *Now let's think about if these like poles were people, how would they feel about each other?*
 - 4) *Let's make up a story about these magnets. What might they say as their poles make them repel and run away from each other?*
- Teacher will also demonstrate dramatizing how common objects, either magnetic or non-magnetic, might interact with the magnets in a story.

Part 2

- Teacher will review the information the students have learned about magnetic and non-magnetic objects.
- Teacher will review the elements of a storytelling drama using a simple beginning, middle, and end script.

Part 3

- Students will create and write a small group short dramatization about magnets and how the poles attract. Students will include a beginning, middle, and end for their dramatization. (If needed, students could visually represent their ideas by drawing the beginning, middle, and end for their dramatization.)
- An example of this would be two north poles walk up to each other and repelling one another.
- Students will use their voice and body to dramatize this action. They might begin with "Hey, why are you pushing me?" (Beginning); "I'm not pushing you, you are pushing me." (Middle); "I know, we are like poles, and we are repelling each other." (End).
- The students will repeat this type of process with common objects in their group.
- Groups will have at least 3 small scripts with beginning, middle, and end. One of them has to be about the poles repelling and attracting.
- The others can be about being attracted or not attracted to the other magnetic and non-magnetic objects in the group.

Part 4

- Students will present their magnetic drama to the class. Other classroom students may provide constructive feedback on theatrical delivery (diction, facial expression, tone, volume, pitch, etc.) using theater vocabulary.

VISUAL ARTS:**Activating Strategy****Part 1**

- Begin with teacher-led mirror exercises to get students focused and warmed-up for dance activities.
- Challenge students to work with a partner and practice mirroring. Begin seated, then explore mirror activities that travel through space.

- Discuss the properties of magnets, including the response of same and opposite poles.
- Return to mirror activity, incorporating concepts of same and opposite magnetic poles.

Part 2

- Discuss and list how magnet concepts would influence choreographic decisions.
- Divide into groups (having an equal number of students per group, if possible). Within groups, have students create short choreographic phrases (2-4 phrases of eight counts) based on the magnetic pole they have been assigned.

Part 3

- When student compositions are complete, present to classmates.
- Discuss the different choreographic creations, comparing and contrasting as possible.

Main Activity**Part 1**

- YouTube video: Kid-powered Magnetic Separating Recycling Conveyor Belt (57 seconds)
[Kid-powered Magnetic Separating Recycling Conveyor Belt](#)
- Teacher demonstration with soda can and vegetable/soup can.
- Discuss: Why is one type of can magnetic while the other is not?

Part 2

- Teacher will lead a class discussion of what makes an object magnetic. Teacher will make a T-chart (magnetic, non-magnetic) and students will contribute ideas to fill it in. Students will make predictions as to which objects are magnetic and non-magnetic.

Part 3

- Students will create a t-chart and label one side magnetic and the other non-magnetic. (An alternative option would be for the students to sketch a t-chart using visual cues if the written part is too difficult.)
- Student partner groups will each be given a paper bag, containing: a small piece of wood, penny, paper clip, eraser, dime, screw, thumb tack, nail.
- Each group will be given two bowls, one to sort magnetic, one to sort non-magnetic.
- Each group will be given one cookie sheet, two pieces of cardstock, two magnetic wands, tape to adhere the paper to the cookie sheet, and four colors of paint. (one squeeze of each color on each paper)
- Students will take turns choosing an item and seeing if they can paint with it. After both students have used the item, they will place it in the appropriate bowl.

Part 4

- Students will complete their T-chart based on their sorting of magnetic or non-magnetic objects.
- Students will complete a written reflection evaluating why certain objects are magnetic or non-magnetic.
- Compare the T-chart created as a class to those created by the students.

REFLECTION

Reflection Questions

- *Explain how north and south poles attract and repel each other.*
- *How did sharing out our dramatic scene help me understand how north and south poles attract and repel each other?*
- *How did sharing out our dramatic scene help me understand how other common objects are attracted or not attracted to magnets?*
- *How did creating a painting through the exploration of magnetic and non-magnetic materials help me understand how magnets work?*

ADDITIONAL RESOURCES & EXTENSION ACTIVITIES

Books

- *Magnetic and Nonmagnetic* by Angela Royston
- *Amazing Magnetism (Magic School Bus)* by Rebecca Carmi
- *What Makes a Magnet?* by Franklyn M. Branley
- *Magnets: Pulling Together, Pushing Apart* by N. Rosinsky
- *Magnetic and Non-Magnetic* by Angela Royston
- *What Magnets Can Do (Rookie Read-about Science)* by Allen Fowler

Websites

- YouTube video: Kid-powered Magnetic Separating Recycling Conveyor Belt:
<https://www.youtube.com/watch?v=FFvc0-cP0jw>
- ScienceWiz Portal to Discovery: Magnetism:
http://www.sciencewiz.com/Portal/portal_to_Magnetism.php
- Internet4Classrooms: Magnets for Elementary Science:
http://www.internet4classrooms.com/science_elem_magnets.htm

APPENDIX

- **Theatre Rubric**
- **Visual Arts Painting Rubric**

Theater Rubric for Magnets STEAM Module

Task	4	3	2	1
Writing Process	Student demonstrates a thorough understanding of which objects are magnetic and non-magnetic through at least three fully developed scenes. Each scene clearly depicts the interaction of a material and a magnetic pole.	Student demonstrates a thorough understanding of which objects are magnetic and non-magnetic through at least three mostly developed scenes. Each scene mostly depicts the interaction of a material and a magnetic pole.	Student demonstrates an understanding of which objects are magnetic and non-magnetic through at least two somewhat developed scenes. Each scene somewhat depicts the interaction of a material and a magnetic pole.	Student demonstrates a minimal understanding of which objects are magnetic and non-magnetic through at least two rarely developed scenes. Each scene rarely depicts the interaction of a material and a magnetic pole.
Science Concept	The science vocabulary is used correctly and fully integrated throughout each scene.	The science vocabulary is mostly used correctly and mostly integrated throughout each scene.	The science vocabulary is somewhat used correctly and somewhat integrated throughout each scene.	The science vocabulary is rarely used correctly and rarely integrated throughout each scene.
Performance Skills	Student consistently uses a loud, clear, expressive voice to perform his or her scene. Facial expressions and body movement are integrated fully.	Student mostly uses a loud, clear, expressive voice to perform his or her scene. Facial expressions and body movement are integrated most of the time.	Student somewhat uses a loud, clear, expressive voice to perform his or her scene. Facial expressions and body movement are somewhat integrated.	Student rarely uses a loud, clear, expressive voice to perform his or her scene. Facial expressions and body movement are rarely integrated.
Student collaboration	Student consistently collaborates with group members and contributes ideas to the group. Mutual respect is consistently demonstrated by student towards his/her peers.	Student mostly collaborates with group members and contributes ideas to the group. Mutual respect is mostly demonstrated by student towards his/her peers.	Student somewhat collaborates with group members and contributes some ideas to the group. Mutual respect is somewhat demonstrated by student towards his/her peers.	Student rarely collaborates with group members and rarely contributes ideas to the group. Mutual respect is rarely demonstrated by student towards his/her peers.

Visual Arts Painting Rubric for Magnets STEAM Module

Task	4	3	2	1
Writing Process	Student demonstrates a thorough understanding of which objects are magnetic and non-magnetic. Analysis is written in complete sentences, using proper capitalization and punctuation. All science content vocabulary is spelled correctly.	Student mostly demonstrates an understanding of which objects are magnetic and non-magnetic. Analysis is mostly written in complete sentences, with proper capitalization and punctuation. Nearly all science content vocabulary is spelled correctly.	Student somewhat demonstrates an understanding of which objects are magnetic and non-magnetic. Analysis is somewhat written in complete sentences, with proper capitalization and punctuation. Half of the science content vocabulary is spelled correctly.	Student rarely demonstrates an understanding of which objects are magnetic and non-magnetic. Analysis is not written in complete sentences, and lacks proper capitalization and punctuation. Most of the science content vocabulary is spelled incorrectly.
Creation of Painting (using magnetic and non-magnetic objects)	All magnetic objects have been swirled through all four colors, covering the majority of the cardstock.	All or most of the magnetic objects have been swirled through at least three colors, covering the majority of the cardstock.	Some of the magnetic objects have been swirled through at least two colors, covering at least 50% of the cardstock.	Less than half of the objects were used to create the painting, and less than half the cardstock is covered.
Accuracy of Science Content (T-Chart)	All eight objects are sorted into the correct categories of magnetic/non-magnetic.	At least six objects are sorted into the correct categories of magnetic/non-magnetic.	At least four objects are sorted into the correct categories of magnetic/non-magnetic.	At least two objects are sorted into the correct categories of magnetic/non-magnetic.
Student Collaboration	Student worked well with his/her partner throughout the entire project. Student gave positive feedback to peers. Student shared materials appropriately.	Student worked well with his/her partner most of the time. Student gave positive feedback to peers most of the time. Student mostly shared materials appropriately.	Student worked well with his/her partner some of the time. Student gave positive feedback to peers some of the time. Student somewhat shared materials appropriately.	Student did not work well with his/her partner. Student did not give positive feedback to peers. Student did not share materials appropriately.