Energy

Content Area: **Science**
Course(s): **Science 6**
Time Period: **December**
Length: **5 weeks**
Status: **Published**

Energy Overview

Over a 5 week period, students will apply ideas about gravitational, electrical, and magnetic forces to explain a variety of phenomena including beginning ideas about why some materials attract each other while others repel. In particular, students develop understandings that gravitational interactions are always attractive but that electrical and magnetic forces can be both attractive and negative. Students also develop ideas that objects can exert forces on each other even though the objects are not in contact, through fields.

Energy Priority Standards

SCI.MS-PS2-3	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
SCI.MS-PS2-4	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
SCI.MS-PS2-5	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

Energy Learning Goals

- Students will be able to ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
- Students will be able to conduct an investigation to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.
- Students will be able to construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objetcs
- Students will be able to evaluate the experimental design to provide evidence that field exist between objects exerting forces on each other even though the objects are not in contact.

Energy Learning Targets

- Students will be able to determine how distance and mass affect gravitational attraction.
- Students will be able to distinguish between and describe electric and magnetic forces.
- Students will be able to distinguish between and describe electric and magnetic forces.
- Students will be able to show that the strength of electricity and magnetism can be affected by similar factors.
- Students will be able to show that the strength of electricity can be affected by different factors such

as voltage or resistance.

- Students will be able to show that the strength of magnetism can be affected by different factors such as material, size, distance, and temperature.
- Students will be able to summarize how a field works and why objects do not need to be in contact.
- Students will be able to summarize how attractive forces work.
- Students will be able to use engineering design to conduct their observation.
- Students will recognize or recall specific vocabulary, including: Electricity, magnetism, proton, electron, neutron, charge, poles, domain, solenoid.
- Students will recognize or recall specific vocabulary, including: orbit, gravity, mass, attractive.
- Students will recognize or recall specific vocabulary, including:Electricity, magnetism, conductor, insulator, current, ampere, voltage, resistance, ohm, poles, domain, solenoid.

Energy Essential Questions

- What evidence can be used to show that gravitational interactions are attractive?
- What factors affect the strength of electric and magnetic forces?
- Where does a field exist between objects exerting forces on each other?

Mazano Elements

- DQ 1-1 Providing Clear Learning Goals and Scales
- DQ 2-6 Identifying Critical Information
- DQ 3-14 Reviewing Content
- DQ 3-16 Using Homework
- DQ 3-19 Practicing Skills, Strategies, and Processes
- DQ 4-21 Organize Students for Cognitively Complex Tasks
- DQ 4-23 Providing Resources and Guidance

Differentiated Instruction

- Have individual students explain content understanding in their own words
- Use a variety of visual aids to help student understanding
- Use different teaching styles to introduce, explain, and reinforce content understanding
- Use small groups to check for understanding.

Assessments

- Do Now Activities
- MS-PS2-3 Learning Scale
- MS-PS2-4 Learning Scale

- MS-PS2-5 Learning Scale
- Teacher-created quizzes
- Teacher-created worksheets
- Unit Benchmark Assessment

Learning Plan

Week	Topic	Lesson Activities	Standard/Learning Goal/Target	Materials
Wk 1 - Wk 2	Energy	Do Now Activities (Warm up) Review Power Point slides from online information together. Show videos from You Tube on electric and magnetic fields: https://www.youtube.com/watch?v=zHJkJGBdvwE https://www.youtube.com/watch?v=uj0DFDfQajw Students will work collaboratively with hands-on materials to conduct an investigation to provide evidence that fields exist between objects without contact. Assign *Readworks* packet Assign student worksheets.	**Standard:** Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though they are not in contact. Evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though they are not in contact. **Learning Goals:** Students will be able to conduct an investigation to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. Students will be able to evaluate the experimental design to provide evidence that field exist between objects exerting forces on each other even though the objects are not in contact.	Power Point slides Chrome book *Readworks Packet* Videos Worksheets

			Learning Targets: Students will be able to conduct an investigation using magnets, electrically-charged balloons with packing peanuts, and other electrically charged objects to provide evidence that field exist between two objects exerting a force on each other without direct contact. Students will be able to evaluate data taken from hands-on experiences and simulations to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contacts.	
Wk 3	Energy	Do Now Activities (Warm up) Review Power Point slides from online information together. Demonstrate how an electromagnet and electric motor are created and how they work. Show video from You Tube on electric and magnetic force: https://www.youtube.com/watch?v=V7K9EQnVpn	**Standard:** Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. **Learning Goals:** Students will be able to ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	Power Point slides Chrome book Videos Electromagnets Electric motor

		M https://www.youtube.com/watch?v=MZtTVsIOA9c https://www.youtube.com/watch?v=HQdLFEiVeCA Assign student worksheets.	**Learning Target:** Students will be able to determine how adding more turns of a wire to an electromagnet and increasing the strength of a magnet in an electric motor will affect the strength of electric and magnetic forces.	Worksheets
Wk 4	Energy	Do Now Activities (Warm up) Review Power Point slides from online information together. Show video from You Tube on gravity: https://www.youtube.com/watch?v=xICEt51A-Ac Complete chart of statistical information on gravitational interactions of objects in the Solar system together. Practice using the statistical information chart.	**Standard:** Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. **Learning Goal:** Students will be able to construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objetcs	Power Point slides Chrome book Youtube Video Statistical Information Sheet
		Use demonstration from Physics website: https://phet.colorado.edu/en/simulation/legacy/gravity-and-orbits Assign student worksheets.	**Learning Target:** Students will be able to utilize an informational chart on gravitational interactions to construct and present arguments to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects	Physics website Worksheets

				Power Point slides
Wk 5	Energy	Do Now Activities (Warm up) Complete a list of review topics in preparation for unit assessment. Complete an open-note quiz. Complete a standards review worksheet. Complete a Unit learning scale on. Complete a standards-based assessment.	**Standards:** All unit standards listed above in weeks 1-4. **Learning Goals:** Students will review and complete multiple assignments in order to be able to pass a standards-basesd assessment. **Learning Target:** Students will complete all assignments during the review period and work collaboratively with the teacher to prepare themselves to pass a standards-based assessment.	Chrome book Open-note quiz Standards-based assessment List of Review Topics Learning Scales: MS-PS2-5 MS-PS2-3 MS-PS2-4

Materials & Resources

- Scientific hands-on materials
- Teacher choice of You Tube videos on the content
- Teacher-created Google Documents
- Teacher-created Google Slides