CPS Science Unit Plan

Grade	5	Subject	Science	Unit #	2
Unit Name	Energy Transfer Through Electricity And Magnetism		Timeline	6 weeks	
How to use the Framework	This Framework should be used to implement daily science instruction. The resources and instructional strategies reflected in the Framework will provide a foundation for effective implementation and student mastery of standards. Please see the hyperlinked abbreviation document to ensure understanding of all abbreviations used with this framework. CCPS Department of Science Website for access to all unit frameworks.				
Unit Overview	By the end of this unit, students will have an understanding of the difference between natural/static electricity and human harnessed electricity. Students will also know the difference between an electromagnet, a magnet and how the magnetic field interacts with magnetic material. SW be able to show what objects are insulators and conductors of electricity and how the thickness of an object can affect the magnetic attraction of an object to a magnet. **Background:** Energy is the ability to do work or apply force to move an object. Forms of energy include heat, light, chemical and electrical. In the case of electrical energy, the force is electrical attraction or repulsion between charged particles or energy resulting from the flow of an electric charge. Electricity is the movement of charged particles that can be naturally occurring (static), or human harnessed. Naturally occurring electricity (static) means it is created in the natural world. Human harness means it is controlled by humans. Students will be given the opportunity to build different types of circuits such as simple, series or parallel. Students will use simple circuits to determine if an object is a conductor or insulator of electricity. Objects that are conductors allow electricity to flow fairly easily. Most metals are considered to be good conductors of electrical current. Insulators are materials that have the opposite effect on the flow of electricity. They do not allow negatively charged particles to flow easily from one place to another. **Throughout this unit, the teacher should:** ● provide students with opportunities to build and refine models that illustrate the difference between natural/static electricity and human-harnessed electricity and how parts of circuits work together ● provide students with opportunities to plan and carry out investigations using conductors and insulators ● support the See-Think-Wonder protocol to record students' thoughts, observations, and questions. ● explain how to communicate through writing and speaking using the Claim-Evidence-Reasoning protocol ● support the protocol for **reading and sharing text** . **Throughout this unit, the student will be able to**: ● build and refine models to illustrate the difference between natural/static electricity and human-harnessed electricity. ● build and refine models of simple circuits. ● plan and carry out investigations to determine what is a conductor or insulator of electricity. ● develop systems to understand how the flow of electricity can generate a magnetic field, and a magnetic field in turn creates electric charge movement. ● communicate through writing and speaking using the Claim-Evidence-Reasoning protocol ● engage in argument based upon investigation, research, and textual information.				

	Refer to Teacher Notes for more details.

Standards

GSE	Science and Engineering Practices	Crosscutting Concepts
S5P2: Obtain, evaluate, and communicate information to investigate electricity. **a.** Obtain and combine information from multiple sources to explain the difference between naturally occurring electricity (static) and human-harnessed electricity. **b.** Design a complete, simple electric circuit, and explain all necessary components **c.** Plan and carry out investigations on common materials to determine if they are insulators or conductors of electricity **S5P3: Obtain, evaluate, and communicate information about magnetism and its relationship to electricity.** a. Construct an argument based on experimental evidence to communicate the differences in function and purpose of an electromagnet and a magnet. (Clarification statement: Function is limited to understanding temporary and permanent magnetism). b. Plan and carry out an investigation to observe the interaction between a magnetic field and a magnetic object. (Clarification statement: The interaction should include placing materials of various types (wood, glass, metal, and rocks) and thickness between the magnet and the magnetic object.)	**Plan and carry out investigations**: Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. **Engaging in argument from evidence:** Argumentation is the process by which explanations and solutions are reached.	**Energy and Matter:** Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior. **Systems and system models:** A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

NGSS Alignment	NGSS Alignment to Disciplinary Core Ideas

The Phenomenon Protocol

Anchoring Phenomena	Learning Targets
Phenomenon Card S5P2a	Students will obtain and combine information from multiple sources to explain the difference between naturally occurring electricity (static) and human-harnessed electricity.
Phenomenon Card S5P2b	Students will design a complete, simple electric circuit, and explain all necessary components.
Phenomenon Card S5P2c	Students will investigate and test common materials to determine if they are insulators or conductors of electricity.
Phenomenon Card S5P3a	Students will construct an argument based on experimental evidence to communicate the differences in function and purpose of an electromagnet and magnet.
Phenomenon Card S5P3b	Students will plan and carry out an investigation to observe the interaction between a magnet and a magnetic object on opposite sides of various materials such as wood, paper, glass, metal, and rocks.

Weekly Lesson Tasks

Navigation: Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Return to the top | Assessment Prep

Week 1

Standards | Phenomenon | Weekly Lessons

GSE: S5P2a	**Focused Concept:** To determine the difference between naturally occurring electricity and human harnessed electricity.
Learning Targets:	Students will obtain and combine information from multiple sources to explain the difference between naturally occurring electricity (static) and human-harnessed electricity.
Lab Safety and Materials	**General Safety Practices for the Elementary Science Classroom- TOC.docx**

SEP TEACHER TIP:
To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Obtain, Evaluate, Communicate.pdf

Phenomenon: Phenomenon Card S5P2a	**DQ:** What is the difference between naturally occurring electricity and human harnessed electricity?

Day 1: Opening	Day 2 : Guided Practice/ Transition	Day 3: Independent Practice	Day 4: Independent Practice	Day 5: Assessment / Summary
Phenomenon Introduction (5-7 minutes) Teachers will show the following image and video link	**Introduce the Driving Question: (7 - 10 minutes)** *What is the difference between*	**Review the Driving Question: (1-2) minutes** *What is the difference between naturally occurring electricity*	**Text Annotation Strategy (25 - 30 minutes)** Have students read and annotate the following text:	**Review the Phenomenon (5-7 minutes)** Allow students to review the initial observations and

to discuss phenomenon:
Phenomenon Card S5P2a

Phenomenon Card video link:
Super Static

Use the see, think wonder strategy to guide student thinking.

Teachers should provide students opportunities to share observations and develop questions. The teacher should record students' observations on chart paper and refer back to initial student ideas throughout the week.

Have students record their observations with drawings and labels.

Inquiry Activity
(10-15 minutes)
PhET Simulation: John Travoltage

Objective: Have students observe the movement of charged particles

Provide students an opportunity to see how static electricity occurs. Provide the PhET simulation and ask students to consider the process of how static electricity occurs.

Have students pay close attention to the movements of the electrons in the simulations.

The teacher should record students' ideas on chart paper.

naturally occurring electricity and human harnessed electricity?

Use the strategy to support students with making connections and understanding the driving question (DQ).

Visualizing the Driving Question

Click here to access question words reference chart

The process can be recorded on chart paper with the students or the teacher can complete the graphic organizer.

Be sure to create a reference for students to have throughout the week.

**TEACHER NOTE:
Students should not answer the driving question at this time. Students will need to collect information, data and understanding from the phenomenon strategy, inquiry activity, investigation, text or video protocol and vocabulary strategy to develop a response in the claim-evidence-reasoning format.

(3-5 teachers and students should focus on developing claim, evidence, and reasoning)

Claim-Evidence-Reasoning

and human harnessed electricity?

Graphic Organizer
(2 - 3 minutes to access)
Teachers will provide students an opportunity to see how static electricity occurs.

Provide the PhET *Balloons & Static Electricity* simulation and ask students to consider the process of how static electricity occurs.

The students can also use real balloons and wool material to simulate this activity.

uConnect Lab
What are the types of ele…
What are the types of ele…

Investigation Facilitation
(30 - 35 minutes)

The teacher should have students access the PhET *Balloons & Static Electricity* or wool and balloons

Objective: Have students observe how the charged particles interact with one another.

Have students complete Procedure Step 1

Have students use the following for research for Procedure Step 2

Static Electricity: Snap, Crackle, Jump

Natural vs. Human Harnessed Electricity: Its Hair Raising!

The teacher should facilitate the following process. Have the students follow the text protocol facilitation directions provided in the following strategy:

3-5 Text Annotation Protoc…

Students should complete the following student handout as they work through the text annotation protocol:

3-5 Information Analysis Student Organizer (editable)
3-5 Information Analysis G…

During the teacher-led discussion, the teacher should ask the following questions:

What is static electricity? What is one of the best examples of static electricity and how does it happen? How does clothing in a dryer build up static electricity?

**TEACHER NOTE: Read and review the annotation protocol prior to providing this lesson to students. Students will need to be placed in groups or have an understanding of how the groups will change to limit time used for transitioning.

Vocabulary:
static electricity
human harnessed electricity
naturally occurring electricity
electrical energy

questions from see, think, wonder strategy on Day 1.

Have students review initial ideas. Ask students: *Have any of your ideas about the phenomenon changed? How?*

Have students review their initial questions. Ask students: *What questions generated on Day 1 can you answer, now? What are your answers to the questions?*

Claim-Evidence-Reasoning
(20 - 25 minutes)

Students will write a response to the following driving question in the CER format.

What is the difference between naturally occurring electricity and human harnessed electricity?

Review the claim-evidence-reasoning poster with the students

**TEACHER NOTE: Provide students with sentence starters by sharing on the board:

3-5 Claim-Evidence-Rea…

Have students write their claim-evidence-reasoning

writing a claim
Have students develop a claim which is their answer to the driving question, claim. Students should use all their knowledge from the phenomenon, inquiry activity,

The teacher should ask the following: *Describe the behaviors of the simulation. What is occurring? What is the relationship between the character's behavior in the simulation and the particles seen? What do you think the symbol in the particles mean?*

Guide students to understand that the negatively charged particles build up. After enough build up, they are released to another object or organism. Negatively charged particles are obtained through friction or the rubbing of some objects or materials.

Assessment Prep Activity:
Following the task, click the link above. Have students practice applying their knowledge to an assessment question. Follow assessment prep protocol.

Complete Week 1 Day 1 assessment prep question.

(CER)
(10 - 12 minutes)

Objective: Expose students to claim-evidence-reasoning (CER) student samples below to review and understand their peers' thoughts on the topic, initiating the process of developing skills for effective argumentation.

The teacher should state the following to students:

"Claim-Evidence-Reasoning or CER is a way of writing that helps students understand and explain what they learn in science investigations and science ideas."

Review the claim-evidence-reasoning poster with students.

As a class or in student groups, provide students with this week's claim-evidence-reasoning sample.

Use student sample linked here

The teacher or students should read over student sample(s) to analyze claim-evidence-reasoning protocol. Ask students to use the CER observations chart to complete the following analysis protocol:

Claim-Evidence-Reasoning Record Observations Document (google doc)

Ga.Power: Human Harnessed Electricity

Mystery Science: Mini-Lesson (How do batteries work?)

**TEACHER NOTE:

Allow students to research using the above videos. Have students create a two-column chart to organize information collected about static-electricity and human-harnessed electricity.

NOTE:** Students will develop more understanding of human-harnessed or current electricity in the following weeks.

Assessment Prep Activity:
Following the task, click the link above. Have students practice applying their knowledge to an assessment question. Follow assessment prep protocol.

Complete Week 1 Day 3 assessment prep question.

Vocabulary Strategy
(10 - 15 minutes)

Vocabulary Terms Chart
Provide students with the graphic organizer (editable) or pdf handout, explaining its sections: word, *What did it look like in the investigation?*, meaning, image/drawing, connection

Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words. The teacher should provide the meaning of the word to the students and ask students to provide examples of how the word was represented during the investigation, phenomenon and/or inquiry activity. In the connection column, students should write how the word connects to concepts or observations they gathered during their classroom tasks.
Allow students to work in collaborative groups. Actively monitor and facilitate small group discussions and review various artifacts (pictures, images, primary sources, charts) to build knowledge of the term.

Have students collaborate, in groups, to complete the vocabulary terms chart for the other vocabulary terms.

Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.

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investigation, and information analysis protocol to develop an answer to the question.

writing evidence
Students should provide observational or numerical data as their evidence from their investigation and write a short caption or brief description of the data they provide to support their claim.

writing the reasoning
Students will use textual evidence from the "text annotation graphic organizer" to generate the reasoning or justification in the CER format.

Have students use the following template to write their claim-evidence-reasoning (CER)

3-5 Student Writing Template (editable)
3-5 Student Writing Template (pdf)

**TEACHER NOTE: Have students review the student sample(s) of claim-evidence-reasoning on Day 2. Have students compare their writing to those students' samples. Ask the following questions:

How are your thoughts or understanding similar to another writer on the topic? How are your thoughts or understanding different to another writer on the topic? What would you like to learn more about? Why?

	Claim-Evidence-Reaso… (PDF) *1. Identify the student's claim in the sample and have the teacher or students write their observations or questions.* *2. Identify the student's evidence in the sample and have the teacher or students write their observations or questions.* *3. Identify the student's reasoning in the sample and have the teacher or students write their observations or questions.* Ask the following questions to students as they analyze the student samples: Claim-Evidence-Reaso… ****Teacher Note:** As students review the student samples, they will begin to see or read vocabulary. Begin or continue a reference chart of questions or observations about vocabulary. Students will explicitly learn vocabulary on Day 4.			

Week 2 Standards | Phenomenon | Weekly Lessons	
GSE: S5P2b	**Focused Concept:** What are all components necessary to build a complete simple circuit?
Learning Targets:	Students will design a complete, simple electric circuit, and explain all necessary components.

Lab Safety and Materials	General Safety Practices for the Elementary Science Classroom- TOC.docx			
SEP TEACHER TIP: To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Develop and Use Models.pdf				
Phenomenon: Phenomenon Card S5P2b		**DQ:** How do the components of a complete simple circuit allow the flow of energy to light the light bulb?		
Day 1: Opening	**Day 2 : Guided Practice/ Transition**	**Day 3: Independent Practice**	**Day 4: Independent Practice**	**Day 5: Assessment / Summary**
Phenomenon Introduction (5-7 minutes) Review the following image to discuss phenomenon: Phenomenon Card S5P2b Have the students review their previous observations and questions. Ask the student to see, think, and wonder while viewing the above image. Have students record their initial ideas on post-it notes. Keep the post it notes on chart paper in an area students can revisit. Allow students to generate questions and answer as they gather new information. **Teacher will ask students the following questions:** **Inquiry Activity** Circuit Construction PHET **Objective:** Have students to obtain information on the circuits necessary components and their relationship to completing a closed circuit	**Introduce the Driving Question:** Have students review the driving question: *How do the components of a complete simple circuit allow the flow of energy to light the light bulb?* Use the strategy to support students with making connections and understanding the driving question (DQ). Visualizing the Driving Question Click here to access question words reference chart The process can be recorded on chart paper with the students or the teacher can complete the graphic organizer. Be sure to create a reference for students to have throughout the week. **TEACHER NOTE: Students should not answer the driving question at this time. Students will need to collect information,	**Review the Driving Question: (1-2) minutes** *How do the components of a complete simple circuit allow the flow of energy to light the light bulb?* **Graphic Organizer**: **(2-3 minutes to access)** How does electrical ener… How does electrical ener… **SAVVAS uInvestigate Lab** Provide students with the following student handout. NOTE**: The google slide has been modified to encourage extended thinking of the standard. **Investigation Facilitation: (30 - 35 minutes)** **Objective:** Students will make a model and get a bulb to light with an electric circuit. **What to Expect:** Students will first create a model of a circuit. They will then test the model, using the materials to try to light the bulb. They will evaluate the	**Text Annotation Strategy (25 - 30 minutes)** Have students read and annotate the following text: Electricity Text SAVVAS… or have students access in their consumable booklets The teacher should facilitate the following process. Have the students follow the text protocol facilitation directions provided in the following strategy: 3-5 Text Annotation Prot… Students should complete the following student handout as they work through the text annotation protocol: 3-5 Information Analysis Student Organizer (editable) 3-5 Information Analysis… During the teacher-led discussion, the teacher should ask the following questions: *What is an electrical circuit? What are components of a*	**Review the Phenomenon (5-7 minutes)** Allow students to review the initial observations and questions from see, think, wonder strategy on Day 1. Have students review initial ideas. Ask students: *Have any of your ideas about the phenomenon changed? How?* Have students review their initial questions. Ask students: *What questions generated on Day 1 can you answer, now? What are your answers to the questions?* **Claim-Evidence-Reasoning (20 - 25 minutes)** Students will write a response to the following driving question in the CER format. *How can I make a light bulb turn on?* Review the claim-evidence-reasoning poster with the students

Teacher facilitation: Allow students to engage with the PhET simulation for the inquiry activity.

Tell students, "Take a few minutes to see if you can find two different ways to make a lightbulb light up using the following materials:

wire
battery
lightbulb

Ask students the following questions:

What is your process to light the bulb? What patterns are you noticing when the light bulb lights and when the light bulb is not lit?

State to students:

**TEACHER NOTE:

Students will struggle productively. Please allow students to work on this simulation. Give students about 3-5 minutes to get the lightbulb to light. In the meantime, you may see the following:

When the battery "catches fire"

When the battery and wires are not connected to the lightbulb properly, the power source overheats. Batteries do over heat when energy is being transferred back to the battery.

data and understanding from the phenomenon strategy, inquiry activity, investigation, text or video protocol and vocabulary strategy to develop a response in the claim-evidence-reasoning format.

(3-5 teachers and students should focus on developing claim, evidence, and reasoning)

Claim-Evidence-Reasoning (CER)

Objective: Expose students to claim-evidence-reasoning (CER) student samples below to review and understand their peers' thoughts on the topic, initiating the process of developing skills for effective argumentation.

The teacher should state the following to students:

"Claim-Evidence-Reasoning or CER is a way of writing that helps students understand and explain what they learn in science investigations and science ideas."

Review the claim-evidence-reasoning poster with students.

As a class or in student groups, provide students with this week's claim-evidence-reasoning sample.

Use student sample linked here

The teacher or students should read over student sample(s) to

circuit to show how it works and what would make it not work.

Students can develop effective methods of modeling by understanding that sometimes models do not work. When models do not work, they can be revised until they do. In this lab, students can try different ways of connecting the battery, wires, and bulb until the bulb lights. Each model should cause them to create the circuit differently.

Guiding Inquiry
If your students need more direction on this lab, use the following procedure.

1. Draw a model with one battery, two wires, and one bulb, with the wires connecting the battery and the bulb.
2. Create the circuit according to your model and see if the bulb lights.
3. If the bulb does not light, change the model and try again.

Ask the following questions throughout the students learning:

What steps are you taking to light the lightbulb?
What have you observed?
Why isn't the lightbulb lighting?
What is needed to light the lightbulb?

**TEACHER NOTE: : Students will struggle productively. Please allow students to work on this simulation. Give

simple circuit? What are the functions of the components in a simple circuit?

**TEACHER NOTE: Read and review the annotation protocol prior to providing this lesson to students. Students will need to be placed in groups or have an understanding of how the groups will change to limit time used for transitioning.

Vocabulary Strategy
(10 - 15 minutes)

Vocabulary Words:
circuit
open circuit
closed circuit
components
load (bulb, fan, buzzer, etc.)
battery
wire

Vocabulary Strategy:

Vocabulary Terms Chart
Provide students with the graphic organizer (editable) or pdf handout, explaining its sections: word, *What did it look like in the investigation?*, meaning, image/drawing, connection

Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words. The teacher should provide the meaning of the word to the students and ask students to provide examples of how the word was represented during the investigation, phenomenon

**TEACHER NOTE: Provide students with sentence starters by sharing on the board:

3-5 Claim-Evidence-Rea…

Have students write their claim-evidence-reasoning

writing a claim
Have students develop a claim which is their answer to the driving question, claim. Students should use all their knowledge from the phenomenon, inquiry activity, investigation, and information analysis protocol to develop an answer to the question.

writing evidence
Students should provide observational or numerical data as their evidence from their investigation and write a short caption or brief description of the data they provide to support their claim.

writing the reasoning
Students will use textual evidence from the "text annotation graphic organizer" to generate the reasoning or justification in the CER format.

Have students use the following template to write their claim-evidence-reasoning (CER)

3-5 Student Writing Template (editable)
3-5 Student Writing Template (pdf)

This means, when you all receive your hands-on materials, we all must be careful to ensure the battery, wires, and lightbulbs are connected properly. **When the lightbulb does not light** Consider how the materials are connected. Are all components connected? PhET gives you some cues to help you with connecting the components. **Assessment Prep Activity:** Following the task, click the link above. Have students practice applying their knowledge to an assessment question. Follow assessment prep protocol. Complete Week 2 Day 1 assessment prep question.	analyze claim-evidence-reasoning protocol. Ask students to use the CER observations chart to complete the following analysis protocol: Claim-Evidence-Reasoning Record Observations Document (google doc) Claim-Evidence-Reasoni… (PDF) *1. Identify the student's claim in the sample and have the teacher or students write their observations or questions.* *2. Identify the student's evidence in the sample and have the teacher or students write their observations or questions.* *3. Identify the student's reasoning in the sample and have the teacher or students write their observations or questions.* Ask the following questions to students as they analyze the student samples: Claim-Evidence-Reasoni… **Teacher Note:** As students review the student samples, they will begin to see or read vocabulary. Begin or continue a reference chart of questions or observations about vocabulary. Students will explicitly learn vocabulary on Day 4.	students about 3-5 minutes to get the lightbulb to light. In the meantime, you may see the following: Be sure to let students know the following: ****WARNING: Improper connections of the circuit components could result in an overheating of the battery provided. Ensure students are using gloves when building all circuits.** **Assessment Prep Activity:** Following the task, click the link above. Have students practice applying their knowledge to an assessment question. Follow assessment prep protocol. Complete Week 2 Day 3 assessment prep question.	and/or inquiry activity. In the connection column, students should write how the word connects to concepts or observations they gathered during their classroom tasks. Allow students to work in collaborative groups. Actively monitor and facilitate small group discussions and review various artifacts (pictures, images, primary sources, charts) to build knowledge of the term. Have students collaborate, in groups, to complete the vocabulary terms chart for the other vocabulary terms. Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.	**TEACHER NOTE: Have students review the student sample(s) of claim-evidence-reasoning on Day 2. Have students compare their writing to those students' samples. Ask the following questions: *How are your thoughts or understanding similar to another writer on the topic? How are your thoughts or understanding different to another writer on the topic? What would you like to learn more about? Why?* **Assessment for Learning: (10 - 15 minutes)** Have students complete the following assessment. S5P2a & 25P2b Quiz

Week 3 Standards | Phenomenon | Weekly Lessons				
GSE: S5P2c		**Focused Concept:** What observations of an investigation can determine if common materials are insulators or conductors?		
Learning Targets:	**Students will** investigate and test common materials to determine if they are insulators or conductors of electricity.			
Lab Safety and Materials	**General Safety Practices for the Elementary Science Classroom- TOC.docx**			
SEP TEACHER TIP: To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Plan and Carry Out Investigations.pdf				
Phenomenon: Phenomenon Card S5P2c			**DQ: What observations of an investigation can determine if common materials are insulators or conductors?**	
Day 1: Opening	**Day 2 : Guided Practice/ Transition**	**Day 3: Independent Practice**	**Day 4: Independent Practice**	**Day 5: Assessment / Summary**
Phenomenon Introduction **(5-7 minutes)** Teachers will provide the following image to discuss phenomenon: Phenomenon Card S5P2c Ask the student to see, think, and wonder while viewing the above image. Have students record their initial ideas on post-it notes. Keep the post it notes on chart paper in an area students can revisit. Allow students to generate questions and answer as they gather new information. **Inquiry Activity** **(20-25 minutes)**	**Introduce the Driving Question:** **(7-10 minutes)** Have students review the driving question: *What observations of an investigation can determine if common materials are insulators or conductors?* Use the strategy to support students with making connections and understanding the driving question (DQ). Visualizing the Driving Question Click here to access question words reference chart The process can be recorded on	**Graphic Organizer**: **(2-3 minutes to access)** How do you test insulator… How do you test insulator… **SAVVAS uDemonstrate Lab: How do you test insulators and conductors?** Use materials above or have students complete the task in consumable books. **Materials:** three pieces of wire battery and holder bulb and holder cotton wooden craft stick rubber eraser or rubber band plastic spoon metal spoon metal nail plastic paper clip metal paper clip	**Text Annotation Strategy** **(25 - 30 minutes)** Have students read and annotate the following text: Insulators & Conductors The teacher should facilitate the following process.Have the students follow the text protocol facilitation directions provided in the following strategy: 3-5 Text Annotation Prot… Students should complete the following student handout as they work through the text annotation protocol:	**Review the Phenomenon** **(5-7 minutes)** Allow students to review the initial observations and questions from see, think, wonder strategy on Day 1. Have students review initial ideas. Ask students: *Have any of your ideas about the phenomenon changed? How?* Have students review their initial questions. Ask students: *What questions generated on Day 1 can you answer, now? What are your answers to the questions?* **Claim-Evidence-Reasoning** **(20 - 25 minutes)** Students will write a response to

Objective: Allow students to test materials to determine which materials allow the flow of energy and which materials do not allow the flow of energy.

GIZMO Circuit Builder
Circuit Builder Inquiry Activity

Provide students with the GIZMO: Circuit Builder graphic organizer. Have students open the GIZMO simulation: Circuit Builder.

(GIZMO can be accessed by teachers and students through the CCPS Portal with the CLEVER application. GIZMO is an Explore Learning application)

Allow students to work in groups and discuss the guiding questions and tasks provided in the graphic organizer.

The teacher should monitor students progress by moving around the classroom from group to group asking the following questions:

What are the differences in the open and closed circuit? How could you use your open circuit to test if materials allow the flow of energy or do not allow the flow of energy? What types of materials allowed energy to flow? Why? What types of materials slowed or did not allow the energy flow? Why?

**TEACHER NOTE:
Students will need access to the **Circuit Builder** simulation, chart paper with the students or the teacher can complete the graphic organizer.

Be sure to create a reference for students to have throughout the week.

****Teacher Note:** Students should not answer the driving question at this time. Students will need to collect information, data and understanding from the phenomenon strategy, inquiry activity, investigation, text or video protocol and vocabulary strategy to develop a response in the claim-evidence-reasoning format.

(3-5 teachers and students should focus on developing claim, evidence, and reasoning)

Claim-Evidence-Reasoning (CER)
(10-12 minutes)

Objective: Expose students to claim-evidence-reasoning (CER) student samples below to review and understand their peers' thoughts on the topic, initiating the process of developing skills for effective argumentation.

The teacher should state the following to students:

"Claim-Evidence-Reasoning or CER is a way of writing that helps students understand and explain what they learn in science investigations and science ideas."

Investigation Facilitation:
(35-40 minutes)

Assign students the "uDemonstrate Lab" found in **Savvas: uDemonstrate - How do you test insulators and conductors? (page 168 currently)**

Objective:
Students will carry out investigations to test whether certain materials are insulators or conductors.

Be sure you have assigned the uDemonstrate lab to students and students have access to type on the online lab report.

Have students work in groups to investigate whether materials are insulators and conductors. The teacher should monitor students' progress by moving around the classroom guiding students' thinking.

Prior to students investigating insulators and conductors, students should follow the directions on the uDemonstrate lab.

Students will use the lab report to draw a picture of their plan/design and make a prediction of the material's ability to conduct or insulate electricity.

Next, students will show the teacher their plan for approval.

With the teacher's approval,

3-5 Information Analysis Student Organizer (editable)
3-5 Information Analysis…

During the teacher-led discussion, the teacher should ask the following questions:

What is a conductor?
What are some of the best conductors?
How does electricity or energy through insulators?

**TEACHER NOTE: Read and review the annotation protocol prior to providing this lesson to students. Students will need to be placed in groups or have an understanding of how the groups will change to limit time used for transitioning.

Vocabulary Strategy
(10 - 15 minutes)
Vocabulary Words:
simple circuit
insulators
conductors

Vocabulary Strategy:

Vocabulary Terms Chart
Provide students with the graphic organizer (editable) or pdf handout, explaining its sections: word, *What did it look like in the investigation?*, meaning, image/drawing, connection

Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words.

the following driving question in the CER format.

What observations of an investigation can determine if common materials are insulators or conductors?

Review the claim-evidence-reasoning poster with the students

**TEACHER NOTE: Provide students with sentence starters by sharing on the board:
3-5 Claim-Evidence-Rea…

Have students write their claim-evidence-reasoning

writing a claim
Have students develop a claim which is their answer to the driving question, claim. Students should use all their knowledge from the phenomenon, inquiry activity, investigation, and information analysis protocol to develop an answer to the question.

writing evidence
Students should provide observational or numerical data as their evidence from their investigation and write a short caption or brief description of the data they provide to support their claim.

writing the reasoning
Students will use textual evidence from the "text annotation graphic organizer" to generate the reasoning or justification in the CER format.

specifically for this inquiry activity. Gizmo provides other simulations, but they will not meet the need for this lesson. **Assessment Prep Activity:** Following the task, click the link above. Have students practice applying their knowledge to an assessment question. Follow assessment prep protocol. Complete Week 3 Day 1 assessment prep question.	Review the claim-evidence-reasoning poster with students. As a class or in student groups, provide students with this week's claim-evidence-reasoning sample. Use student sample linked here **TEACHER NOTE: The student sample for this week is a concept learned in a later week. The goal is to analyze the writing, not the content. Be sure to go through the protocol with students despite this being a focus for a later week. The teacher or students should read over student sample(s) to analyze claim-evidence-reasoning protocol. Ask students to use the CER observations chart to complete the following analysis protocol: Claim-Evidence-Reasoning Record Observations Document (google doc) Claim-Evidence-Reasoni… (PDF) *1. Identify the student's claim in the sample and have the teacher or students write their observations or questions.* *2. Identify the student's evidence in the sample and have the teacher or students write their observations or questions.* *3. Identify the student's*	students will begin testing each material to determine if it is a conductor or insulator of electricity. Students should record their data on the lab investigation handout or graphic organizer. Teachers will allow students to use and display the cotton balls, wooden popsicle sticks, rubber band or eraser, plastic spoons, metal spoon or nail, paper clips (plastic and metal), penny, foil, pieces of construction paper, plastic straw, and a few others that can be added. Teachers will ask students the following: *Which objects allow the flow of energy? Which objects do not allow the flow of energy? Which objects can we classify as conductors? Why? Which objects can we classify as insulators? Why?* Following students completion of the investigation, the teacher will record student data on chart paper. The teacher should allow time for the students to compare their initial predictions with the results of their investigations. ****WARNING: Improper connections of the circuit components could result in an overheating of the battery provided. Ensure students are using gloves when building all circuits.**	The teacher should provide the meaning of the word to the students and ask students to provide examples of how the word was represented during the investigation, phenomenon and/or inquiry activity. In the connection column, students should write how the word connects to concepts or observations they gathered during their classroom tasks. Allow students to work in collaborative groups. Actively monitor and facilitate small group discussions and review various artifacts (pictures, images, primary sources, charts) to build knowledge of the term. Have students collaborate, in groups, to complete the vocabulary terms chart for the other vocabulary terms. Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.	Have students use the following template to write their claim-evidence-reasoning (CER) 3-5 Student Writing Template (editable) 3-5 Student Writing Template (pdf) **TEACHER NOTE: Have students review the student sample(s) of claim-evidence-reasoning on Day 2. Have students compare their writing to those students' samples. Ask the following questions: *How are your thoughts or understanding similar to another writer on the topic? How are your thoughts or understanding different to another writer on the topic? What would you like to learn more about? Why?* **Assessment for Learning: (10 - 15 minutes)** Have students complete the following assessment. S5P2c Quiz

	reasoning in the sample and have the teacher or students write their observations or questions. Ask the following questions to students as they analyze the student samples: Claim-Evidence-Reasoni… **Teacher Note:** As students review the student samples, they will begin to see or read vocabulary. Begin or continue a reference chart of questions or observations about vocabulary. Students will explicitly learn vocabulary on Day 4.	**Assessment Prep Activity:** Following the task, click the link above. Have students practice applying their knowledge to an assessment question. Follow assessment prep protocol. Complete Week 3 Day 3 assessment prep question.		

Week 4 Standards | Phenomenon | Weekly Lessons				
GSE: S5P3a		**Focused Concept:** What are the differences in function and purpose of an electromagnet or magnet?		
Learning Targets:	Students will construct an argument based on experimental evidence to communicate the differences in function and purpose of an electromagnet and magnet.			
Lab Safety and Materials	**General Safety Practices for the Elementary Science Classroom- TOC.docx**			
SEP TEACHER TIP: To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Construct Explanations and Argue from Evidence.pdf				
Phenomenon: Phenomenon Card S5P3a		**DQ:** What is the difference in function and purpose of an electromagnet or a magnet?		
Day 1: Opening	**Day 2 : Guided Practice/ Transition**	**Day 3: Independent Practice**	**Day 4: Independent Practice**	**Day 5: Assessment / Summary**
Phenomenon Introduction **(5-7 minutes)** Teachers will show the	**Introduce the Driving Question:** **(7 - 10 minutes)**	**Graphic Organizer**: **(2-3 minutes to access)**	**Text Annotation Strategy** **(25 - 30 minutes)**	**Review the Phenomenon** **(5-7 minutes)**

following image and video link to discuss phenomenon:

Phenomenon Card S5P3a
Electro Lifting Magnets

Ask the student to see, think, and wonder while viewing the above image. Have students record their initial ideas on post-it notes. Keep the post it notes on chart paper in an area students can revisit. Allow students to generate questions and answer as they gather new information.

Inquiry Activity
(20 - 25 minutes)

Objective:
Students will design an electromagnet to determine its function.

Provide students with the following materials to be found in the SAVVAS or STEMscopes kit:

bar magnet
wire (exposed)
iron nail
D battery
electrical tape (STEMscopes kit)
paper clips
warming gloves
(STEMscopes/Accelerate equipment boxes)

**TEACHER NOTE:

Preparation: Teachers will have to strip the green wire provided in the STEMscopes

Have students review the driving question:

What is the difference in function and purpose of an electromagnet or a magnet?

Use the strategy to support students with making connections and understanding the driving question (DQ).

Visualizing the Driving Question

Click here to access question words reference chart

The process can be recorded on chart paper with the students or the teacher can complete the graphic organizer.

Be sure to create a reference for students to have throughout the week.

**TEACHER NOTE: Students should not answer the driving question at this time. Students will need to collect information, data and understanding from the phenomenon strategy, inquiry activity, investigation, text or video protocol and vocabulary strategy to develop a response in the claim-evidence-reasoning format.

(3-5 teachers and students should focus on developing claim, evidence, and reasoning)

Claim-Evidence-Reasoning (CER)
(10 - 12 minutes)
Objective: Expose students to

How can I compare a per…
How can I compare a per…

or have students complete in consumable books

Investigation Facilitation:
(35-40 minutes to access)

SAVVAS: How can I compare a permanent magnet and an electromagnet?

Objective: Students will compare permanent magnets with electromagnets.

**TEACHER NOTE: Students will create their own electromagnet. They will plan an investigation to test it and compare it with a permanent magnet. After their tests, they will analyze the data and construct arguments about how the two magnets compare.

Facilitation:

Have students build their electromagnets (use steps and information gained on Day 1: Inquiry Activity, if needed). Have students test the strength of the electromagnet by seeing how many paper clips the electromagnet picks up at the same time.

State the following to students: You all will need to compare the permanent magnet to the electromagnet. Using your electromagnet and permanent magnet, test to see how many paper clips the magnets pick up.

Have students read and annotate the following text:

Electromagnets and Per…
SAVVAS Lesson 3 resource

The teacher should facilitate the following process.Have the students follow the text protocol facilitation directions provided in the following strategy:

3-5 Text Annotation Prot…

Students should complete the following student handout as they work through the text annotation protocol:

3-5 Information Analysis Student Organizer (editable)
3-5 Information Analysis…

During the teacher-led discussion, the teacher should ask the following questions:

What is the difference between an electromagnet and a permanent magnet?
How can a magnet be used to help an animal?
How can a magnet be used to help humans?

**TEACHER NOTE: Read and review the annotation protocol prior to providing this lesson to students. Students will need to be placed in groups or have an understanding of how the groups will change to limit time used for transitioning.

Allow students to review the initial observations and questions from see, think, wonder strategy on Day 1.

Have students review initial ideas. Ask students: *Have any of your ideas about the phenomenon changed? How?*

Have students review their initial questions. Ask students: *What questions generated on Day 1 can you answer, now? What are your answers to the questions?*

Claim-Evidence-Reasoning
(20 - 25 minutes)

Students will write a response to the following driving question in the CER format.

What is the difference in function and purpose of an electromagnet or a magnet?
Review the claim-evidence-reasoning poster with the students

**TEACHER NOTE: Provide students with sentence starters by sharing on the board:

3-5 Claim-Evidence-Rea…

Have students write their claim-evidence-reasoning

writing a claim
Have students develop a claim which is their answer to the driving question, claim. Students should use all their knowledge from the phenomenon, inquiry activity,

kits for this lab. **This should be done prior to the lesson administration.** The wire will need to be cut into 10 inches and stripped to completely expose the metal wire inside the plastic coating. Dispose of the plastic coating. Keep the exposed wire for Day 3 lab.
****WARNING: Improper connections of the circuit components could result in an overheating of the battery provided. Ensure students are using gloves when building all circuits.**

State to students: Today, we will use closed circuit to build a magnet. This is called an **electromagnet.** There are two types of magnets: a permanent magnet (bar) and electromagnet. This week, you will determine the differences in function and purpose of the two types of magnets.

Facilitation: Have students work in groups to complete the following tasks.

Display the following guidance to students on the board:
Building an electromagn…

Have students use the guided steps to build their own electromagnets in groups.

claim-evidence-reasoning (CER) student samples below to review and understand their peers' thoughts on the topic, initiating the process of developing skills for effective argumentation.

The teacher should state the following to students:

"Claim-Evidence-Reasoning or CER is a way of writing that helps students understand and explain what they learn in science investigations and science ideas."

Review the claim-evidence-reasoning poster with students.

As a class or in student groups, provide students with this week's claim-evidence-reasoning sample.

The teacher will pull students samples from earlier in the unit for peer review. Be sure to hide student names.

The teacher or students should read over student sample(s) to analyze claim-evidence-reasoning protocol. Ask students to use the CER observations chart to complete the following analysis protocol:

Claim-Evidence-Reasoning Record Observations Document (google doc)

Claim-Evidence-Reasoni… (PDF)

Have students try the following test:

Compare how many paper clips each picks up; adjust the electromagnet to pick up the same amount of paper clips as the permanent magnet; adjust the electromagnet to pick up a smaller amount of paper clips than the permanent magnet; adjust the electromagnet to pick up more paper clips than the permanent magnet

**TEACHER NOTE:
The goal is to have students use a permanent magnet to pick up paper clips. Students should compare how many paper clips each magnet picked up. Have students record their data and test adjustments to the electromagnet. The teacher should not provide explicit instructions on how to adjust the electromagnet.

****WARNING: Improper connections of the circuit components could result in an overheating of the battery provided. Ensure students are using gloves when building all circuits.**

Assessment Prep Activity:
Following the task, click the link above. Have students practice applying their knowledge to an assessment question. Follow assessment prep protocol.

Vocabulary Strategy
(10 - 15 minutes)
Vocabulary Words:
Magnet
Electromagnet
Permanent Magnet
Natural Magnet

Vocabulary Strategy:
Vocabulary Terms Chart
Provide students with the graphic organizer (editable) or pdf handout, explaining its sections: word, *What did it look like in the investigation?*, meaning, image/drawing, connection

Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words. The teacher should provide the meaning of the word to the students and ask students to provide examples of how the word was represented during the investigation, phenomenon and/or inquiry activity. In the connection column, students should write how the word connects to concepts or observations they gathered during their classroom tasks. Allow students to work in collaborative groups. Actively monitor and facilitate small group discussions and review various artifacts (pictures, images, primary sources, charts) to build knowledge of the term.

Have students collaborate, in groups, to complete the vocabulary terms chart for the other vocabulary terms.

investigation, and information analysis protocol to develop an answer to the question.

writing evidence
Students should provide observational or numerical data as their evidence from their investigation and write a short caption or brief description of the data they provide to support their claim.

writing the reasoning
Students will use textual evidence from the "text annotation graphic organizer" to generate the reasoning or justification in the CER format.

Have students use the following template to write their claim-evidence-reasoning (CER)

3-5 Student Writing Template (editable)
3-5 Student Writing Template (pdf)

**TEACHER NOTE: Have students review the student sample(s) of claim-evidence-reasoning on Day 2. Have students compare their writing to those students' samples. Ask the following questions:

How are your thoughts or understanding similar to another writer on the topic? How are your thoughts or understanding different to another writer on the topic? What would you like to learn more about? Why?

Allow students to test their built magnets by providing the students with paper clips. If the students' magnets work, the paper clips will attract. If the magnet does not work, the paper clips will not attract. If the paper clips do not attract, provide the following guidance: *Why do you believe the paper clips are not being attracted to the magnet you have built? How can you adjust the materials to ensure the paper clips are attracted?* When students successfully build an electromagnet, challenge the students by asking the following: *How can you adjust the electromagnet to pick up more paper clips?* **TEACHER NOTE: The teacher should not provide any additional guidance at this time. The goal is for students to build a functional electromagnet. Even with the guided steps on the board, the students will experience some productive struggle. Allow students to struggle productively. Students should decide the following with their peers: **Students will determine:** how many times to wrap the wire, how tightly to wrap the	*1. Identify the student's claim in the sample and have the teacher or students write their observations or questions.* *2. Identify the student's evidence in the sample and have the teacher or students write their observations or questions.* *3. Identify the student's reasoning in the sample and have the teacher or students write their observations or questions.* Ask the following questions to students as they analyze the student samples: Claim-Evidence-Reasoni… **Teacher Note:** As students review the student samples, they will begin to see or read vocabulary. Begin or continue a reference chart of questions or observations about vocabulary. Students will explicitly learn vocabulary on Day 4.	Complete Week 4 Day 3 assessment prep question.	Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups. and research the other provided vocabulary terms and repeat the modeled instructional strategy. Have students collaborate, in groups, to complete the strategy for the other vocabulary terms. Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.	

wire, and how closely to wrap the wire coils **Assessment Prep Activity:** Following the task, click the link above. Have students practice applying their knowledge to an assessment question. Follow assessment prep protocol. Complete Week 4 Day 1 assessment prep question.				

Week 5 Standards | Phenomenon | Weekly Lessons				
GSE:S5P3b		**Focused Concept:** Observe the interaction between a magnet and a magnetic object		
Learning Targets:	Students will plan and carry out an investigation to observe the interaction between a magnet and a magnetic object on opposite sides of various materials such as wood, paper, glass, metal, and rocks.			
Lab Safety and Materials:	**General Safety Practices for the Elementary Science Classroom- TOC.docx**			
SEP TEACHER TIP: To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Plan and Carry Out Investigations.pdf				
Phenomenon: Phenomenon Card S5P3b		**DQ:** What interactions can be observed between a magnetic field and a magnetic object?		
Day 1: Opening	**Day 2 : Guided Practice/ Transition**	**Day 3: Independent Practice**	**Day 4: Independent Practice**	**Day 5: Assessment / Summary**
Phenomenon Introduction **(5-7 minutes)** **Teachers will** show the following image and video to discuss phenomenon: Phenomenon Card S5P3b Plotting Magnetic Field …	**Introduce the Driving Question:** **(7- 10 minutes)** Have students review the driving question: *What interactions can be observed between a magnetic field and a magnetic object?*	**Graphic Organizer**: **(2-3 minutes to access)** Student Sheet _ GaDOE … **Materials:** magnets (*can be found in ADI kits: Pushing a magnet with a magnet or Magnetic Attraction or found in STEMscopes kit)*	**Text Annotation Strategy** **(25 - 30 minutes)** Have students read and annotate the following text: Magnetic Fields and Pole… The teacher should facilitate the following process.Have the	**Review the Phenomenon** **(5-7 minutes)** Allow students to review the initial observations and questions from see, think, wonder strategy on Day 1. Have students review initial ideas. Ask students: *Have any of*

Ask the student to see, think, and wonder while viewing the above image. Have students record their initial ideas on post-it notes. Keep the post it notes on chart paper in an area students can revisit. Allow students to generate questions and answer as they gather new information.

Inquiry Activity
(20-25 minutes)

How do materials affect …

How do materials affect …

Objective: Students will investigate the effects of magnets on other magnets and the effects of different materials placed between the magnets.

Allow students to plan and carry out an investigation. Review the guided facilitation and teacher notes below to provide support if students struggle with developing a plan.

Guided Facilitation:
If your students need more direction on this lab, use the following procedure.
Have students draw a model of at least three different ways to align the bar magnets close to one another to see how they interact.

Then, have students place each material between the magnets to see if they are

Use the strategy to support students with making connections and understanding the driving question (DQ).

Visualizing the Driving Question

Click here to access question words reference chart

The process can be recorded on chart paper with the students or the teacher can complete the graphic organizer.

Be sure to create a reference for students to have throughout the week.

**TEACHER NOTE: Students should not answer the driving question at this time. Students will need to collect information, data and understanding from the phenomenon strategy, inquiry activity, investigation, text or video protocol and vocabulary strategy to develop a response in the claim-evidence-reasoning format.

(3-5 teachers and students should focus on developing claim, evidence, and reasoning)

Claim-Evidence-Reasoning (CER)
(10- 12 minutes)

Objective: Expose students to claim-evidence-reasoning (CER) student samples below to review and understand their peers' thoughts on the topic, initiating the process of

paper clips
other materials to test magnetic field *(cup of water, paper, glass, wood, cardboard, wooden block, aluminum pan - most materials can be found in fifth grade STEMscopes kit)*

*NOTE** There might be glass jars or glass cups students can use from the school to test the magnetic field*

Investigation Facilitation:
(35 -40 minutes)

GaDOE: Phenomenon Task-Magnetic Fields (modified)

Objective: Have students investigate and test the strength of a magnet's magnetic field through various objects.

Provide the following problem to the students.

Locating the Paper Clips.…

Display on the board and discuss the problem.

Have students complete the accompanying graphic organizer.

Student Sheet _ GaDOE …

Procedure: Students will need to identify a magnet as the tool to use to pick up the paper clips. Have students plan and carry out an investigation to pick up paper clips through various materials.

The students will need to test

students follow the text protocol facilitation directions provided in the following strategy:

3-5 Text Annotation Prot…

Students should complete the following student handout as they work through the text annotation protocol:

3-5 Information Analysis Student Organizer (editable)
3-5 Information Analysis…

During the teacher-led discussion, the teacher should ask the following questions:

How is the way that magnetic poles interact like the way that electric charges interact? What happens if you move a magnet closer to a piece of metal?

**TEACHER NOTE: Read and review the annotation protocol prior to providing this lesson to students. Students will need to be placed in groups or have an understanding of how the groups will change to limit time used for transitioning.

Vocabulary Strategy
(10-15 minutes)

Vocabulary Words:
magnetic field/ force
magnetism
magnetic pole
interact
attraction

your ideas about the phenomenon changed? How?

Have students review their initial questions. Ask students: *What questions generated on Day 1 can you answer, now? What are your answers to the questions?*

Claim-Evidence-Reasoning
(20 - 25 minutes)

Students will write a response to the following driving question in the CER format.

What interactions can be observed between a magnetic field and a magnetic object?

Review the claim-evidence-reasoning poster with the students

**TEACHER NOTE: Provide students with sentence starters by sharing on the board:
K-2 Claim-Evidence-Rea…

3-5 Claim-Evidence-Rea…

Have students write their claim-evidence-reasoning

writing a claim
Have students develop a claim which is their answer to the driving question, claim. Students should use all their knowledge from the phenomenon, inquiry activity, investigation, and information analysis protocol to develop an answer to the question.

writing evidence

still attracted to each other.

Ask students to observe if they can make one magnet move another magnet through a different material.

Have students investigate the disruption of the magnetic field by placing multiple pieces of cardboard or multiple craft sticks between the magnets to see if there is any effect.

**TEACHER NOTE: Students will observe how magnets interact with each other. Then they should observe that only other magnets can affect the magnets' magnetic field.

Students can develop effective methods of planning investigations. When investigating the effects of one object on another, there are multiple ways to align the objects to observe the effects.

Have students think about all the different ways they could test the effect of materials on magnets.

For example, *what effect does placing multiple sheets of cardboard between the two magnets have on the magnetic field? What would happen if they placed a microscope slide or a small rock in between the magnet and magnetic material?*

Students should see that the

developing skills for effective argumentation.

The teacher should state the following to students:

"Claim-Evidence-Reasoning or CER is a way of writing that helps students understand and explain what they learn in science investigations and science ideas."

Review the claim-evidence-reasoning poster with students.

As a class or in student groups, provide students with this week's claim-evidence-reasoning sample.

The teacher will pull students samples from earlier in the unit for peer review. Be sure to hide student names.

The teacher or students should read over student sample(s) to analyze claim-evidence-reasoning protocol. Ask students to use the CER observations chart to complete the following analysis protocol:

Claim-Evidence-Reasoning Record Observations Document (google doc)

Claim-Evidence-Reasoni… (PDF)

1. Identify the student's claim in the sample and have the teacher or students write their observations or questions.

the magnet's strength by putting 10 paper clips on opposite side of the provided materials in the lab sheet.

**TEACHER NOTE: The students should make connections between the thickness of the materials and the magnet's ability to pick up all 10 paper clips.

Have students use the magnet to pick up 10 paper clips prior to the test. This will show the students the magnet's strength. Then, allow students to start testing with the materials in between the magnet and the paper clips.

Thinner materials will allow the magnetic field to travel through to attract a greater amount of paper clips.

Thicker materials will not allow the magnetic field to travel through fully, resulting in a less amount of paper clips being attracted.

Students will need this knowledge to understand the expectation of the standard. The teacher should facilitate student thinking by asking students the following questions:

The teacher should ask students the following guiding questions:

What effect does the material have on the magnetic field? How does the thickness of a material affect the magnetic field?

Vocabulary Terms Chart
Provide students with the graphic organizer (editable) or pdf handout, explaining its sections: word, *What did it look like in the investigation?*, meaning, image/drawing, connection

Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words. The teacher should provide the meaning of the word to the students and ask students to provide examples of how the word was represented during the investigation, phenomenon and/or inquiry activity. In the connection column, students should write how the word connects to concepts or observations they gathered during their classroom tasks. Allow students to work in collaborative groups. Actively monitor and facilitate small group discussions and review various artifacts (pictures, images, primary sources, charts) to build knowledge of the term.

Have students collaborate, in groups, to complete the vocabulary terms chart for the other vocabulary terms.

Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.

Students should provide observational or numerical data as their evidence from their investigation and write a short caption or brief description of the data they provide to support their claim.

writing the reasoning
Students will use textual evidence from the "text annotation graphic organizer" to generate the reasoning or justification in the CER format.

Have students use the following template to write their claim-evidence-reasoning (CER)

3-5 Student Writing Template (editable)
3-5 Student Writing Template (pdf)

**TEACHER NOTE: Have students review the student sample(s) of claim-evidence-reasoning on Day 2. Have students compare their writing to those students' samples. Ask the following questions:

How are your thoughts or understanding similar to another writer on the topic? How are your thoughts or understanding different to another writer on the topic? What would you like to learn more about? Why?

Assessment
(10-15 minutes)

Provide students the following

thicker the material, the more difficult for the magnetic field to have any effect on the magnetic objects or other magnets. Thinner materials will allow the magnetic field/force to have very little effect on attracting or repelling magnetic material.	*2. Identify the student's evidence in the sample and have the teacher or students write their observations or questions.* *3. Identify the student's reasoning in the sample and have the teacher or students write their observations or questions.* Ask the following questions to students as they analyze the student samples: Claim-Evidence-Reasoni… ****Teacher Note:** As students review the student samples, they will begin to see or read vocabulary. Begin or continue a reference chart of questions or observations about vocabulary. Students will explicitly learn vocabulary on Day 4.			assessment: Magnetism_ Quick Chec… Assessment can be accessed through illuminate to administer online to students.

Assessment Prep (5-7 minutes)

Prepare students for assessment by reviewing the following Assessment Prep Presentation.

Objective: Have students make connections between in class tasks and assessment questions to provide an opportunity for students to analyze and interpret the expectations of test and quiz questions and apply knowledge of experience to answering the assessment questions accurately

Facilitation: The teacher will select an assessment question that relates to the concept of the day. Students should only analyze one question each day the *"Assessment Prep Activity"* is provided in the plan. Students should engage in discussion to argue and develop reasoning for answer choices that are both correct and incorrect.

Goal: The goal is to practice the skills of test taking, such as: process of elimination, reasoned assumption, avoiding premature selection, checking for consistency, time management, using context clues, reading questions carefully, etc to build confidence in students as they perform on summative assessments throughout the year.

Use the following:

Electricity_Magnetism Assessment Prep Presentation *(This can be assigned individually to students)*

Provide the following guidance:

Place students in groups and display the assessment question. Complete the following assessment prep protocol:

Ask the students the following questions as they work through the assessment prep protocol.

- *What is the question asking you?*
- *What do you know about the vocabulary or concept in the question?*
- *Is this question similar to any investigations or tasks we've completed?*
- *How can what you've done help you answer this question?*
- *Just view the assessment question: What is the question asking you?*

Guide students to think about how their inquiry task and investigation experience connects to the question.
Using the answer choices provided, students should begin asking themselves and their group members:

- Identify a wrong answer: How do I know this answer is incorrect?
- Identify the right answer: How do we know this answer is correct?

Allow the students time to discuss in collaborative groups.

TEACHER NOTE: If students struggle with the question, review the same question on the very next day. Do not feel the need to rush to the next question to review. Assessment prep is not meant to be a lengthy activity when considering time. Provide students with five - seven minutes to analyze the question and check for understanding.

Labs / Investigations

Mandatory Labs	Explore Learning Gizmo	Pivot Interactives/Phet
What are the types of electricity? **How does electricity flow in circuits?** **How do you test insulators and conductors?** **How can I compare a permanent magnet to an electromagnet?** **How do materials affect magnets?** **Electricity & Magnetism: Whose Field Line Is It Anyway?**	GIZMO Circuit Builder	PhET Simulation: John Travoltage *Balloons & Static Electricity* Circuit Construction PHET

Additional- Resources/Tasks

Supplemental Labs	
Culminating Performance Task	***CER - What is the difference between naturally occurring electricity and human harnessed electricity?*** ***CER - How can I make the lightbulb turn on?*** ***CER - What observations of an investigation can determine if common materials are insulators or conductors?*** ***CER - What is the difference in function and purpose of an electromagnet or a magnet?*** ***CER - What interactions can be observed between a magnetic field and a magnetic object?*** ***CER - How does understanding the relationship between electricity and magnetism help us in our everyday life?***
STEM Activities	