CCPS Science Unit Plan

Grade	2nd	Subject	Science	Unit #	1
Unit Name	Patterns in Day and Night		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. Science Framework Abbreviations .pdf CCPS Department of Science Website for access to all unit frameworks				
Unit Overview	*All resources related to this Framework are embedded in this document or can be located via the Science Department website. **Background Information:** In this unit, the student will describe the physical attributes (size & brightness) of stars. Stars that are farther away appear smaller and dimmer. The Sun is so much closer than other stars, it looks much bigger and brighter. Earth rotates on its axis and revolves around the Sun. The Moon revolves around Earth. Revolution describes the movement around another object (Earth revolves around the Sun, the Moon revolves around the Earth). Second graders will learn that these movements affect our daily lives by creating day and night, our days of the year, our seasons, the availability of light and heat and the appearance of the Sun and Moon in our sky. **Prerequisites:** Kindergarten- Unit 5: Time Patterns and Organisms (SKE1a/b) **Throughout this unit, the student should:** ● *ask questions* to describe the physical attributes (size and brightness) of stars ● *construct an argument to support the claim that* although the sun appears to be the brightest and largest star, it is actually medium in size and brightness ● *plan and carry out an investigation* to determine the effect of the position of the Sun in relation to a fixed object on Earth at various times of the day ● *design and build* a structure that demonstrates how shadows change throughout the day ● *represent data in tables and/or graphs* of the length of the day and night to recognize the change in seasons ● *use data* from personal observations to describe, illustrate, and predict how the appearance of the Moon changes over time in a pattern **Throughout this unit, the teacher should:** ● *ensure* that students will develop the ability to inquire about and describe the physical characteristics of stars ● *help* students build an argument to support their claim ● *assist* students in designing and conducting an investigation to represent the scientific phenomena ● *guide* students in creating a structure that illustrates the scientific concept ● *support* students' with tables and/or graphs to represent data on the length of day and night, helping them understand the seasonal changes Science-2nd-Teacher-Notes.pdf				

Standards

GSE	Science and Engineering Practices	Crosscutting Concepts
S2E1. Obtain, evaluate, and communicate information about stars having different sizes and brightness. a. Ask questions to describe the physical attributes (size and brightness) of stars. b. Construct an argument to support the claim that although the sun appears to be the brightest and the largest star, it is actually medium in size and brightness. **S2E2. Obtain, evaluate, and communicate information to develop an understanding of the patterns of the sun and the moon and the sun's effect on Earth.** a. Plan and carry out an investigation to determine the effect of the position of the sun in relation to a fixed object on Earth at various times of the day . b. Design and build a structure that demonstrates how shadows change throughout the day. c. Represent data in tables and/or graphs of the length of the day and night to recognize the change in seasons. d. Use data from personal observations to describe, illustrate, and predict how the appearance of the moon changes over time in a pattern. (Clarification statement: Students are not required to know the names of the phases of the moon or understand the tilt of the Earth.)	**Asking Questions and Defining Problems** A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works and which can be empirically tested. **Planning and Carrying 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. **Analyzing and Interpreting Data** Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis. **Constructing Explanations and Designing Solutions** The products of science are explanations and the products of engineering are solutions. **Developing and Using Models** A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations.	**Patterns** Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. **Cause and Effect** Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. **Scale, Proportion, and Quantity** In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. **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. **Stability and Change** For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand

NGSS Alignment	NGSS Alignment to Disciplinary Core Ideas

The Phenomenon Protocol

Anchoring Phenomena	Learning Targets
S2E1.a.	Students will ask questions to describe the physical attributes (size and brightness) of stars.
S2E1.b.	Students will construct an argument to support the claim that although the Sun appears to be the brightest and largest star, it is actually medium in size and brightness.
S2E2.a.	Students will plan and carry out an investigation to determine the effect of the positioning of the Sun in relation to a fixed object on Earth at various times of the day.
S2E2.b.	Students will design and build a structure that demonstrates how shadows change throughout
S2E2.c.	Students will represent data in tables and or graphs of the length of the day and night to recognize the change in seasons.
S2E2.d.	Students will use data from personal observations to describe, illustrate, and predict how the appearance of the Moon changes over time in a pattern.

Weekly Lesson Tasks

Navigation: Week 1 | Week 2 | Week 3 | Week 4| Week 5 | Week 6| Return to top | Additional Resources

Week 1

Standards| Phenomenon | Weekly Lessons

GSE: S2E1.a.	**Focused Concept:** Ask questions to describe the physical attributes (size and brightness) of stars.
Learning Target:	The students will ask questions to describe the physical attributes (size and brightness) of stars.
Lab Safety and Materials:	General Safety Practices for the Elementary Science Classroom- TOC.docx.pdf

SEP Teacher Tip: (Day 1 and 3)
To support students with the science and engineering practices for this week, follow the guidance in this protocol: Ask Questions and Define Problems.pdf

Phenomenon: Stars in the Night Sky	**DQ:** What are some similarities and differences among the stars?

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)** Show students the phenomenon	**Introduce the Driving Question:** **(7-10 minutes)**	**Review the Driving Question:** **(1-2 minutes)**	**Text Annotation Strategy** **(30-45 minutes)** Have students read and	**Review the Phenomenon** **(5-7 minutes)**

card : Stars in the Night Sky and view video

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.

Inquiry Activity
(10-15 minutes)

Stars at Night Activity

Have students follow the procedures laid out in the following activity:
Stars at Night: Teacher Notes

The teacher should record the observations of the students throughout the activity on chart paper.

Objective: Students will model a star in the night sky and the day sky. Students will generate questions based on their observations or gathered information from the investigation.

Have students follow the procedure provided in the lab.

**TEACHER NOTE:
Teacher should follow the facilitation notes below:
Stars at Night Teacher Notes

Materials

Have students review the driving question:

What are some similarities and differences among the stars?

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.

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.

What are some similarities and differences among the stars?

Graphic Organizer and Materials
(2-3 minutes)

Students will need and will use the student lab sheet for **Savvas Lesson 1 p.237 uInvestigate Lab:** "How are distance and brightness related?

Materials
flashlight
construction paper
metric ruler

Investigation Facilitation
(35-40 minutes)

Objective: Students will investigate the relationship between the distance from a light source and the brightness of the light. Students will generate questions based on their observations or gathered information from the investigation.

Have students follow the procedure provided in the lab.

Students will need to work in partner pairs. The teacher should assign partners prior to the beginning of the lesson.

TEACHER NOTE: In this lab, teacher should follow the facilitation notes and student procedures in the following link: **Teacher (Student)

annotate the following text:
Star Size and Brightness Text

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

K-2 Text Annotation Protocol

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

K-2 Text Annotation Student Document (editable)

Text Annotation Student Document

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

Why does the Sun look like a big ball of fire? (The Sun looks like a big ball of fire because it is very close to Earth compared to other stars..)

Why can't we see other stars during the day? (The Sun is too bright and the other stars are very far away.)

**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

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
(15-25 minutes)
Students will write a response to the following driving question in the CER format.

What are some similarities and differences among the stars?

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-Reasoning Sentence Starters

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

same sized flashlights different sized flashlights	**Claim-Evidence-Reasoning (CER) (10-12 minutes)** 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. Student Sample 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-Reasoning Record Observation Document 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*	**Facilitation Notes** *Ask students:* *How did the brightness of the light change as you moved further away from the light source?* *Why do you think the brightness of the light decreases as the distance from the source increases?*	**(10-15 minutes)** **Vocabulary** attribute brightness sky star observation **Four Square** Provide students with the graphic organizer (editable) or pdf handout, explaining its four sections: word, meaning, picture, and sentence. Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words. 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 to complete the four square strategy for the other vocabulary terms. Monitor student progress, sharing new ideas for class discussion, and help students distinguish essential from non-essential characteristics. Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.	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) K-2 Student Writing Template (editable) K-2 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)**

	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-Reasoning Questions ****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.			Have students complete the following assessment. Week I Assessment Week 1 Assessment PDF

Week 2

Standards | Phenomenon | Weekly Lessons

GSE: S2E1.b.	**Focused Concept:** Students will construct an argument to support the claim that although the Sun appears to be the brightest and largest star, it is actually medium in size and brightest.
Learning Target:	The students will construct an argument to support the claim that although the Sun appears to be the brightest and largest star, it is actually medium in size and brightest.
Lab Safety and Materials:	General Safety Practices for the Elementary Science Classroom- TOC.docx.pdf

SEP Teacher Tip: (Day 1 and 3)
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: The Sun	**DQ:** Is the sun the brightest star?

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) Show students the phenomenon	**Introduce the Guiding Question: (7-10 minutes)**	**Review the Driving Question: (1-2 minutes)** *Is the sun the brightest star?*	**Text Annotation Strategy (30-45 minutes)**	**Review the Phenomenon (5-7 minutes)**

card : The Sun and view video

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.

Inquiry Activity
(10-15 minutes)

Star Appearance

Have students follow the procedures laid out in the following activity:
Star Appearance Teacher Facilitation and Student Procedures

Star Appearance Data Sheet

The teacher should record the observations of the students throughout the activity on chart paper.

Objective: Students will construct an argument to support the claim that the perceived size of objects changes with distance, simulating how stars, including the Sun, appear from Earth.

**TEACHER NOTE: Teacher will assist students in using a tape measure to measure the distance. This lab should be on a flat smooth surface, which

Is the sun the brightest star?

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.

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

The teacher should state the following to students:

Graphic Organizer and Materials (2-3 minutes)

Students will need and will use the student lab sheet provided in their consumable book or access to the student handout.
How large and bright is t…
How large and bright is t…

Investigation Facilitation
(25-30 minutes)

How large and bright is the sun?

Objective: Students will model the sun to compare its size and brightness with other stars.

Students will need to work in partner pairs. The teacher should assign partners prior to the beginning of the lesson.

Assist students with developing a plan using the following guidance on this lab.

1. Shine each flashlight so you can see how they look when they are close. This models the sun, which is close to Earth.

2. Shine each flashlight from the other side of the room to see how they look. This models other stars, which are far away from Earth.

3. Determine whether you can know how the sun compares with other stars just by looking. Research to find how the sun compares with other stars in

Have students read and annotate the following text:
The Sun

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

K-2 Annotation Protocol

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

K-2 Text Annotation Student Document (editable)

Text Annotation Student Document PDF

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

Why can't we see other stars during the day?

(This question helps students recall the concept of the Sun's brightness outshining other stars.)

How many Earths could fit inside the Sun?

(This question focuses on the comparison of sizes, helping students understand the vast difference between Earth and the Sun.)
**TEACHER NOTE: Read and review the annotation protocol prior to providing this lesson to students. Students will need to

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
(15-25 minutes)
Students will write a response to the following driving question in the CER format.

Is the sun the brightest star?

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-Reasoning Sentence Starters

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

will require the activity to be completed in the hallway if carpet is in the classroom. Teacher should also ensure that students understand the concept of perspective and relative size by observing different balls from various positions.

Materials
1 Golf Ball
1 Tennis Ball
1 Basketball
1 Tape Measure
Tape
Marker

"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.

Student Sample

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-Reasoning Record Observation Document 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

brightness and size.

**TEACHER NOTE:
Teacher Notes: Guide Students Constructing an Argument)

Guide students to see that developing and using a model allows them to make observations, form explanations, and use the evidence and their explanations to back up their arguments they make.

Students will learn that the sun is moderate in size and brightness compared to other stars, but it is a lot closer, which is why we see more of its light.

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
attributes
star
brightness
size

Four Square
Provide students with the graphic organizer (editable) or pdf handout, explaining its four sections: word, meaning, picture, and sentence.

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

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 to complete the four square strategy for the other vocabulary terms.

Monitor student progress, sharing new ideas for class discussion, and help students distinguish essential from non-essential characteristics.

Allow groups to share their thinking through academic

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)
K-2 Student Writing Template (editable)
K-2 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 the teacher or students write their observations or questions. Ask the following questions to students as they analyze the student samples: Claim-Evidence-Reasoning Questions **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.		dialogue and compare their completed task with members of other groups.	Students will complete this week's CER for the assessment.

Week 3

Standards | Phenomenon | Weekly Lessons

GSE: S2E2.a.	**Focused Concept:** Students will plan and carry out an investigation to determine the effect of the positioning of the Sun in relation to a fixed object on Earth at various times of the day.
Learning Target:	The student will plan and carry out an investigation to determine the effect of the positioning of the Sun in relation to a fixed object on Earth at various times of the day.
Lab Safety and Materials:	General Safety Practices for the Elementary Science Classroom- TOC.docx.pdf

SEP Teacher Tip: (Day 1 and 3)
To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Plan and Carry Out Investigations.pdf

Phenomenon: Sunlight on the National Mall	**DQ:** What happens to shadows throughout the day?

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)	**Introduce the Guiding Question: (7-10 minutes)**	**Review the Driving Question: (1-2 minutes)**	**Text Annotation Strategy (30-45 minutes)**	**Review the Phenomenon (5-7 minutes)**

Show students the phenomenon card : **Sunlight on the National Mall** and **show slides on website** 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. **Inquiry Activity** **(10-15 minutes)** **GaDoe Inspire** **Objective:** Students will discover what happens when sunlight shines on an object. Students will need to work in small groups (five total groups). The teacher should assign these groups prior to the beginning of the lesson. Teacher should print and laminate each picture. Each group should receive one picture to observe and discuss. Have students follow the procedures laid out in the following activity: Shadows on Fixed Objects Students will use the pictures in the link above to plan and carry out an investigation to determine the effect of the positioning of the Sun in relation to a fixed object on Earth at various times of the day.	*What happens to shadows throughout the day?* 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. **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. **Claim-Evidence-Reasoning (CER) (10-12 minutes)**	*What happens to shadows throughout the day?* **Graphic Organizer and Materials (2-3 minutes)** Students will need and will use the student lab sheet provided in their consumable book or access to the student handout. Chalk Tracing **Materials** chalk fixed objects (flagpole, bench, or other structure on concrete) chalk tracing data sheet **Investigation Facilitation** **(35-40 minutes)** **Chalk Tracing** **Objective:** Students will observe and record how the shadow of a fixed object changes in size and shape throughout the day. Students will need to work in partner pairs. The teacher should assign partners prior to the beginning of the lesson. **Teacher Note:** Assist students with developing a plan using the following guidance on this lab. 1. Teacher should take the students outside to select a fixed object on the school grounds, such as a flagpole or bench, that casts a clear shadow. (If not permissible use pictures for students to observe)	Have students read and annotate the following text: Shadows The teacher should facilitate the following process.Have the students follow the text protocol facilitation directions provided in the following strategy: K-2 Annotation Protocol Students should complete the following student handout as they work through the text annotation protocol: K-2 Text Annotation Student Document (editable) Text Annotation Student Document PDF During the teacher-led discussion, the teacher should ask the following questions: *How is the position of the sun important?* *How does the sun appear to move across the sky?* **Vocabulary Strategy** **(10-15 minutes)** **Vocabulary** Shadow fixed objects **Four Square** Provide students with the graphic organizer (editable) or pdf handout, explaining its four sections: word, meaning, picture, and sentence.	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** **(15-25 minutes)** Students will write a response to the following driving question in the CER format. *What happens to shadows throughout the day?* 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-Reasoning Sentence Starters 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,

1. Teacher should distribute pictures to each group. Students will observe each photo and discuss their observations in assigned groups. *Teacher should ask students:* *What is making the dark shape on the ground?* *Can you tell which object formed each shadow?* 2. Students will respond to the above questions by drawing pictures or writing sentences on notebook paper explaining their conclusions. 3. Each group should present their findings and conclusions to the class. 4. Discuss as a class why shadows change shape and size throughout the day, linking it to the movement of the Sun across the sky. Teacher should Summarize the activity by explaining the concept of how the position of the Sun affects shadows. **TEACHER NOTE: In this lab, the teacher should provide support and guidance as students observe, record, and discuss their findings. Teacher should summarize the activity by explaining the scientific concepts related to the investigation. **Materials:** Pictures from"Shadows on fixed objects" link	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. Student Sample 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-Reasoning Record Observation Document 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.*	2. At the first designated time (morning), have students use chalk to trace the outline of the object's shadow on the concrete. Label the shadow with the time of day. 3. Have students observe and record the shape and size of the shadow on their chalk data sheets in the space under the time. They can draw a picture of the traced shadow and write down the time. 4. Repeat the shadow tracing at least two more times throughout the day (noon and afternoon).Ensure students label each traced shadow with the corresponding time of day. 5. After the final observation, bring the students back to the classroom to compare the different traced shadows. Discuss as a group how the shadow's shape and size changed at different times of the day. *Ask Students:* *What happened to the shadow as the day went on?* *Why do you think the shadow changed size and shape?* *What can you conclude about the position of the Sun and the shadows it creates?*	Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words. 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 to complete the four square strategy for the other vocabulary terms. Monitor student progress, sharing new ideas for class discussion, and help students distinguish essential from non-essential characteristics. Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.	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) K-2 Student Writing Template (editable) K-2 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**

paper Pencils	*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-Reasoning Questions ****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			**(10-15 minutes)** Open-Ended Question

Week 4

Standards | Phenomenon | Weekly Lessons

GSE: S2E2b	**Focused Concept:** Design and build a structure that demonstrates how shadows change throughout the day
Learning Target:	The student will design and build a structure that demonstrates how shadows change throughout the day.
Lab Safety and Materials:	General Safety Practices for the Elementary Science Classroom- TOC.docx.pdf

SEP Teacher Tip: (Day 1 and 3)
To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Develop and Use Models.pdf

Phenomenon: Shadow Patterns	**DQ:** *How can we use a model to figure out what caused the stick's shadow pattern?*

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)	**Introduce the Guiding Question: (7-10 minutes)**	**Review the Driving Question: (1-2 minutes)**	**Text Annotation Strategy (30-45 minutes)**	**Review the Phenomenon (5-7 minutes)**

Show students the phenomenon card : Shadow Patterns and view video 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. **Inquiry Activity** **(10-15 minutes)** **GaDoe Inspire** **Shadow Tag** **Objective:** Students will explore how shadows change throughout the day Have students follow the procedures laid out in the following activity: **Shadow Tag** **Morning Observation** 1. Take students outside in the morning (around 9 AM). Have them stand in a fixed spot and use chalk or to mark the tip of their shadows. *2.. Ask students to note*: The length of their shadow. The direction their shadow is facing. Play a few rounds of shadow tag, noting how easy or difficult it is to catch a friend's shadow. Have students record	*How can we use a model to figure out what caused the stick's shadow pattern?* 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. **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. **Claim-Evidence-Reasoning (CER) (10-12 minutes)**	*How can we use a model to figure out what caused the stick's shadow pattern?* **Graphic Organizer and Materials (2-3 minutes)** Students will need and will use the student lab sheet provided in their consumable book or the access to the student handout. Shadow Structure **Materials** linking cubes building blocks wooden craft sticks clay other objects suitable for building structures flashlights **Investigation Facilitation** **(35-40 minutes)** **Shadow Structure** **Objective:** Students will design a structure to demonstrate how shadows change throughout the day. ****Teacher Note:** Remind students about the previous activity where they observed shadows of a fixed object outside. Explain that today they will build their own structures and explore how shadows change with different light sources. Teacher should facilitate the activity and guide students through the process of planning, building, and testing their structures.	Have students read and annotate the following text: Changing Shadows The teacher should facilitate the following process.Have the students follow the text protocol facilitation directions provided in the following strategy: K-2 Annotation Protocol Students should complete the following student handout as they work through the text annotation protocol: K-2 Text Annotation Student Document (editable) Text Annotation Student Document PDF During the teacher-led discussion, the teacher should ask the following questions: *What causes your shadow to appear?* *How does your shadow look different in the morning compared to at noon?* *Why does your shadow change direction in the afternoon?* **Vocabulary Strategy** **(10-15 minutes)** **Vocabulary** **rotate** **diagram** **Four Square** Provide students with the graphic organizer (editable) or pdf handout, explaining its four sections: word, meaning,	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** **(15-25 minutes)** Students will write a response to the following driving question in the CER format. *How can we use a model to figure out what caused the stick's shadow pattern?* 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-Reasoning Sentence Starters 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

observations on paper. **Noon Observation (can be conducted during recess)** Go outside again at noon. Repeat the process of marking, measuring, and drawing shadows. Play shadow tag again and compare the ease of catching shadows to the morning session. Record observations on paper. **Afternoon Observation (If time permits, this observation could be conducted before dismissal or the following day in the afternoon-just be sure to have pictures for students to observe from the prior lab)** Go outside in the afternoon (before dismissal). Repeat the shadow marking, measuring, and drawing. Play shadow tag and observe any differences from the previous sessions. Students should record observations in their science notebooks. *Ask Students:* *How did the length and direction of shadows change throughout the day? Why did this happen?* **TEACHER NOTE: Teacher should guide students to understand that shadows are	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. Student Sample 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-Reasoning Record Observation Document 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*	Assist students with developing a plan using the following guidance on this lab. 1. In small groups, have students plan their structures using their science journals or handouts. Encourage them to think about how tall and complex they want their structures to be. 2. Provide each group with building materials (linking cubes, building blocks, wooden craft sticks, clay, etc.). Have students build a tall structure that can cast a shadow. 3. Darken the room and provide each group with a flashlight. Instruct students to use the flashlight to simulate the Sun by moving it around and above their structure. 4. Have students observe and record how the shadow changes in size and shape as the position of the light source changes. 5. Take the students and their structures outside. Have students place their structures in direct sunlight and observe the shadows at different times of the day, if possible. Encourage students to record their observations on paper or on the "Shadow Structure" data sheet. *Ask Students:* *What do you notice about the shape and size of the shadow when you move the flashlight to different positions around your*	picture, and sentence. Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words. 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 to complete the four square strategy for the other vocabulary terms. Monitor student progress, sharing new ideas for class discussion, and help students distinguish essential from non-essential characteristics. Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.	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) K-2 Student Writing Template (editable) K-2 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?*

longer in the morning and afternoon and shortest at noon because of the sun's position in the sky. **Materials:** open outdoor space with ample sunlight chalk to mark positions notebook paper and pencils for observations Camera (optional-teacher only) to take pictures of shadows at different times	*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-Reasoning Questions **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	*structure?* *Why do you think the shadow changes when the flashlight is moved higher or lower?* *How do the shadows you created indoors with the flashlight compare to the shadows you saw outside in the sunlight?*		**Assessment for Learning** **(10-15 minutes)** Students will complete this week's CER for the assessment.

Week 5

Standards | Phenomenon | Weekly Lessons

GSE: S2E2c	**Focused Concept:** Represent data in tables and or graphs of the length of the day and night to recognize the change in seasons.
Learning Target:	The student will represent data in tables and or graphs of the length of the day and night to recognize the change in seasons.
Lab Safety:	General Safety Practices for the Elementary Science Classroom- TOC.docx.pdf

SEP Teacher Tip: (Day 1 and 3)
To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Analyze and Interpret Data.pdf

Phenomenon: Why is it dark sometimes when I get to school?	**DQ:** *How can data from the length of day help us recognize changes in the seasons?*

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)** Show students the phenomenon card : Why is it dark sometimes when I get to school? and data	**Introduce the Guiding Question:** **(7-10 minutes)** *How can data from the length of*	**Review the Driving Question:** **(1-2 minutes)** *How can data from the length of day help us recognize changes in the seasons?*	**Text Annotation Strategy** **(30-45 minutes)** Have students read and annotate the following text:	**Review the Phenomenon** **(5-7 minutes)** Allow students to review the initial observations and

on website

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.

Inquiry Activity
(10-15 minutes)

What to Wear PDF

What to Wear (Edit)

Objective: Students will examine different types of clothing and determine which season each item is appropriate for and explain their reasoning. They will also collect and represent data on the length of day and night in tables and/or graphs to recognize and understand the changes in seasons.

****Teacher Note:**
Students will need to be divided into four groups prior to activity.

Have students follow the procedures laid out in the following activity:

1. Gather students in a circle and discuss how they decided what to wear to school today.

2. Talk about how the weather influences clothing choices and

day help us recognize changes in the seasons?

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.

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.

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

Graphic Organizer and Materials ,
(2-3 minutes)

Students will need and will use the student lab sheet provided in their consumable book or access to the student handout.
How does the sun cause seasons? PDF

How does the sun cause seasons? Edit

Materials:
balloon
marker
flashlight

Investigation Facilitation
(35-40 minutes)

How does the sun cause seasons?

Objective: Students will model the changing seasons by representing data in tables and graphs, specifically observing and analyzing the variations in day and night lengths throughout the year.

****Teacher Note:**
Students will need to work in partner pairs. The teacher should assign partners prior to the beginning of the lesson.

Assist students with developing a plan using the following guidance on this lab.

1. Blow into the balloon to make a model Earth. Mark

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

K-2 Annotation Protocol

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

K-2 Text Annotation Student Document (editable)

Text Annotation Student Document PDF

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

Ask Students:

What causes the length of days and nights to change?

Why do we do different things at different times?

Vocabulary Strategy
(10-15 minutes)
Vocabulary

seasons

Four Square
Provide students with the graphic organizer (editable) or pdf handout, explaining its four sections: word, meaning, picture, and sentence.

Use a Think Aloud to

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
(15-25 minutes)

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

How can data from the length of day help us recognize changes in the seasons?

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-Reasoning Sentence Starters

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

how it changes throughout the year. Explain that students will solve a problem related to seasonal clothing.

3. Place season-specific clothes into four separate piles (spring, summer, fall, winter). Divide students into four groups and assign each group a clothing pile.

4. Have students discuss within their groups when and why they would wear each type of clothing. Bring the groups together to share their observations about each clothing pile, including temperature discussions.

5. Students should record their knowledge of seasonal weather and appropriate clothing on the Student Data Sheet

Materials:
Student data sheet
(Variation of clothing) Fall clothes pile: long pants, long-sleeve shirts, light jackets

Spring clothes pile: shorts, short-sleeve shirts, umbrellas, raincoats

Winter clothes pile: sweaters, long pants, heavy jackets, hats, gloves, scarves

Summer clothes pile: shorts, bathing suits, tank tops, sunglasses

Season labels: written on sentence strips or index cards (spring, fall, summer, winter)

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-Reasoning Record Observation Document 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

several spots on the balloon with letters A,B, & C

2. Use a light source, such as a lamp without a shade, or a flashlight to model the sun, and turn off overhead lights.

3. Stand about 60cm away from the light source.

4. Observe how the amount of light that strikes each letter changes as you spin the balloon while walking slowly around the light source.

5. Tilt the balloon toward the sun and spin the balloon again. Again observe how the amount of light on each letter changes as you slowly walk around the light.

6. Tilt the balloon more and spin the balloon again. Again observe how the amount of light on each letter changes as you slowly move around the light.

Ask Students:

What happens to the light on the letters (A, B, and C) when you spin the balloon while walking around the light source?

How does tilting the balloon toward the light source change the amount of light on each letter?

What do you notice about the amount of light on each letter when you tilt the balloon more and spin it again while moving around the light source?

demonstrate how to use the graphic organizer with one of the provided vocabulary words. 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 to complete the four square strategy for the other vocabulary terms.

Monitor student progress, sharing new ideas for class discussion, and help students distinguish essential from non-essential characteristics.

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

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)
K-2 Student Writing Template (editable)
K-2 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)

	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-Reasoning Questions ****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			Seasons and Changes

Week 6

Standards | Phenomenon | Weekly Lessons

GSE: S2E2	**Focused Concept:** Students will use data from personal observations to describe, illustrate, and predict how the appearance of the Moon changes over time in a pattern.
Learning Target:	The student will use data from personal observations to describe, illustrate, and predict how the appearance of the Moon changes over time in a pattern.
Lab Safety:	General Safety Practices for the Elementary Science Classroom- TOC.docx.pdf

SEP Teacher Tip: (Day 1 and 3)
To support students with the Science & Engineering Practices for this week, follow the guidance in this protocol: Analyze and Interpret Data.pdf

Phenomenon: The moon appears to change shape each night.	**DQ:** *Can I describe and predict how the moon changes over time?*

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)	**Introduce the Guiding Question:**	**Review the Driving Question: (1-2 minutes)**	**Text Annotation Strategy (30-45 minutes)**	**Review the Phenomenon (5-7 minutes)**

Show students the phenomenon card : The moon appears to change shape each night. and view video

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.

Inquiry Activity
(10-15 minutes)

Moon Observation
Moon Cards PDF
Objective: Students will use data from observations to make predictions about how the moon changes over time.

****Teacher Note:**
Teacher should print and distribute the student data sheet to each student. Teacher should print and cut out the moon phase cards (there is only one page linked-you will need to make multiple copies of the moon phase cards), placing each set in a zippered plastic bag along with a nickel. There are two sets of moon phase cards per page.

Have students follow the procedures laid out in the following activity:

(7-10 minutes)

Can I describe and predict how the moon changes over time?

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.

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.
Claim-Evidence-Reasoning (CER)

Can I describe and predict how the moon changes over time?

Graphic Organizer and Materials
(2-3 minutes)

Students will need and will use the student lab sheet provided in their consumable book or access to the student handout.
Moon Cookies PDF
Moon Cookies Edit
Moon Phases

Materials:
chocolate cream cookies (4 per student)
popsicle sticks
moon phase cards (optional)
paper plates or paper towels
moon journal calendar

Investigation Facilitation
(35-40 minutes)

Objective: Students will use chocolate cream cookies to model and explore the pattern of moon phases. They will utilize data from their personal observations to describe, illustrate, and predict how the appearance of the Moon changes over time in a consistent pattern.

****Teacher Note:** Before the lab, the teacher should briefly review the moon phases with the students using the moon journal calendar linked here Moon Journal Calendar. The teacher should ask students to share what the moon looked like last night and locate that phase

Have students read and annotate the following text:
The Moon

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

K-2 Annotation Protocol

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

K-2 Text Annotation Student Document (editable)

Text Annotation Student Document PDF

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

Ask Students:
Why does the Moon sometimes look different, like a circle or curved?

What makes the Moon look bright in the sky at night?

How long does it take for the Moon to go through all its phases and start the cycle again?
Vocabulary Strategy
(10-15 minutes)
Vocabulary
phases
orbit
pattern

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
(15-25 minutes)

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

Can I describe and predict how the moon changes over time?

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-Reasoning Sentence Starters

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

1.. Students open their bags and review the Moon Phase Cards with their group. 2. Students arrange the cards in the correct order. Some cards are numbered, others are not. 3. While working, students number the moon circles on their Student data sheet from 1 to 8. 4. Teacher will check the groups' work, then have them draw each moon phase in order on their student data sheets. **Materials:** 1 student data sheet (per student), 1 set of moon phase cards (per group), 1 Zippered plastic bag (per group), 1 Nickel (per group)	**(10-12 minutes)** 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-Reasoning Record Observation Document 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*	on the calendar. Assist students with collecting data from observations, using guidance on this lab. 1. Give each student 4 chocolate cream cookies and a popsicle stick. Demonstrate how to carefully twist apart the cookies, showing the cream as the lit part of the moon. 2. Using the popsicle stick, students will shape the cream to replicate the different moon phases. 3. Students will place their cookies on a paper plate or paper towel in the correct sequence of moon phases. Encourage students to discuss with a partner the order of the phases and to identify the moon phase they observed last night. 4. Students will show their moon phase cookies to their partner and ask them to identify which moon phase would come next. Partners will take turns doing this, reinforcing their understanding of the moon phase sequence. 5. Students will draw their moon phase cookies on their graphic organizers. After drawing, students will discuss with their partners the patterns they observed. 6. Teacher should show the students a moon phase cookie and ask them to draw the next phase on their graphic	**Four Square** Provide students with the graphic organizer (editable) or pdf handout, explaining its four sections: word, meaning, picture, and sentence. Use a Think Aloud to demonstrate how to use the graphic organizer with one of the provided vocabulary words. 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 to complete the four square strategy for the other vocabulary terms. Monitor student progress, sharing new ideas for class discussion, and help students distinguish essential from non-essential characteristics. Allow groups to share their thinking through academic dialogue and compare their completed task with members of other groups.	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) K-2 Student Writing Template (editable) K-2 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?*

	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-Reasoning Questions ****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	organizer. Present a plate of moon phase cookies with an intentional error in the sequence. Ask students to identify the error and draw the correct sequence on their graphic organizer. *Ask Students:* *What did the moon look like last night? Can you find the cookie that matches that phase?* *Look at this plate of moon phase cookies. Can you find the mistake in the sequence and tell me what the correct order should be?*		**Assessment for Learning (10-15 minutes)** Students will complete this week's CER for the assessment.

Labs / Investigations

Mandatory Labs	Explore Learning Science 4 Us	Mystery Science/Phet
How are distance and brightness related? **How large and bright is the sun?** **Chalk Tracing** **Shadow Structure** **How does the sun cause seasons?** **Moon Cookies**	**Science 4 Us Earth in Space Module**	

Additional- Resources/Tasks

Supplemental	Science 4 Us Earth in Space Module

Labs	
Culminating Performance Task	Is the sun the brightest star? CER Task How can we use a model to figure out what caused the stick's shadow pattern? CER Task Can I describe and predict how the moon changes over time? CER Task
STEM Activities	GaDOE Moon Gazing Party
Guidance Document	Link the following : https://drive.google.com/file/d/1dDFitw1NesctodMZ9XAr7zc0-S5GZKPB/view?usp=drive_link