Curriculum Context—What is the content/topic for the unit?

This short focused research project will be a component of a unit about the moon.

Next Generation Science Standards:

1-ESS1 Earth's Place in the Universe

Students who demonstrate understanding can:

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.

[Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]

Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

• Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

• Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

Disciplinary Core Ideas

ESS1.A: The Universe and its Stars

• Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)

Patterns

• Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
- Many events are repeated. (1-ESS1-1)

Common Core State Standards:

Include at least one writing standard, one reading standard, one speaking and listening standard, and one language standard. Although multiple standards will be addressed, which standards will be taught and assessed?

First Grade:

<u>Reading Standards for Informational Text K–5</u> Key Ideas and Details: 3. Describe the connection between two individuals, events, ideas, or pieces of information in a text. Writing Standards K-5 Text Types and Purposes: Research to Build and Present Knowledge: 7. Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). 8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. Language Standards K-5 Vocabulary Acquisition and Use: 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 1 *reading and content*, choosing flexibly from an array of strategies. a. Use sentence-level context as a clue to the meaning of a word or phrase. Speaking and Listening Standards K–5 **Comprehension and Collaboration:** 1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. c. Ask questions to clear up any confusion about the topics and texts under discussion.

Presentation of Knowledge and Ideas:

5. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings. 21st Century Skills: Please refer to the Partnership for 21st Century Skills or the end of the template for examples (www.p21.org/overview/skills-framework).

Communication and Collaboration Communicate Clearly

• Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts

Enduring Understanding: Patterns in the appearance of the moon in the sky can be observed, described, and predicted. **Research Ouestion:** *The research* Sub-Questions: What sequence of questions will help question is the enduring understanding in students answer the research question? the form of a question. How will the research question be generated (teacher or student)? What does a new moon look like? What does a crescent moon look like? When you look at the moon, how does the shape What does a quarter moon look like? seem to change over time? What does a gibbous moon look like? What does a full moon look like? What patterns do you see in the appearance of the moon over time?

Learning Intentions				
Students will know What vocabulary is essential for demonstrating an understanding of the	Students will understand that What is the conceptual understanding that is the focus of this research project?	Students will be able to		
<i>concept?</i> the names of the different phases of the moon (e.g., new, crescent, half, gibbous, full).	the appearance of the moon changes over time in a predictable pattern.	 observe and describe the changes in the moon over time. predict the shape of the moon in a given time period (e.g., draw what you think the moon will look like over the next four days). 		

Assessment Evidence		
Formative Assessment Practices:	Summative Assessment/ Performance Task:	
Pre-assessment: Moon ProbeThink about how the moon seems to change over time. Draw a picture in you science notebook to show how the moon changes. Discuss ideas at a class scientists meeting. (1-ESS1-1) Science Notebook—Draw observations of the moon and describe observations. Discuss. (1-ESS1-2, SL 5, W7)	Revisit <u>Papa Please Get Me the Moon</u> at the end of the project. Prompt students to respond to the following question: It mentions in the book that, "the moon got smaller and smaller and finally disappeared altogether." Think about what you have learned about the moon and tell me if you agree or disagree with the story and why? Remember we need to provide evidence from our notes to support our answer. (1-ESS1-1, W8, SL 1)	
Teacher observation of student participation in shared research, class discussions, and writing. (SL 1, W 7 & 8) Reread chunks of text from Phases of the Moon and Faces of the Moon that describe the same phase. Have students draw the phase. Check drawings against picture in the text and revise if necessary. (1-ESS1-1 1-ESS1-2, RI 3, L 4)	Sequence phases of the moon. Give students a long strip of paper, their moon notes, a glue stick, scissors and two printed strips listing the names of the phases of the moon. Have students independently put the moon phases in order and paste the name of each phase underneath. (1-ESS1-1)	
Revisit vocabulary at other times in the day. (L 4)		

Texts/Resources/Materials:

Books:

Carle, Eric. (1986). *Papa, please get the moon for me.* New York, NY: Scholastic. Crelin, Bob. (2009). *Faces of the moon.* Watertown, MA: Charlesbridge Publishing. Delta Science Readers. (2003). *Finding the moon.* Nashua, NH: Delta Education. Fowler, Allan. (1991). *So that's how the moon changes shape!* Danbury, CT: Children's Press. Olson, Gillia M. (2007). *Phases of the moon.* Mankato, Minnesota: Capstone Press.

Online Moon Resources:

Daytime Moon Calendar: <u>https://planetariumweb.madison.k12.wi.us/mooncal/daym0912</u> Live Moon Pro version 2.0 iPad App. Moon PreviewAp

Phases of the Moon Charts: <u>http://aa.usno.navy.mil/faq/docs/moon_phases.php</u>

Phases of the Moon Monthly Charts:

http://sciencenetlinks.com/interactives/moon/moon_worksheet/moon_worksheet.html

Google Earth (the Moon): www.google.com/earth/index.html

Observing the Moon Recording Sheet:

https://planetariumweb.madison.k12.wi.us/files/planetarium/observing_the_moon.pdf

Text Complexity Resources:

Qualitative Rubric for Informational Text:

http://programs.ccsso.org/projects/common%20core%20resources/documents/Informational%20Text%20Qualitative%20Rubric.pdf Qualitative Rubric for Literary Text:

http://programs.ccsso.org/projects/common%20core%20resources/documents/Literary%20Text%20Qualitative%20Rubric.pdf

Text Dependent Questions Resource:

Student Achievement Partners: www.achievethecore.org/

Word Wizard/Winner: <u>www.keshequa.org/webpages/dtuck/word.cfm</u> See below for additional information.

Instructional Process:

How will reading, writing, speaking and listening, and language be incorporated throughout the short focused research project?

Questions to consider as you develop an instructional plan:

- When and how will students work together?
- How will I help the students reflect on the significance of the information?
- How will the information be communicated to others (e.g., short research paper, blog, oral presentation)?

How will learners be engaged in the content and skills?

Let students know that they are going to study the moon and people who study the moon are called astronomers. They will be working like astronomers and observing the moon over time. They will also be reading a number of books about the moon.

Science Moon Bag: Children will take turns bringing home a Science Notebook along with <u>*Finding the Moon*</u> and <u>*Papa, Please Get the Moon for Me.*</u> Multiple bags could be made so that a number of children are involved in this activity at the same time.

Note to Parents: We are studying the moon in school and need your help. Please take some time to read these books and then go outside to observe the moon. Children should draw their observation of the moon and record the date and time in the science notebook. The bag should be returned to school the following day.

Notes: To supplement nighttime observations, we looked at the "Live Moon" (see resources) feed daily and

recorded our observations in pictures on our regular morning calendar. Also, For information about when the moon is visible in the day, please go to: <u>https://planetariumweb.madison.k12.wi.us/mooncal/daymoon</u>.

Session 1—Overview and Introduction to Moon Observations

Class Science Meeting Gather Ideas Discussion: What do you think you know about the moon?

1. So That's How the Moon Changes Shape? Read first: What can we learn about the shape of the moon from this book? Accept all student responses.

- Key Idea: The moon seems to have different shapes, but it really doesn't change, it's always a big ball (p.12, 13) but you only see the part that's lit (p.16)
 - Details: shapes we see:
 - Bright circle- full moon (p.5)
 - Most of a circle (p.6)
 - Half (p.8)
 - Sliver- crescent (p.10)
 - Can't see it at all (p.11)

Construct a "Word Winners" poster that is easily accessible by students and insert vocabulary words. Make a tally mark every time a word is used and identify the "winner" at the end of the week. Word Winners Vocabulary: full, crescent, reflect

2. *Finding the Moon* Read second: What can we learn about the shape of the moon from this book? Accept all student responses.

• Key Idea: The shape of the moon looks different over time. These different shapes are called phases of the moon.

Word Winners Vocabulary: phase (p. 6)

3. *Papa Please Get Me the Moon*. Read third: What can we learn about the shape of the moon from this book? Accept all student responses.

Key Idea: The moon looks smaller and smaller every night until it seems to disappear. Then the moon looks bigger and bigger every night until it looks like a bright round ball.

Word Winners Vocabulary: sliver

Construct a "Word Winners" poster that is easily accessible by students and insert vocabulary words. Make a tally mark every time a word is used and identify the "winner" at the end of the week.

Assessment Note: Return to *Papa Please Get Me the Moon* towards the end of the project and write a class response to the following prompt: In the book, the author writes, "the moon got smaller and smaller and finally disappeared altogether." Think about what you have learned about the moon and tell me if you agree or disagree with the story and why. Remember we need to provide evidence from our notes to support our answer.

Closure/Gathering Ideas Class Discussion: Based on these books, what do you think you know now about the moon?

<u>Conduct Research--</u> How will students gather information? Session 2

- Read *Phases of the Moon* and briefly discuss. •
- Present research question: When you look at the moon, how does the shape seem to change over time? •
- Read *Faces of the Moon* and briefly discuss. How are the two books alike? How are they different? •

After students have multiple opportunities to observe the moon, hold another **Gathering Ideas Discussion**. Encourage students to support their responses with evidence from their science notebooks.

- What did you notice about the moon on different nights? •
- *How did the shape seem to change?* •

Session 3

Teacher Guidelines: With support, the students will research each phase of the moon, drawing information from

two texts. "Notes" will be recorded individually by coloring black construction paper circles with white chalk to show each phase of the moon after it has been researched. (Each student will need 9 construction paper circles, a piece of chalk and an envelope to store them in.)

Both texts are used with permission from the publishers: Excerpted from the work entitled *Phases of the Moon*, by Gillia M. Olson, © 2007 by Capstone Press, an imprint by Capstone. All rights reserved.

Text copyright 2009 by Bob Crelin Illustrations copyright 2009 by Leslie Evans Charlesbridge Publishing, Inc. 85 Main Street Watertown, MA 02472 (617) 926-0329 www.charlesbridge.com

• Read aloud the page from *Phases of the Moon* and discuss the text based questions <u>without showing the accompanying illustrations.</u>

Phases of the Moon (traditional informational text) The moon phases start with the new moon. The new moon looks all dark. p.8 What does the new moon look like?

How do you know?

• Read aloud the corresponding section of *Faces of the Moon*. Use your voice to emphasize the rhyme and rhythm of the text. **After one reading, have the students repeat each line after you. Then "read" the whole stanza togethe**r. Discuss the text based questions below without showing the accompanying illustrations.

Faces of the Moon (poem) The Moon's first phase, we call it NEWwhen Moon's between the Sun and you. her sunlit side is turned away, and we can't see her, night or day.

What does the author mean when he says, "and we can't see her, night or day "? What does the new moon look like?

• Ask students to show comprehension of these passages by drawing a picture of the moon as described by the text.

Now, use your chalk and black circle to show how the new moon looks (allow time for students to realize that there is nothing to color in).

• Show students the illustration(s) that accompany the passages you analyzed.

Did you need your chalk? Why not? Let's look at the photo of the new moon in the books. How does your picture of the moon compare to the picture in the books?

• Have students compare the illustrations to their drawings. How accurate was their understanding? Was it helpful to use two texts? Use the student drawings both as formative assessment and as running 'notes" from which they will deduce the answer to the research question when they have finished reading the

texts.

• Together use a template to help the class record the information they have found. This group writing will become a class report that answers the research question.

Now, let's write down what you have found out. **This is the ______moon. It looks______.**

• Record one response for the group on chart paper, sentence strips or an interactive whiteboard. Chorally read what you have written. Save this writing for a culminating research report. Continue this process with the rest of the phases of the moon.

Phases of the Moon (traditional informational text)	Faces of the Moon (poem)	
The next phase looks like a banana . It's called a	A few days pass, and Moon's less shy;	
crescent moon.	her <i>smile</i> lights the twilight sky.	
p.10	The more her sunlit surface shows,	
	the more Moon's WAXING <i>CRESCENT</i> grows.	
What is a crescent moon? How do you know?	<i>Everyone smile! Why does the author tell us that this</i>	
	phase looks like the moon is smiling?	
	What shape is a smile? How will <u>vou</u> remember what the	
	what shape is a sinile: now will <u>you</u> remember what the word crescent means?	
	word crescent means?	
Now, use your chalk to color in a black circle to show how	, the crossent meen looks (allow a minute or two for	
students to do this.)		
Lat's look at the photo of the grassent moon in the heal.	Low door your nicture of the mean compare to the nicture	
in the books?	low does your picture of the moon compare to the picture	
In the books?		
Halo and a standard a loss of a standard about the		
Help me to write down what we have learned about the c	rescent moon. Then comes themoon. It	
looks		
Teacher Note: If a student's drawing does not represent		
	will need these science notes for the sequencing activity	
at the end of the research project		
Phases of the Moon	Faces of the Moon	
Then the moon looks like half of a circle . This phase	We notice Moon's FIRST QUARTER phase	
is a quarter moon.	around the count of seven days.	
p.12	Her western half 's so brightly lit-	
	right down the middle, Moon looks split .	
What phase of the moon does this page tell you about?	The poem says, "the moon looks split".	
What does the quarter moon look like?	What does that mean?	
How do you know?		
	How could these words help you to draw this phase?	
	now could these works help you to draw this phase.	
Now, use your chalk to color in a black circle to show how the quarter moon looks. What will you do first? (allow a		
minute or two for students to do this.)		

Let's look at the photo of the quarter moon in the book. How does your picture of the moon compare to the picture in the books?

Help me to write down what we have learned about the quarter moon. Then comes the ______moon. It looks_____.

Continue research after reviewing notes taken so far: Phases of the Moon	Faces of the Moon
The next phase is a gibbous moon. It looks like a circle with a crescent cut out. p.14	Now WAXING GIBBOUS, fat with light, she's nearly round- up late at night.
What does the gibbous moon look like?	What does "nearly round" mean? With your fingers show me what "nearly round looks like. How will you draw a moon that is nearly round?
low, use your chalk to color in a black circle to show how tudents to do this.)	the gibbous moon looks (Allow a minute or two for
et's look at the photo of the gibbous moon in the book. He n the books?	
Help me to write down what we have learned about the grooks	
Phases of the Moon	Faces of the Moon
Next , you see all of the sunlit side. It is a full moon . p.16	The FULL Moon, big and bright and round , with not a shadow to be found, now rules the heavens all night long and sets upon the break of dawn.
What does the full moon look like? Can you tell from the words? Maybe the poem will make it clearer	The author tells us that the full moon is (big and bright and round). How is that different from the gibbous moon? <u>Phases of the Moon</u> told us <u>why</u> the full moon is big an round and bright. Listen to those words again. Can yo tell me why the full moon is bright?
Now, use your chalk to color in a black circle to show how do this.)	the full moon looks (Allow a minute or two for students
Let's look at the photo of the moon in the book. How does books?	your picture of the full moon compare to the picture in t
Help me to write down what we have learned about the fu	ıll moon. Then there is amoon. It looks
Assessment Note: Ask students to write a prediction abo How will the moon look next? Why do you think so? Provide the frame: I predict the moon will look like	
students should use evidence from the class book and no	
Phases of the Moon	Faces of the Moon
It's a Pattern! After a full moon, you see less and less of the sunlit side. Then there is a new moon again.	

Look at the notes you have taken so far. What pattern do you see? **When you look at the moon, how does the shape seem to change over time?** How will the moon look next? Why do you think so?

<u>Phases of the Moon</u> doesn't tell us much about the next phase of the moon, but our poem does. You have gotten to be excellent word detectives. Let's see if we can finish our note sheet using the poem and what we have learned so far about the pattern of the phases of the moon.

Session 5

From this point on, students will be making connections within the same text, using Faces of the Moon.

Faces of the Moon (poem) Once past full, the shadows start to darken Moon's most western part. and later each night she'll embark: the WANING GIBBOUS Moon.

What phase of the moon is this stanza about? It's hard to get a picture in our heads from those words. I hear the words "dark" and "shadow" so I know the moon is getting darker, but not how much darker.

Do you remember what the gibbous moon looks like?

What do you think the waning gibbous moon looks like?

Now, use your chalk to color in a black circle to show how the gibbous moon looks. The pattern might help you (Allow a minute or two for students to do this.)

Let's look at the photo of the gibbous moon in the book. How does your picture of the moon compare to the picture in the books? Were you able to figure out how the moon looks from the pattern and the words?

Help me to write down what we have learned about the gibbous moon. This is the _____moon. It looks_____

Faces of the Moon (poem) At Moon's LAST QUARTER of her trip, her eastern half is brightly lit. 'Round midnight hour she will rise to shine amid the morning skies.

What phase is this part of the poem about?

We have read about the quarter moon before.

Listen carefully as I reread that part of the text.

What do you hear that will help us draw this part of the moon?

Now, use your chalk to color in a black circle to show how the quarter moon looks (Allow a minute or two for students to do this.)

Let's look at the photo of the quarter moon in the book. How does your picture of the moon compare to the picture in the books?

Help me to write down what we have learned about the quarter moon. Then comes the _____ moon. It looks_____.

Faces of the Moon (poem)

From early dawn to morning blue, her **crescent grin** is **smiling** through. Poised high above the morning dew is WANING **CRESCENT** Moon

What phase is this part of the poem about?

What is a grin? Why does the author think the crescent moon is like a grin?

Now, use your chalk to color in a black circle to show how the crescent moon looks (allow a minute or two for students to do this.)

Let's look at the photo of the crescent moon in the book. How does your picture of the moon compare to the picture in the books?

Help me to write down what we have learned about the crescent moon. Then comes the _____ moon. It looks_____.

Faces of the Moon (poem)	Faces of the Moon (previous stanza of the poem)		
Then Moon <i>returns</i> where she'd begun,	The Moon's first phase, we call it NEW-		
to hide between our Earth and Sun,	when Moon's between the Sun and you.		
and though this orbit now is <i>done</i> ,	her sunlit side is turned away,		
next month she starts anew.	and we can't see her, night or day.		
The author says that the moon is "hiding". If she is	What words tell you that the new moon is "hiding"?		
hiding, can we see her?			
Which phase do you think this part of the poem is about?			
Why?			
What familiar word do you hear in "anew"? What might			
"anew" mean?			
Listen as I read the first stanza we read about the new			
moon.			
Now, use your chalk to color in a black circle to show how the new moon looks (Allow a few seconds for students to realize there is nothing to color in.)			
Let's look at the photo of the new moon in the book. How does your picture of the new moon compare to the picture in the books?			

Help me to write down what we have learned about the new moon. Now it's the_____.

Session 6

Use the notes taken to answer the research question.

We have used two books to finish our research on all of the phases of the moon. **Making Meaning Class Discussion:**

Arrange your circles in order. Look at all the notes you have taken.

- What do you know about the moon now? How do you know that?
- When you look at the moon, how does the shape seem to change over time?
 What pattern do you notice?

(Help students to summarize: The moon appears to get bigger, then get smaller.)

Now we can go back and write down the answer to our research question.... **When you look at the moon, how does the shape seem to change over time?** Help the students to develop an answer similar to the one below: The moon appears to change shape in a pattern. At first the moon appears to get bigger. After the full moon, the moon appears to get smaller.

Together write an introduction and conclusion for a group report. Use the student's notes as the body of the report (see model below).

The Phases of the Moon: A Research Project by

The Blue School First Grade

Research Question: When you look at the moon how does the shape seem to change over time?

We observed the moon and then read books to learn more about what we saw. We found out that the moon doesn't really change shape. What changes is only how much of the moon you can see. But, the shape of the moon <u>appears</u> to change over time.

At first, the moon appears to be getting bigger. This is the new moon. It looks all dark. Then comes a crescent moon. It looks like a smile or a banana. The moon seems to be getting bigger. Then comes a quarter moon. It looks half lit up. The moon seems to be getting bigger. Then comes the gibbous moon. It looks like a circle with a smile cut out. The moon seems to be getting bigger. Then there is a full moon. It looks all lit up and round.

After the full moon, the moon appears to get smaller. This is the gibbous moon. It looks like a full moon with a crescent cut out of it. The moon seems to be getting smaller. Then comes the quarter moon. It looks like a full moon with one half cut

out. The moon seems to be getting smaller. Then comes the crescent moon. It looks like a grin. The moon seems to be getting smaller. Now it's a new moon again, and we can't see her night or day!

Then the whole thing happens all over again. First the moon seems to get bigger, then the moon seems to get smaller. It's one of nature's awesome patterns!

You may want to add student created illustrations as well. Reread the report often to reinforce concepts and deepen understanding.

Assessment Note: Provide students with a long strip of black paper, their moon notes, a glue stick, scissors and two printed strips listing the names of the phases of the moon. Have students independently put the moon phases in order and paste the name of each phase underneath.

Session 7

Assessment Note: Revisit <u>Papa Please Give Me the Moon Book.</u> Ask students to write a class response about the book for the following prompt: It mentions in the book that, "the moon got smaller and smaller and finally disappeared altogether." Think about what you have learned about the moon and tell me if you agree or disagree with the story and why? Remember we need to provide evidence from our notes to support our answer.

Word Winners (or Word Wizards)

(Modified from "Word Wizards" technique introduced by Beck, Perfetti and McKeown, 1982)

Purpose: to provide encouragement and incentive for repeated and varied use of new vocabulary Applicable for: use in K- 6, possibly with older students

Method:

1. Construct a "Word Winners" poster somewhere in the classroom that is easily accessible by students. (Some teachers use colored index card for the actual words, so that the poster can be more or less permanent, while the words are changed over time.)

2. During read-aloud or other occasions when interesting words are noticed, select a few words to be placed on the "Word Winners" poster. Words should be

- interesting and/or important: high utility words
- slightly challenging (a "stretch," but not so sophisticated for the grade level as to be out of reach)

3. Make sure that students can decode the word, and explain its meaning (in student-friendly terms) if you have not already done so. Use active, engaging approaches to help students develop a deeper understanding of the

word, as needed. When introducing the approach, provide time for students to work in pairs or groups of three to practice using the words in meaningful sentences.

4. Explain that we learn new words through practice, and the poster will provide a way to help us keep new words in mind so we can notice them when they are used. Any time a student:

- reads the word in text
- hears the word being used
- uses the word (appropriately) in a sentence when speaking or writing the word can receive a "tally" mark.

5. Every so often, the teacher should call on a student who adds a tally to the chart, and ask him or her to describe or explain how the word was used. At the end of the week, tally the marks, and declare one word the "word winner "of the week. Ask a student to take the words down and place them in a "word star "box. This box becomes a repository of already- explored vocabulary words, and a source of words that might be used for periodic review and classroom –based assessment.

Summarized by Susan Carey Biggam. VT READS Institute at UVM. 11/08

Word Wizards!





