Amplify Core Knowledge Language Arts®

Knowledge 6

Teacher Guide | Grade 1

Astronomy

Grade 1 | Knowledge 6

Astronomy

Teacher Guide

Amplify Core Knowledge Language Arts

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Grade 1 | Knowledge 6

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Introduction

This introduction includes the necessary background information to be used in teaching the *Astronomy* domain. The Teacher Guide for *Astronomy* contains nine daily lessons in addition to six days for a Pausing Point (two days), Domain Review, Domain Assessment, and Culminating Activities (two days) in the order presented in this Teacher Guide. You should spend no more than fifteen days total on this domain.

DOMAIN COMPONENTS

Along with this Teacher Guide, you will need:

- Flip Book for *Astronomy*, which can also be found on the CKLA™ Teacher Resources website at CKLA.Amplify.com
- Image Cards for *Astronomy*
- Activity Book
- Digital Components for *Astronomy*

RECOMMENDED RESOURCES

Core Knowledge Grade 1 Teacher Handbook, edited by E.D. Hirsch, Jr. and Souzanne A. Wright (Core Knowledge Foundation, 2004) ISBN: 978-1890517700

You should consider various times throughout the day when you might infuse the curriculum with authentic domain-related literature. If you are able to do so, you may recommend students select books from the Recommended Resources list. In addition, if you recommend that families read aloud with their child each night, you may wish to suggest that they choose titles from this list to reinforce the concepts covered in this unit.

You might also consider creating a classroom lending library, allowing students to borrow domain-related books to read at home with their families. The Recommended Resources list, which also includes online resources, can be found online in the digital components for this domain at ckla.amplify.com.

WHY ASTRONOMY IS IMPORTANT

In this domain, students will be introduced to the solar system—our home in space. They will learn that Earth, the planet on which we live, is just one of many different celestial bodies within the solar system. They will learn how the sun, stars, moon, and other planets relate to the earth (given its position in space). In the early read-alouds, students will learn that the sun is a star and a source of light, heat, and energy for the earth. They will also learn about the earth's orbit around the sun, and how the earth's own rotation on its axis leads to the phenomenon of day and night.

In the second half of this domain, students will learn about the history of space exploration and the missions to the moon. Students will learn about NASA, the Space Race, the Apollo missions, and what it takes to be an astronaut. Students will get a good introduction to the basics of astronomy in this domain, and this foundation will be built upon when students study the solar system in much greater depth in the third grade.

WHAT STUDENTS HAVE ALREADY LEARNED

The following domains, and the specific core content that was targeted in those domains, are particularly relevant to the read-alouds students will hear in *Astronomy*. This background knowledge will greatly enhance your students' understanding of the read-alouds they are about to enjoy:

- Kindergarten, *Seasons and Weather*
- Kindergarten, *Taking Care of the Earth*
- Grade 1, *Early American Civilizations*

CORE VOCABULARY FOR ASTRONOMY

The following list contains all of the core vocabulary words in *Astronomy* in the forms in which they appear in the read-alouds. Boldfaced words in the list have an associated Word Work activity. The inclusion of the words on this list does not mean that students are immediately expected to be able to use all of these words on their own. However, through repeated exposure throughout the lessons, they should acquire a good understanding of most of these words and begin to use some of them in conversation.

Lesson 1	**Lesson 4**	**Lesson 7**
atmosphere	advances	**determined**
gas	**ancient**	disaster
rays	celestial bodies	historic
shadow	constellations	missions
surface	myths	nervously
Lesson 2	**Lesson 5**	**Lesson 8**
gravity	appearance	**abundant**
horizon	**counterclockwise**	accomplish
orbit	craters	inner
planet	crescent	solar
rotates	reflecting	unique
Lesson 3	**Lesson 6**	**Lesson 9**
debris	astronaut	**categorize**
dusk	**launch**	outer
meteor	rockets	probes
telescopes	spacecraft	violent
universe	technology	

CORE CONTENT OBJECTIVES

- Explain that the sun, moon, and stars are located in outer space
- Explain that the sun is a source of energy, light, and heat
- Classify the sun as a star
- Identify the earth's rotation, or spin, as the cause of day and night
- Recognize that other parts of the world experience nighttime while we have daytime
- Explain sunrise and sunset
- Explain that Earth orbits the sun

- Describe stars as large, hot, distant, and made of gas
- Recognize the Big Dipper
- Identify four phases of the moon—new, crescent, half, full
- Explain that the moon orbits the earth
- Explain the first landing on the moon by American astronauts
- Indicate that there are eight planets in our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune)

WRITING

In this domain, students will explore the genres of informational and opinion writing. They will learn to identify important facts and information before, during, and after informational read-alouds. They will practice collecting and synthesizing information by note-taking as a group with a Planets Chart and other graphic organizers. Students will independently journal one- to three-sentence responses to read-alouds and activities throughout the domain. In Lesson 5, you will model opinion paragraph writing. Then in their subsequent journal entries, students will write opinion statements in which they state an opinion and supply reasons for it. The following activities may be added to students' writing portfolios to showcase student writing within and across domains:

- Astronomy Journals (Lessons 1, 2, 4, 5, 7–9)
- any additional writing completed during the Pausing Point, Domain Review, or Culminating Activities

LESSON

1

ASTRONOMY

Introduction to the Sun and Space

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will discuss Earth's atmosphere and outer space.
[SL.1.1]

Reading

Students will distinguish between Earth's atmosphere and outer space.
[RI.1.3]

Language

Students will demonstrate an understanding of the Tier 3 word *gas*.
[L.1.5, L.1.5a, L.1.5b]

Writing

Students will make observations about the sky and record them in a journal.
[W.1.2]

FORMATIVE ASSESSMENT

Exit Pass

Astronomy Journals Students will make observations about the sky and record them in a journal.
[W.1.2]

LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
Core Connections	Whole Group	15 min	❑ globe ❑ rendering of Earth in space (optional)
Where Are We?			
Domain Introduction			
Read-Aloud			
Purpose for Listening	Whole Group	25 min	❑ Poster 1M (optional) ❑ binoculars, flashlight, and balloon (optional) ❑ T-Chart for Atmosphere/Outer Space ❑ image of a tree shading a person
"Introduction to the Sun and Space"			
Comprehension Questions			
Word Work: *Gas*			
This is a good opportunity to take a break.			
Application			
Astronomy Journals	Independent	20 min	❑ Activity Pages 1.1, 1.2 ❑ several sheets of paper per student ❑ writing and drawing tools
Take-Home Material			
Family Letter			❑ Activity Page 1.3

ADVANCE PREPARATION

Read-Aloud

- Prepare and display a T-Chart for Atmosphere/Outer Space. Alternatively, you may access a digital version in the digital components for this domain. You may also choose to add images to the chart in addition to the words listed.

Atmosphere	Outer Space
airplanes birds clouds	sun moon stars

Application

- In this domain, students will pretend to be astronomers as they learn about outer space. They will use astronomy journals to record observations and facts about outer space. Make a journal for every student by folding and stapling together Activity Page 1.1 and at least two sheets of paper to create a booklet.

Universal Access

- Gather a rendering of Earth in space and an image/sample of binoculars, a flashlight, a balloon, and a tree shading a person.
- In the Activity Book, you will find modified Astronomy Journal pages with prompts for students who need additional support.

CORE VOCABULARY

atmosphere, n. the bubble of air that surrounds Earth
Example: The earth's atmosphere allows us to breathe.
Variation(s): atmospheres

gas, n. something that is neither a liquid or solid
Example: The scientist won a prize for discovering a new gas.
Variation(s): gases

rays, n. beams of light
Example: The sun's rays were shining in my eyes.
Variation(s): ray

shadow, n. a shaded spot created when light is blocked by something
Example: I like trying to step on my shadow when I am walking down the sidewalk.
Variation(s): shadows

surface, n. the outside or top layer of something
Example: The surface of the moon is very bumpy.
Variation(s): surfaces

Vocabulary Chart for "Introduction to the Sun and Space"

Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Vocabulary	atmosphere gas *(gas)*		
Multiple Meaning		surface	rays *(rayos)* shadow
Sayings and Phrases	outer space an array of cause serious damage shedding light on have learned anything		

Start Lesson

Lesson 1: Introduction to the Sun and Space

Introducing the Read-Aloud

15M

Speaking and Listening: Students will discuss Earth's atmosphere and outer space. **[SL.1.1]**

CORE CONNECTIONS (5 MIN)

- Tell students that over the next few weeks they will be learning about astronomy, the study of outer space.
- Ask students if they have ever heard of outer space. If so, ask them what can be found in outer space (beyond the earth).
- Tell students that they might be surprised to know that they see objects from outer space in the sky every day. Ask the following questions:
  - What is the big, hot, bright object we can see in the sky during the day? (*the sun*)
  - What is the big object that we can see in the sky at night and that appears to be glowing? (*the moon*)
  - What are the smaller, twinkling lights we can see in the sky at night? (*the stars*)
- Point out that all of these objects—the sun, moon, and stars—are actually in outer space. Tell students that over the next few weeks, they will learn more about the sun, the moon, the stars, and other objects in outer space.

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging
Have students answer yes/no questions about outer space (e.g., "Is the moon seen best at night?").

Transitioning/Expanding
Have students contribute using a short sentence or completing the sentence frame (e.g., "_____ is the biggest object that looks like it's glowing that we can see better at night.").

Bridging
Have students contribute a complete sentence using key details.

Support

The earth is located in space. When we use the term "outer" space, we are referring to areas beyond the earth's immediate atmosphere. If students name objects that they can see in the sky—such as airplanes, birds, or clouds—keep in mind that these objects are in the first level of sky called the atmosphere, so they are not considered to be in outer space.

WHERE ARE WE? (5 MIN)

- Show students a globe, and tell them that the globe is a model of the earth, where we live. Point to the appropriate location on the globe as you say the following:
  - You live in [your town].
  - [Your town] is in the state of [your state].
  - [Your state] is in the country of the United States of America.
  - The United States of America is on the continent of North America.
  - North America is on Earth.
  - Earth is in space.
- Explain that even though it seems that the ground we stand on is flat and still, we actually live on a tiny part of a huge sphere, or ball, just like this globe. This huge sphere is called Earth, and it is always moving in space. If you traveled in a rocket far, far up in the sky and then looked back down, you would see something that looked like this globe moving in a huge, black, seemingly endless space. Emphasize the following points:
  - The earth, sun, moon, and stars are all in space.
  - The sun, moon, and stars are beyond the earth, where we live. To us on Earth, the sun, moon, and stars are in outer space.

Support

Show students a rendering of Earth in space to help them visualize this idea.

DOMAIN INTRODUCTION (5 MIN)

- Tell students that the name for the study of objects in outer space—the area beyond the earth—is astronomy.
- Ask students to repeat the word *astronomy*.
- Explain that *astro–* means stars, and that astronomy is a science that includes the study of the stars.
- Ask students to say the word *astronomer*.
- Explain that astronomers are scientists who study outer space. Tell students that astronomers look at the stars through telescopes and try to learn about our universe. A person must study for many years before becoming an astronomer.
- Tell students that over the next few weeks, they will pretend to be astronomers as they learn about outer space.

Challenge

If *astro–* means stars, what do you think an astronomer's job might be? *(Answers may vary, but should include something to do with stars.)*

Lesson 1: Introduction to the Sun and Space

Read-Aloud

25M

Reading: Students will distinguish between Earth's atmosphere and outer space. **[RI.1.3]**

Language: Students will demonstrate an understanding of the Tier 3 word *gas*. **[L.1.5, L.1.5a, L.1.5b]**

PURPOSE FOR LISTENING

- Explain to students that the sky they see during the day or night actually has two parts: the part with air and clouds that looks blue during the day and is close to Earth, called the atmosphere; and a huge, black part even farther away called outer space.
- Tell students to listen carefully to hear about some objects they can see in the sky, and to hear which of these objects are located in the atmosphere and which are located in outer space.

"INTRODUCTION TO THE SUN AND SPACE" (10 MIN)

Show image 1A-1: Sky

Have you looked up at the sky lately? What did you see? *[Pause for responses. If there is a window in your classroom, ask a student to look out and describe the sky.]* Perhaps you saw a clear, blue sky, or maybe there were a few puffy, white clouds floating around. Or maybe the sky was streaked with gray clouds.

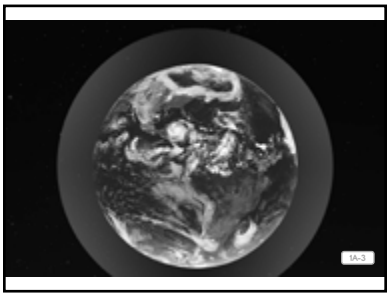
Show image 1A-2: Plane, bird, red balloon, clouds

Occasionally when you look up in the sky you can see an airplane or a bird flying by, or even a red balloon someone accidentally let loose. *[Point to these objects in the image.]* Some days, it is fun to lie on your back in the grass and stare up at the interesting shapes of the

Challenge

If any of your students have traveled in an airplane, ask them to share what the sky, clouds, and earth looked like from the plane.

puffy, white clouds overhead. Perhaps you or someone you know has even flown in an airplane, up among the clouds high above the earth's **surface**. *The ground we walk on is the top layer of the earth called the earth's surface.*



Show image 1A-3: Bubble of air

You can think of the sky in two layers. There is a big blanket or bubble of air that surrounds Earth. This bubble covers the whole earth—all the ground and oceans and everything else on the earth's surface, including you! This bubble of air is called the **atmosphere**. But the atmosphere does not tell the whole story. The second layer of the sky is all of outer space, which lies beyond the atmosphere, an endless expanse of stars and moons and other objects.

Of course, during the day here on Earth, it is easy to forget that outer space is there, but it always is. The earth—your home—is just one little object moving around in the middle of it all, like a speck of sand amidst all the sands in the ocean.

Show image 1A-4: Sun over a field

During the day, the sun shines over the earth, shedding light on all the animals and plants that live on the earth's surface. The sun's **rays** *or beams of light* spread across the skies, which appear blue to your eyes.

The sun itself is a star. It is not part of Earth or Earth's sky. In fact, the sun is far, far away from Earth—so far away that it would take more than three months to reach it in the fastest rocket ship. But even if you could reach the sun in a rocket ship, you would never be able to get close to it. That is because the sun, like other stars, is an enormous ball of very hot **gas**. *That means the sun is not a solid object or a liquid. It is made of gas, a thin substance that objects can pass right through—if they didn't burn up first!* Everything that gets too close to it burns up instantly.

Just how enormous is the sun? Think about this: if the sun were a huge bowl and the earth were a little marble, you could stuff about one million marbles into that bowl. In other words, it would take a million Earths to fill the sun!

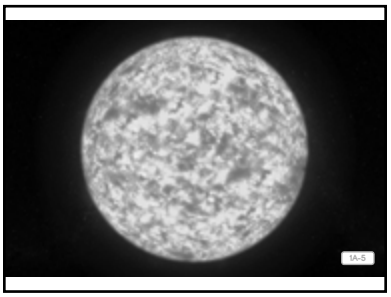
Support

Here the word *space* means the region beyond Earth's atmosphere in which there are stars and planets. The word *space* can also mean a blank area separating written or printed words. Refer to Poster 1M to help students understand the different meanings.

Support

Do you recall what the word *enormous* means? *(very large)*

[Show the globe.] The real Earth is much, much bigger than this. The sun is gigantic if it's the same size as a million Earths!



Show image 1A-5: The sun

The sun is just one out of billions of stars in space. However, the sun is our star; it is the earth's star. Without the sun, Earth would be a cold, lifeless hunk of rock. All living things on Earth that you can see every day—from the trees to the bees to the flowers and the fleas—rely on the sun in one way or another. The heat, light, and energy of the sun allow life to flourish here on Earth. *Most living things wouldn't be able to live without the heat, light, and energy of the sun.*

Show image 1A-6: Sunrise

The rising sun signals the start of a new day. In the morning, the sun rises in the east, and its rays shed light across the land. *The sun warms up the land, too. It's usually colder at night than during the day.* People wake up and get ready for a new day, getting dressed and eating breakfast, and then traveling outside to wherever it is they go—to school, to the office, to a store, or simply out for a walk.

Show image 1A-7: Shadows

Have you ever noticed your **shadow** on the ground? If the sun is behind you while you are walking down the sidewalk, then your body blocks the sun's rays and creates a shadow *or shaded spot* on the ground. Your shadow is not the only shadow in the world. *[Point to the shadows in the image.]* Clouds cast shadows as well. So do buildings and trees. Have you ever rested under the shade of a tree on a hot summer day? If so, you were resting in the shadow cast by the tree's leaves and branches.

Support

Demonstrate shadows for students using a light and some object or your hands.

Support

Show an image of a tree shading a person.

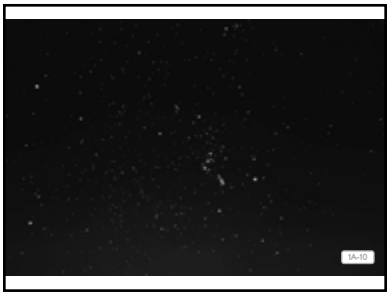
Show image 1A-8: Applying sunscreen

On a hot summer day you can feel the warmth of the sun on your skin, and if you do not use sunscreen *[Point to the sunscreen.]* then you may get a sunburn. Ouch! The sun's energy can burn your skin, and that's bad. Sunburns hurt, and if you get sunburned too often, it can cause serious damage to your skin.

On the other hand, the sun's light is also good for you. When your bare skin is exposed to sunlight, your body creates Vitamin D, which is one of the many vitamins your body needs in order to stay healthy and strong. So playing outside in the sunshine isn't just fun; it's good for you, too!

Show image 1A-9: Moon

At the end of each day, when the sun goes down in the west, the sky changes. It isn't blue anymore. The sky becomes black, and new sights appear. Instead of clouds and birds and blue sky, you may see an array of shining stars. You may see something else, as well—not the sun, but another object hovering in the skies above: the moon. *[Point to the moon in the image.] Sometimes you can also see the moon during the day.*



Show image 1A-10: Outer space

Over the next several days you will learn about the sun, the moon, the stars, and you will hear all sorts of amazing and interesting facts about outer space—the place beyond the earth's sky or atmosphere. This study of the stars and other things in outer space is called astronomy. *Do you remember what* astro– *means?* (star) The read-alouds you will hear in the coming days will provide a basic introduction to astronomy, but it's only a beginning. There is so much to learn about the stars and other objects in space, that you can spend the rest of your life studying it and never run out of new things to learn and discover. That is because astronomy is the study of everything beyond our little home that we call Earth. *Do you remember what an astronomer is?* And if astronomers have learned anything through the years, they know

that there is no end to the amount of new knowledge and surprises to be discovered in the study of the stars and outer space.

COMPREHENSION QUESTIONS (10 MIN)

1. **Literal** You just heard that the sky can be described as having two layers. One layer of sky is made up of a blanket or bubble of air that surrounds the earth. What do we call this bubble of air? (*the atmosphere*)
   - **Literal** What is the other layer of sky that lies beyond the atmosphere? (*outer space*)

Check for Understanding

Think-Share: [Have students hold up one finger if the object you state is found in the atmosphere, and two fingers if it is found in outer space.] stars? *(2)* clouds? *(1)* airplanes? *(1)* moon? *(2)* [Display the T-Chart you prepared in advance and review and add anything additional information.]

2. **Literal** What is astronomy? *(the study of the stars and other things in outer space)* What things might an astronomer study? Think of two things and share with a partner. *(Answers may vary, but may include stars, sun, moon, planets, etc.)*

Show image 1A-5: The sun

3. **Literal** What is this a picture of? (*the sun*) What did you learn about the sun? [Ask any of the following questions to cover information missing from students' descriptions of the sun.]
   - Is the sun a rock or a star? (*star*)
   - Is the sun hot or cold? (*hot*)
   - What is the sun made of? (*gas*)
   - Is the sun near Earth or far away? (*far away*)
   - Is the sun bigger or smaller than the earth? (*bigger*) How much bigger? (*a million times*)
4. **Literal** What is a shadow? (*a shady spot*) How are shadows created? (*When light shines on an object, the object blocks the light that hits it from landing behind that object, causing a shaded area.*)

Support

If students have difficulty responding to questions, reread pertinent lines of the read-aloud, refer to specific images, and/or refer to the T-Chart for Atmosphere/Outer Space.

Speaking and Listening

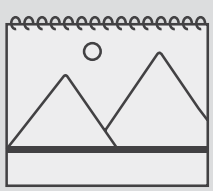
Reading/Viewing Closely

Entering/Emerging
Have students answer simple yes/no questions (e.g., "Is the sun a rock?").

Transitioning/Expanding
Have students respond to the question using a sentence frame (e.g., "The sun is a rock/star, hot/cold, near/far away, big/small, etc.").

Bridging
Have students respond to the question in complete sentences, using key details from the illustration and read-aloud.

Flip Book 1A-5



5. **Literal** What do we call the scientific study of stars and outer space? (*astronomy*) What do we call a scientist who studies astronomy? (*an astronomer*)

6. **Evaluative** *What? Pair Share:* Asking questions after a read-aloud is one way to see how much everyone has learned. Think of a question you can ask your neighbor about the read-aloud that starts with the word what. For example, you could ask, "What does the sun do in the morning?" Turn to your neighbor and ask your what question. Listen to your neighbor's response. Then your neighbor will ask a new what question, and you will get a chance to respond. I will call on several of you to share your questions with the class.

WORD WORK: GAS (5 MIN)

Support

You may wish to show students an inflated balloon and demonstrate deflating it to help them see that there is a gas inside.

1. In the read-aloud you heard, "[T]he sun, like other stars, is an enormous ball of very hot gas."
2. Say the word *gas* with me.
3. A gas, unlike a solid or a liquid, is a thin substance through which objects can pass.
4. An example of a gas you might know is the air you breathe, which you may notice when you blow into a balloon to fill it up.
5. What do you think is a gas in the classroom? Outside? [Ask two or three students. If necessary, guide and/or rephrase the students' responses,"_____ is a gas."]
6. What's the word we've been talking about?

Use a Making Choices activity for follow-up. I am going to name some substances. If the substance I name is a gas, say, "That is a gas." If not, say, "That is not a gas." Remind students that a gas cannot be a liquid or a solid. Encourage them to explain their choices (e.g., "Orange juice is not a gas because it is a liquid.").

- orange juice (*That is not a gas.*)
- wood (*That is not a gas.*)
- steam (*That is a gas.*)
- air (*That is a gas.*)
- brick (*That is not a gas.*)

Lesson 1: Introduction to the Sun and Space

Application

20M

Writing: Students will make observations about the sky and record them in a journal.

[W.1.2]

ASTRONOMY JOURNALS (20 MIN)

- Tell students that over the next few weeks they are going to pretend to be astronomers as they learn about outer space. Tell them they will use astronomy journals to record both observations (what they see) and facts (what they learn) about outer space.
- Hand out the journals you prepared in advance.
- Take students outside, or if that is not possible, take them to a large window where they can see the sky.
- Have students spend a few minutes sketching the objects they see in the sky on the first page of their journals. Tell students that a sketch is a simple drawing with few details or colors.
- Have students return to their work spaces.
- Have students label the objects they drew.
- Remind students about the two levels of the sky: the atmosphere and outer space.
- Discuss students' sketches, helping them recognize which objects in their drawings are located inside Earth's atmosphere. *(birds, airplanes, clouds, etc.)*

Check for Understanding

Circle It: Direct students to circle any object in their drawings that is found in outer space, outside or beyond the bubble of air we call the atmosphere. *(the sun, or possibly the moon if it is visible)*

Support

Some students may benefit from using the modified Astronomy Journal prompts on Activity Page 1.2.

Support

If students have difficulty categorizing their images, have them refer to the T-Chart for Atmosphere/ Outer Space.

Challenge

Encourage students to share their drawings with a partner and identify which objects are part of the atmosphere and which are part of outer space.

Writing

Writing

Entering/Emerging
Referencing their drawings and the T-Chart for Atmosphere/Outer Space, students will dictate their responses to an adult.

Transitioning/Expanding
Referencing their drawing and the T-Chart for Atmosphere/Outer Space, students will dictate their responses to a peer.

Bridging
Students will independently write one to three detailed sentences on topic.

Activity Page 1.3

Exit Pass

- Below their drawing, have students write one to three sentences describing the objects they can see in the sky and whether they are part of the atmosphere or outer space.
- Collect students' journals to check that they are recording information on the atmosphere and outer space.

End Lesson

Lesson 1: Introduction to the Sun and Space

Take-Home Material

FAMILY LETTER

- Send home Activity Page 1.3.

LESSON

2

ASTRONOMY

The Earth and the Sun

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will distinguish between the earth's atmosphere and outer space.
[SL.1.2]

Reading

Students will identify what causes day and night.
[RI.1.3]

Language

Students will demonstrate an understanding of the Tier 2 word *rotates*.
[L.1.5, L.1.5a, L.1.5d]

Speaking and Listening

After observing a demonstration, students will explain why the sun appears to be moving across the sky.
[SL.1.2]

FORMATIVE ASSESSMENT

Exit Pass

Draw and Describe an Event Students will draw a picture and write a phrase or sentence to explain what causes day and night.
[RI.1.2; W.1.8]

LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
What Have We Already Learned?	Whole Group	15 min	❑ globe, plastic hoop, pin
Essential Background Information or Terms			
Read-Aloud			
Purpose for Listening	Whole Group	25 min	❑ Idea Web for the sun ❑ globe, video clips of Earth's rotation (optional)
"The Earth and the Sun"			
Comprehension Questions			
Word Work: *Rotates*			
This is a good opportunity to take a break.			
Application			
Sayings and Phrases: AM and PM	Independent	20 min	❑ clock, flashlight, globe, pin ❑ paper and writing tools
Day and Night Demonstration			

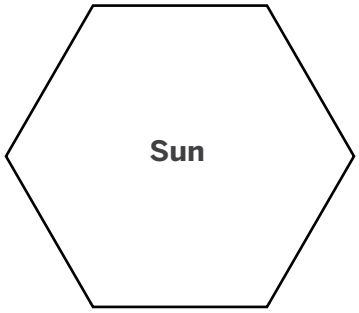
ADVANCE PREPARATION

Introducing the Read-Aloud

- Be sure to have a globe and a plastic hoop easily accessible for use in the Essential Background Information or Terms segment of today's lesson.

Read-Aloud

- Prepare and display an Idea Web for the sun. Alternatively, you may access a digital version in the digital components for this domain. Suggested information from the day's lesson for this Idea Web can be found in Teacher Resources.



Note to Teacher

During the Introducing the Read-Aloud and Application sections of this lesson, you will be demonstrating the earth's rotation and orbit. Be sure to read these sections thoroughly in advance.

In the next lesson, students will study the sky at night. You may wish to have students observe the night sky for homework tonight.

Universal Access

- Find age-appropriate video clips showing how Earth's rotation causes day and night.

CORE VOCABULARY

gravity, n. the force or pull of objects down to Earth or toward each other
Example: Every time I throw a ball up in the air, gravity pulls it down again.
Variation(s): none

horizon, n. the line in the distance where land or a body of water appears to meet the sky
Example: While I was standing on the beach, I saw a large ship on the horizon, far off in the distance.
Variation(s): horizons

orbit, n. a curved path that one object takes around another, usually in space
Example: People used to believe that the sun circled the earth; now we know the earth travels in an orbit around the sun.
Variation(s): orbits

planet, n. a large object in space that circles around a star
Example: The earth is a planet that circles around the sun.
Variation(s): planets

rotates, v. spins
Example: The ballet dancer rotates round and round very fast during a pirouette.
Variation(s): rotate, rotated, rotating

Vocabulary Chart for "The Earth and the Sun"

Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Vocabulary	horizon *(horizonte)*	rotates planet *(planeta)*	
Multiple Meaning	gravity *(gravedad)* orbit *(órbita)*		
Sayings and Phrases			

Start Lesson

Lesson 2: The Earth and the Sun

Introducing the Read-Aloud

15M

Speaking and Listening: Students will distinguish between the earth's atmosphere and outer space.
[SL.1.2]

WHAT HAVE WE ALREADY LEARNED? (5 MIN)

- Begin with a review of the previous lesson by asking students the following questions:
  - What do we call the first layer of the sky, the bubble of air that surrounds the earth? (*the atmosphere*)
  - What do we call a scientist who studies astronomy or space? (*an astronomer*)

Check for Understanding

Recall: What is the second layer of sky, beyond the atmosphere? *(outer space)*

  - Name some objects that are in outer space. (*sun, moon, and stars*)
  - Which of the objects in space—sun, moon, or stars—can be seen during the day? (*the sun and sometimes the moon*) Which can be seen at night? (*the moon and the stars*)
- Remind students that even though it is far away from the earth and looks smaller, the sun is actually much larger than the earth and provides the earth with light, heat, and energy.

Reading

Exchanging Information and Ideas

Entering/Emerging
Ask students yes/no questions about the atmosphere (e.g., "Is the atmosphere the bubble of air that surrounds the earth?").

Transitioning/Expanding
Provide students with a specific sentence frame (e.g., "The _____ is the bubble of air that surrounds the earth.").

Bridging
Encourage students to use key details in complete sentences.

ESSENTIAL BACKGROUND INFORMATION OR TERMS (10 MIN)

- Tell students that the earth moves in two different ways and that you are going to show them these ways today.
- Using a flag or pin, mark the approximate location of your town on a globe.
- Tell students that this is where you live and emphasize that you live on the planet Earth, which is represented by the globe.
- Tell students that even though they can't feel it, the earth is spinning. Explain that astronomers use the word *rotation* to describe the earth's spin. When the earth spins around, we say it rotates.
- Spin the globe to demonstrate this rotation.
- Ask students to rotate or spin in place, by standing and slowly turning all the way around.
- Tell students that rotation is one of the two ways the earth moves in space. Share that the earth doesn't just rotate or spin in place; it also orbits, or revolves around, the sun.
- Place a plastic hoop on the floor and tell students that you will now pretend that the hoop is the sun. Explain that the real sun is much bigger than the earth.
- Walk around the hoop while holding and continuing to spin the globe. Tell students that astronomers call the path that the earth follows as it revolves around the sun its orbit.
- Ask one or two students to walk around, or orbit, the plastic hoop sun. Tell students that it takes the earth one year to travel all the way around the sun.
- Tell students that the earth is always orbiting, or revolving around, the sun. Share with students that the earth is also always rotating, which is why we always have day and night.
- Tell students they will learn more about this in today's read-aloud.

Support

Point out to students that *orbit* is both the path Earth takes around the sun, and the word we use to describe one full trip along that path.

Lesson 2: The Earth and the Sun

Read-Aloud

25M

Reading: Students will identify what causes day and night.
[RI.1.3]

Language: Students will demonstrate an understanding of the Tier 2 word *rotates*.
[L.1.5d; SL.1.2]

PURPOSE FOR LISTENING

- Tell students to listen carefully to find out how the earth's rotation causes day and night.

"THE EARTH AND THE SUN" (10 MIN)

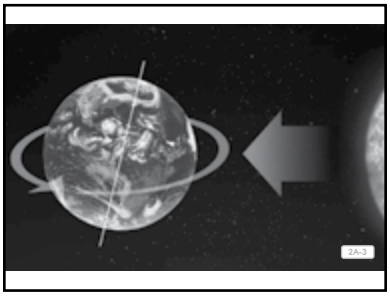
Show image 2A-1: Sunrise
All plants, animals, and people rely on the sun for life. The sun's energy gives life to plants, which in turn provides food for animals and people. The sun's heat keeps the surface of the earth warm enough for plants and animals to survive.

For people on Earth, it makes sense to say that the sun rises in the morning. Each morning at dawn, the sun appears on the **horizon** in the eastern sky. *The horizon is the line in the distance where it appears that the land meets the sky.* At dawn, some people say, "Look! The sun is coming up!" This first appearance of the sun above the eastern horizon is called sunrise.

Show image 2A-2: Sunset
Over the course of the day, the sun appears to move across the sky, gradually following its path from east to west. In the evening, the sun sets in the west. Ever so slowly, it gets lower in the sky and disappears below the horizon. That's when people say, "The sun is going

down." This disappearance of the sun below the western horizon is called sunset.

So, based on what we can see from where we live on Earth, it seems sensible to say that the sun moves across the sky each day—rising, or moving up, in the east; and setting, or sinking down, in the west. *In fact, that's exactly what people thousands of years ago thought was happening.* But that's not actually true. It is the daily rotation, or spin, of the earth that makes the sun appear to rise and set each day.



Show image 2A-3: Earth rotation
Earth **rotates**, or spins, on its axis. *[Show the globe.] Remember how we made the globe rotate earlier?* Imagine the earth's axis as an imaginary pole sticking through the center of the **planet** from north to south. It takes twenty-four hours, or one day, for the earth to spin, or rotate, all the way around one time.

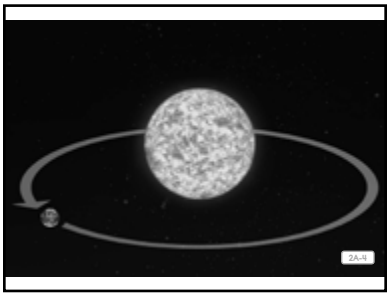
Check for Understanding

Think of a Word: With your body, mimic the movement of the earth as it is described here. [Encourage students to stand and spin in place.] Think of one word that describes this movement. [Ask several students to share.] *(Answers may vary, but may include* spins*,* rotates*,* turns*, etc.)*

Support

Show a video clip demonstrating how Earth's rotation causes day and night.

This daily rotation explains why there is always night and day on Earth. As it spins, certain parts of Earth's surface face the sun, receiving its heat and light. When it is light on one side of the earth, it is dark on the other side. So, if it is daytime where you are right now, then on the other side of the earth it is nighttime, and the children there are sound asleep. *[Using the globe from earlier in the lesson, point out to students a country that is on the opposite side of the world from them.]* And, when you are nestled in your bed tonight, children on the other side of the planet will be waking up to a bright new day.



Show image 2A-4: Orbit diagram

This spinning or rotation of the earth, however, is not the only way Earth moves in space.

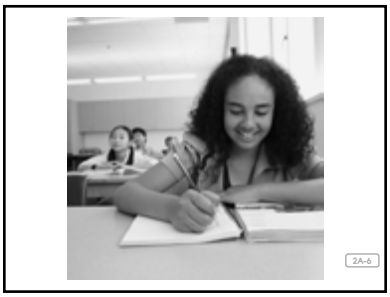
Because Earth is a planet, it also moves, or revolves, around the sun. The word planet means a large object in space that revolves around a star for light. *Remember that the sun is a star and provides the earth with light.* Earth moves, or revolves, around the sun, following a constant path. The path that Earth follows around the sun is called the earth's **orbit**. *Remember when I carried the globe around the plastic hoop sun? I was imitating the earth's orbit.*

Earth follows the same path as it revolves around, or orbits, the sun. It takes about 365 days, or one year, for Earth to make one complete orbit, or revolution, around the sun. But how and why does Earth orbit the sun? The answer to this question involves one of the most important lessons you can learn in the study of astronomy.

In space there are large objects, like the sun, and there are smaller objects, like the earth and moon. All objects in space actually pull on all other objects, but larger objects pull harder than smaller objects. The force that causes objects to pull on each other is called **gravity**. As this pulling action happens, the force of the sun's gravity holds Earth in its place. Although Earth continues to follow its orbit around the sun, the earth does not wander off into space. *So the sun's gravity holds the earth in place.*

Show image 2A-5: Person jumping

Just as the sun pulls on the earth and other objects out in space, the earth pulls on objects on or near its surface. Because of this, your feet stay planted firmly on the ground. And if you jump up, you come back down. If you throw a ball in the air, it falls back down, too. This force of gravity holds things on the ground and holds the planet Earth in orbit around the sun.



Show image 2A-6: Student at desk

You cannot tell that the earth is always moving as you sit in your classroom or wherever you happen to be. It rotates, or spins, all day and every day as it travels in its year-long course around the sun. These two types of movement—the rotation and the orbit of the earth—create the days and years that we keep track of on the calendar.

COMPREHENSION QUESTIONS (10 MIN)

As students answer the following questions, add relevant information to the idea web for the sun.

Support

If students have difficulty responding to questions, reread pertinent lines of the read-aloud and/or refer to specific images.

1. **Literal** Describe what we see at sunrise each day. (*sun coming up over the horizon in the east*) Describe what we see at sunset each day. (*sun going down below the horizon in the west*)
2. **Literal** What do we call a large object in space that revolves around a star? (*a planet*) On which planet do we live? (*Earth*)
3. **Literal** If we look up in the sky at different times of the day, the sun is in many different places and looks like it has moved. Does the sun move around the earth? (*no*) What moves? (*the earth*)
   - **Inferential** When we are on the side of the earth facing the sun, is it day or night? (*day*) Is it day or night on the opposite side of the earth? (*night*) What causes night and day? (*the earth's rotation*)
   - **Literal** You also heard that the earth travels in a path around the sun, and that it takes one year to go all the way around the sun. What is this path called? (*an orbit*)
4. **Literal** Is the sun solid, liquid, or gas? *(gas)*
   - **Inferential** What else did you learn about the sun in today's read-aloud? *(Answers may vary, but may include that it is very big, far away, a source of heat and light, a star, etc.)*
5. **Inferential** The earth moves in two different ways. One way the earth moves is by orbiting the sun. What is the other way it moves? (*It spins or rotates on its axis.*)
   - **Evaluative** *Think Pair Share:* How is an orbit different from a rotation? *(Answers may vary, but should include that an orbit is the path one object takes around another, like the earth around the sun, whereas a rotation is when something spins, like the Earth around its axis.)*

WORD WORK: ROTATES (5 MIN)

1. In the read-aloud you heard, "Earth rotates, or spins, on its axis."
2. Say the word *rotates* with me.
3. If something rotates, it spins.
4. A top rotates many times until it comes to a complete stop.
5. Can you think of an example of anything else that rotates? Try to use the word *rotates* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "A _____ rotates when . . ."]
6. What's the word we've been talking about?

Use a Making Choices activity for follow-up.

[Write rotate, turn, and twirl on the board] Some words mean almost the same thing but are still different. The words might express more or less action. For example, rotate, turn, and twirl mean almost the same thing but they are different. Watch as I act out the words [Say the word *rotate* and walk/rotate around an object such as a desk. Say the word *turn* and stand in one place and turn your body around 360 degrees. Say the word *twirl* and quickly spin around a few times moving your arms.] Talk with a partner about what you noticed was different about the three words.

I am going to read a sentence that has a word missing. With your partner I want you to decide if the word *rotate, turn,* or *twirl* fits best and explain why.

- She likes to _____ her hair. *(twirl)*
- We _____ to each activity around the class. *(rotate)*
- _____ the key to open the door. *(Turn)*

Reading

Evaluating Language Choices

Entering/Emerging
Have students respond to different situations (e.g., Does a wheel spinning round and round on a car rotate?", with "That rotates." or "That does not rotate."

Transitioning/Expanding
Prompt and support students to recall what from the read-aloud rotates**.**

Bridging
Challenge students to think of other situations in which something would rotate**.**

Challenge

Is the following sentence referring to rotation or another important vocabulary word? Our planet makes one revolution around the sun a year? *(No, this is an orbit.)* How are these two different? *(An object rotates around itself, but orbits around some other object.)*

Lesson 2: The Earth and the Sun

Application

20M

Speaking and Listening: After observing a demonstration, students will explain why the sun appears to be moving across the sky.
[SL.1.2]

SAYINGS AND PHRASES (5 MIN)

AM and PM

- Remind students that each time the earth makes one complete rotation, one full day passes. There are twenty-four hours in one full day.
- Tell students that half of twenty-four hours is twelve hours, so there are approximately twelve hours in the day and twelve hours in the night.
- Point to the numbers on a clock dial as you count one o'clock through twelve o'clock.
- Explain to students that, in the United States, we don't say thirteen o'clock through twenty-four o'clock for the last twelve hours of the day. Instead, after we count to twelve o'clock for the morning hours, we start at one o'clock and begin counting to twelve all over again for the afternoon and evening hours.
- Tell students that there are two twelve o'clocks: one at noon and one at midnight; two one o'clocks, one in the afternoon and one at night; two two o'clocks, and so on. Explain to students that since there are two twelve o'clocks, etc., people need to know at what time of day (morning, afternoon, or evening) we are referring to.
- Tell students that this is the reason why, if we are talking about the hours between midnight and one minute before twelve o'clock noon, we say "am." Have students repeat "am."
- Tell students that "am" stands for two Latin words (*ante meridian*) that mean "before noon."
- Explain that if we are talking about noon or the hours between twelve o'clock noon and one minute to midnight, we say "pm." Have students repeat "pm."
- Tell students that "pm" stands for two other Latin words (*post meridian*) that mean "after noon."
- As you read the following example, point to the corresponding numbers on a clock dial: "If the time is one hour before twelve noon, we say that it is eleven

Challenge

How would you write one minute before twelve o'clock noon? *(11:59)* How would you write one minute to midnight? *(11:59)* How do you distinguish between these two times? *(By adding* am *or* pm *to the end)*

o'clock am. If the time is one hour after twelve noon, we say that it is one o'clock pm."

- Tell students which activity you are usually engaged in at noon so that they can judge if they have reached noon yet today. Then point to the clock, and tell students what time it is.

Check for Understanding

One-Word Answer: Based on what you now know, would you add "am" or "pm" to the current time? *(Answers will vary.)*

- Find opportunities each day to talk about *am* and *pm*.

DAY AND NIGHT DEMONSTRATION (15 MIN)

- Remind students that earlier in the day they saw a demonstration of how the earth rotates on its axis and revolves around the sun.
- Explain that now you will repeat that demonstration, but that this time you will use a flashlight to demonstrate day and night. This demonstration will help students understand what's happening in the sky at sunrise and sunset.
- Show students the globe with the area in which they live marked by a flag or pin. Darken the room.
- Ask a volunteer to point the flashlight at the globe while you hold it steady. Tell students that the flashlight represents the sun. Tell students that when the marked area is directly in the path of the sun, it is day in your town.
- Explain that when it is day in your town, it is night on the opposite side of the globe. Identify the country directly opposite your town (i.e., on the other side of the globe). Have students observe that when it is day in your town, the country on the opposite side of the globe is not illuminated and is in shadow. Then slowly spin the globe counterclockwise until that country is hit directly by the flashlight's beam. Ask a volunteer to point to the flag or pin for your town without spinning the globe. Ask students whether it is day or night in your town when the sun is hitting the opposite side of the globe. (*night*)
- Now continue slowly spinning the globe counterclockwise, until the flag or pin representing your town is once again directly in the beam of light.

Support

You may wish to have students come up with motions and/or sounds to represent daytime and nighttime, and sunrise and sunset.

- Explain that when the globe makes a full rotation, one whole day, or twenty-four hours, has passed on the earth. Remind students, however, that when it is day in one place on the globe, it is night on the opposite side. The side of the globe not facing the sun is in shadow, which makes the sky dark.
- Now, tell students that by using the globe, you are going to show them how sunrise and sunset happen. Ask another volunteer to point the flashlight at the globe and hold it steady, reminding students that the flashlight represents the sun, the globe is the earth, and the flag or marked area on the globe is the town in which they live.
- Start with the marked side of the globe turned away from the flashlight. Say, "It's night in our town now." Then spin the globe very slowly counterclockwise (or to the left). Stop spinning the globe as soon as the light of the flashlight is near the mark that represents your town. Compare this to sunrise, when you just begin to see light in the sky in your town.
- Rotate the globe so the pin/flag representing your town is directly facing the flashlight. Compare this to twelve o'clock noon, when the sun shines directly on your town, and is directly overhead in the sky. Then rotate the globe counterclockwise again, until the light from the flashlight is just past the mark of your town. Compare this to sunset in your town, when there is only a little sun left in your view.
- Explain that at sunrise, you were turning the pin/flag representing your town toward the sun, so the sun started to come into the view of your town. Explain that at sunset, you were turning the pin/flag representing your town away from the sun, so the sun was starting to leave the view of your town.
- Then ask students to turn to a neighbor and discuss the following question: Why does the sun look like it's moving across the sky from sunrise to sunset? (*because the earth is moving*)
- Encourage students to share and elaborate upon their responses with domain-related vocabulary.

Exit Pass

On a piece of paper, have students draw a picture and write a phrase or sentence describing what causes day and night. For example, a student might draw a picture of the sun in the sky and write, "The earth rotating causes day and night."

End Lesson

LESSON

3

ASTRONOMY

Stars

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will explain why the sun appears to be moving across the sky.
[RI.1.8; SL.1.2]

Reading

Students will describe the appearance of stars.
[RI.1.1]

Language

Students will demonstrate an understanding of the Tier 2 words *dusk* and *dawn*.
[L.1.5, L.1.5c]

Reading

Students will compare and contrast factual and fictional texts about stars.
[RI.1.9]

FORMATIVE ASSESSMENT

Exit Pass

Astronomy Journals Students will compare and contrast factual and fictional texts about stars in a journal.
[RI.1.9; W.1.8]

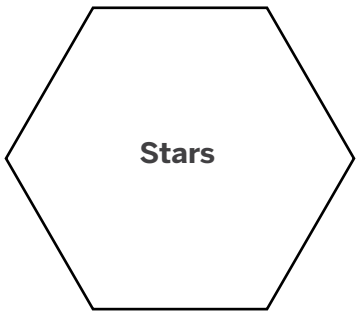
LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
What Have We Already Learned?	Whole Group	10 min	❑ plastic hoop ❑ globe, examples of solids and liquids (optional) ❑ Idea Web for the sun (optional)
Read-Aloud			
Purpose for Listening	Whole Group	30 min	❑ Idea Web for stars ❑ Poster 2M (optional)
"Stars"			
Comprehension Questions			
Word Work: *Dusk*			
This is a good opportunity to take a break.			
Application			
Poetry Read-Aloud	Independent	20 min	❑ "Star Light, Star Bright" ❑ "Twinkle, Twinkle, Little Star" ❑ astronomy journals ❑ Activity Page 3.1 (optional) ❑ drawing and writing tools
Astronomy Journals			

ADVANCE PREPARATION

Read-Aloud

- Prepare and display an Idea Web for stars. After you have filled this out, display it next to the idea web for the sun, and draw a line connecting the two, to show that the sun is a star. Alternatively, a digital version may be found in the digital components for this domain.



Application

- Display enlarged versions of "Star Light, Star Bright" and "Twinkle, Twinkle, Little Star" on the board/chart paper. Alternatively, digital versions may be found in the digital components for this domain.

Universal Access

- Display the Idea Web for the sun you created for Lesson 2.
- Gather a globe, plastic hoop, and examples of liquids and solids.

CORE VOCABULARY

debris, n. the pieces left over when something is broken or destroyed
Example: When I dropped my plate of food, I had to clean up the mess while my dad swept up the debris from the broken plate.
Variation(s): none

dusk, n. the time of day just after sunset when the sky is not yet fully dark
Example: In the summertime, my mom lets me play outside until dusk.
Variation(s): none

meteor, n. the bright light you see when something flies from space into Earth's atmosphere; "shooting star"
Example: Some people make a wish on the first star they see at night, but I will make a wish on the first meteor I see.
Variation(s): meteors

telescopes, n. instruments that make distant objects appear closer when you look through them
Example: Telescopes are fun to use because you can see things in the sky that you cannot see at all without them.
Variation(s): telescope

universe, n. everything that exists, including planets, stars, and space itself
Example: The universe is so big that I can't even imagine it.
Variation(s): universes

Vocabulary Chart for "Stars"

Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Vocabulary	meteor *(meteoro)* telescopes *(telescopios)*	debris dusk universe *(universo)*	
Multiple Meaning			
Sayings and Phrases	in the blink of an eye shooting star streak of light feast your eyes on from time to time pretty far away		

Lesson 3: Stars

Introducing the Read-Aloud

10M

Speaking and Listening: Students will explain why the sun appears to be moving across the sky.
[RI.1.8; SL.1.2]

WHAT HAVE WE ALREADY LEARNED?

- Ask students what causes day and night. Encourage students to identify specific things that they heard in the read aloud they had heard before. *(the earth's rotation)*
- Model for the students how to use the read-aloud to support your answer. Turn to Image 2A-3 Earth Rotation and explain how this part of the read-aloud supports the answer.
- Review the previous read-aloud, highlighting two ways the earth moves: rotating on its axis and orbiting around the sun.
- Place the hoop sun on the floor. Ask students to stand, rotate (spin), and then orbit the "sun."
- Remind students that the earth rotates when it spins on its own axis, and that this spin creates day and night.

Check for Understanding

Recall: [Ask students to recall the demonstration they observed during the previous lesson as well as cite specific from the read-aloud to support their answers.] When the part of Earth we are on is facing the sun, what time of day is it? *(day)* When our part of Earth is facing away from the sun, what time of day is it? *(night)* So why does the sun look like it is moving across the sky? *(the earth's rotation)*

- Remind students that the earth is a planet because it orbits the sun.
- Ask students if the sun is a planet or a star. (*a star*)
- Tell students that today's read-aloud is about stars.

Reading

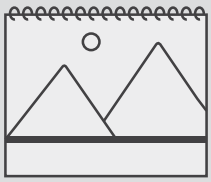
Reading/Viewing Closely

Entering/Emerging
Have students answer simple yes/no questions (e.g., "Is the sun a star?").

Transitioning/Expanding
Have students respond to the question using a sentence frame (e.g., "I learned that the sun . . . ").

Bridging
Have students respond to the question in complete sentences, using key details.

Flip Book 1A-5



Support

Show students the Idea Web for the sun and examples of liquids and solids.

Support

Show students an object up close. Then walk to the opposite side of the room and ask them if it still appears to be the same size. Point out that this same thing happens to the stars in the sky. The sun is closer so it looks much larger than the other stars.

Show image 1A-5

- Remind students they have already learned about Earth's most important star. Ask them to recall what it is. *(the sun)* Ask students what they remember learning about the sun. (*very hot, made of gases, huge and far from Earth, appears to rise and set, etc.*)
- Ask students what a gas is. *(not a solid or liquid)*
- Tell students stars are balls of gases even though they appear to be in points as we view them from so far away.
- Point out that the sun is one of billions of stars in space. It looks bigger than the stars we see in the night sky because it is much closer to Earth than the rest of the stars, even though it is still very far away.
- Give another example of how things that are far away look smaller than they actually are. *(Answers may vary, but could include houses when you are in an airplane, the village below when you are hiking up a mountain, etc.)*
- Tell students that today's read-aloud will teach them more about the faraway stars, which actually look smaller to us than they really are.

Lesson 3: Stars

Read-Aloud

30M

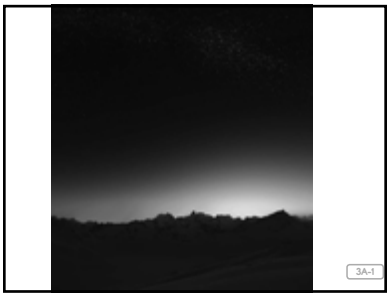
Reading: Students will describe the appearance of stars.
[RI.1.1]

Language: Students will demonstrate an understanding of the Tier 2 words *dusk* and *dawn*.
[L.1.5, L.1.5c]

PURPOSE FOR LISTENING

- Explain to students that they will now learn more about stars. They will even learn about "shooting stars," which aren't really stars at all! Tell students to listen carefully to find out what "shooting stars" really are.

"STARS" (15 MIN)

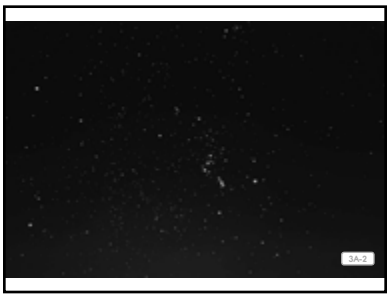


Show image 3A-1: Dusk
When nighttime comes, you can say good night to the sun—our daytime star—and you can say hello to all the millions of other stars that shine in outer space. *Stars are hot balls of gas that give off light and heat.* Remember, the stars are always out there. Outer space does not disappear during the day and then reappear at night. You can see those stars at night because the sun's light is no longer shining on your part of the earth, but the stars are always there.

At **dusk**, just after the sun has set in the west but before all of its light has faded, the first stars of night appear. *It is dusk in this image.* One, two, three, and then more and more. The darker it is, the more stars you can see. If you live in the city, then you can't see as many stars as people who live in the country can see. Lights in the cities brighten the night sky and make it difficult to see the stars. Out in the country—and especially out in the wilderness far away from buildings, street lights, and cars—the night sky seems to explode with glittery, twinkling stars.

Support

As you read, pause to discuss and add relevant information to the Idea Web for stars.

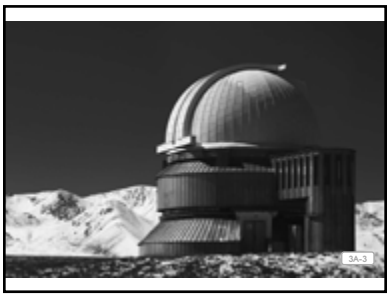


Show image 3A-2: Starry night
They may look small, but many of those stars that you see *[Point to a few stars.]* are actually incredibly large. Many stars are larger than our own sun, which, as you may remember, is big enough to fit a million Earths inside. The stars look small because they are so far away. *Everything looks smaller when it is far away. Think of how small an airplane looks when it is high up in the sky.* And the stars look like they're blinking, but they're actually shining steadily. The gases in our atmosphere cause their light to look like it is twinkling.

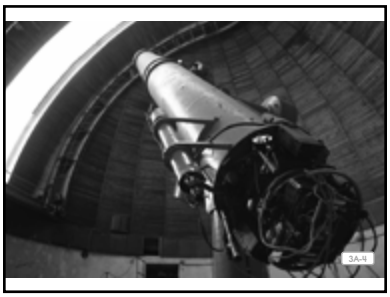
Just how far away are the stars? Here's one way to think about it: if someone put you on the fastest rocket ship today and launched you out into space, it would take you thousands of years—about seventy-three thousand to be exact—to reach the nearest star beyond our sun! That's pretty far away. However, you can still see the light from that massive, hot star, even though it looks more like a tiny, twinkling diamond from here on the earth.

Support

Show students Poster 2M. In the read-aloud, the word *ship* means a large spacecraft. The word *ship* can also mean a large boat or it can mean to send a package through the mail.

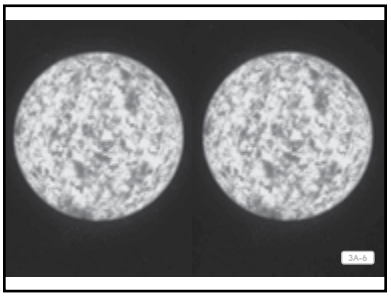


Show image 3A-3: Observatory
At night, astronomers study the stars. Astronomers work in observatories, which are buildings where large **telescopes** are housed. *Telescopes are tube-like tools with lenses and mirrors used for magnifying objects in space in order to observe them.* Observatories are built high up on hills or mountaintops, where there are no buildings or trees blocking the telescope. *What smaller word do you hear in the word observatories?* Observe *means to look.* The roof of the observatory is designed so that it can open and allow the giant telescope inside to move up and down and all around without bumping into anything.



Show image 3A-4: Inside observatory
Astronomers need really big, powerful telescopes to do their work. This is the kind of telescope you find inside an observatory. *[Point to the large telescope.]* That's a big telescope!

Show image 3A-5: Conventional telescope
But you don't need a massive telescope and a fancy mountaintop observatory to enjoy the wonders of stargazing, or looking at the stars. If you want to get a better look at the stars or a closer look at the moon, a pair of binoculars will do the trick. *[Hold your hands to your eyes like you are holding binoculars.]* Or you can use a telescope like this one. *[Point to the telescope in the image.]* You'd be surprised by all the different things you can see through a telescope!



Show image 3A-6: Magnified stars *These are pictures of stars that have been made larger, or magnified.*
Through careful study, astronomers have figured out many interesting facts about stars, even though no person is able to travel and study a star up close. *Even though, as we learned, it would be possible to travel to our sun because it would only take a few months to get there, we wouldn't want to do that because the sun is far too hot.* Astronomers have learned that some stars are older than other stars. Some stars are hotter than others. Some appear red through the telescope *[Point to the red star on the left.]* and others appear blue. *[Point to the blue star on the right.]* Stars change color depending on how hot they are, and how hot a star is depends on its age, size, and other factors.

Show image 3A-7: Meteor
But you do not need a telescope in order to appreciate the wonders of outer space. If you look at the sky long enough on any given night, you will eventually see a **meteor**, or "shooting star."

A meteor is the light we see when a rock that flies through space enters Earth's atmosphere. The meteor, or bright light, appears as a streak in the sky before it disappears in the blink of an eye. At first glance, a meteor may look like a star is literally falling through the sky. However, stars do not move like that. Meteors—although they are sometimes called "shooting stars"—are not

Support

Show an image or sample of binoculars.

Challenge

Do you think a large star would be hotter than a small star? *(Answers may vary, but encourage students to explain their reasoning.)*

Reading

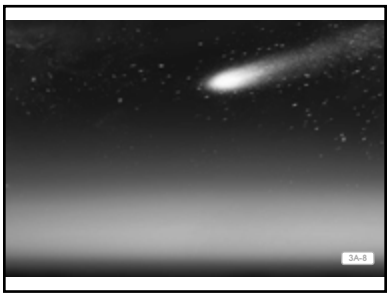
Listening Actively

Entering/Emerging
Have students answer simple yes/no questions (e.g., "Do we only see meteors at night?").

Transitioning/Expanding
Have students respond to the question using a sentence frame (e.g., "We only see meteors at night because . . . ").

Bridging
Have students respond to the question in complete sentences, using key details from the illustration and read-aloud.

stars at all. *So if you see a shooting star, what are you really seeing?* (the light of a rock burning up in earth's atmosphere)



Show image 3A-8: Close-up of rock hitting Earth's atmosphere

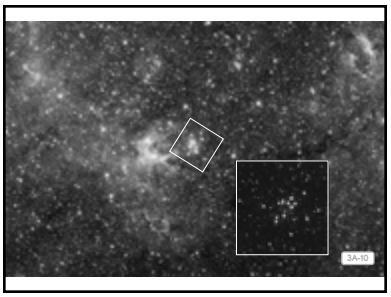
There are billions of rocks and other **debris** in outer space. Some are quite large, but most are tiny, between the size of a grain of sand and a baseball. *When rocks break in space, all the broken pieces, or debris, just move around together because there isn't enough gravity for them to fall anywhere.*

These rocks and debris are whizzing around all over the place in outer space. Occasionally, one crashes toward Earth. Before it can hit Earth's surface, however, it crashes into Earth's atmosphere. For a space rock, hitting the earth's atmosphere is like a person running into a brick wall, except the atmosphere doesn't stop it. The rock or debris hits the atmosphere at an incredible speed and keeps moving through. As it does so, it generates intense heat. The rock burns up as it enters the uppermost parts of Earth's atmosphere, creating a streak of light—a meteor, or a "shooting star" as some people call it. *If meteors occur all the time, why do we only see them at night?*

Show image 3A-9: Recovered meteorite

Occasionally, bits and pieces of rock survive their trip through the atmosphere and fall to Earth. This is rare, but it does happen from time to time, and it is possible to find pieces of them on the ground. When part of a rock or debris survives the trip through the atmosphere and lands on Earth, it is called a meteorite. *[Point to the meteorite in the image.]*

The meteorite in this picture is probably not the most exciting rock you have ever seen, but it is pretty amazing to think that it came from outer space. Sometimes, by studying meteorites, scientists discover new types of rock that do not exist on Earth! *You will learn more about rocks in the next domain.*



Show image 3A-10: Star cluster

Outer space is a strange and wonderful place. By studying the stars, planets, and other objects in space, astronomers have learned many things about this incredible **universe**, of which we and our planet Earth are but a teeny, tiny part. *The universe is everything in space taken together, including planets, stars, and space itself.* Feast your eyes on this massive star cluster *or group* for a moment and imagine, if you can, the incredible number of stars and the incredible distances between us and them, and how much there is for us to learn about our universe. For instance, look at the very center of this photo. There in the middle is a little cluster of fourteen bluish stars. Added together, astronomers estimate that these fourteen stars combined are over 20,000 times larger than our sun! *And remember, our sun is a million times bigger than the whole planet Earth.* That's so huge, it's hard to think about, and that's just fourteen stars out of all the stars in this photo!

Support

Have students count the stars in the inset.

COMPREHENSION QUESTIONS (10 MIN)

As students answer the following questions, add relevant information to the Idea Web for stars.

1. **Inferential** When we look up at the stars at night, they look like they are blinking and they look tiny. Are stars actually tiny and blinking? (*no*) Why do they look like they're blinking? (*Gases in our atmosphere cause stars to look like they are twinkling.*) Why do they look tiny? (*They are really far away.*)
2. **Literal** Stargazers stand outside and look up at the stars, sometimes using binoculars. Astronomers have special buildings they go to in order to study the stars. What are these buildings called? (*observatories*) What tools do astronomers use to see the stars more clearly? (*telescopes*)

Show image 3A-6: Magnified stars

3. **Literal** We learned that not all stars are the same. Why are some stars blue and some stars red? (*Some are hotter than others because of their age, size, and other factors.*)

Challenge

What makes a meteorite different from a meteor? *(A meteorite has entered the atmosphere and landed on Earth; a meteor is the bright light we see when a rock enters the atmosphere from outer space.)*

Check for Understanding

Idea Web: What can we add to the Idea Web to describe stars? *(Answers may vary, but may include that they are very large, far away, different colors, made of gas, appear to us at dusk/night, can be seen close up with telescopes, etc.)*

4. **Literal** If you look up in the sky at night, you might see a streak of light, sometimes called a "shooting star." Is it actually a star? (*no*) Do any stars fall through the sky? (*no*) What are you probably really seeing? (*a meteor*)
   - **Literal** What is a meteor? (*a rock that flies through space*) What happens to meteors when they hit the earth's atmosphere? (*They usually burn up completely.*)
5. **Evaluative** *Think Pair Share:* People who lived thousands of years ago didn't have telescopes or books about stars, so all they knew about stars was what they could see outside at night. Imagine that you could travel back in time thousands of years and tell these people that the sun is actually a star. Do you think they would believe you? (*probably not*) Why or why not? (*Answers may vary, but may include that the stars look so small compared to the sun, and the stars come out at night, whereas the sun comes out during the day.*)

WORD WORK: DUSK (5 MIN)

1. In the read-aloud you heard, "At dusk, just after the sun has set in the west but before all of its light has faded, the first stars of night appear."
2. Say the word *dusk* with me.
3. Dusk is the time of day just after sunset, when the sky is not yet as dark as it will be.
4. The sky glows with the colors of sunset at dusk, when the day ends and the night begins.
5. What do you usually do at dusk? Try to use the word *dusk* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "At dusk I usually . . . "]
6. What's the word we've been talking about?

Use an Antonyms activity for follow-up. We know that dusk is the time when the sun is going down and day turns into night. The opposite of dusk, or its antonym, is dawn, the time when the sun is coming up and night turns into day. Listen to the following examples. If I am describing something that would be going on in the sky at dusk, say, "That happens at dusk." If I am describing something that would be going on in the sky at dawn, say, "That happens at dawn."

- The sun sets. (*That happens at dusk.*)
- The sun rises. (*That happens at dawn.*)
- The stars fade. (*That happens at dawn.*)
- The stars appear brighter. (*That happens at dusk.*)
- The moon rises. (*That happens at dusk*.)

Support

Show students Flip Book images 2A-1 and 3A-1.

Lesson 3: Stars

Application

20M

Reading: Students will compare and contrast factual and fictional texts about stars. **[RI.1.9]**

POETRY READ-ALOUD (15 MIN)

- Tell students that for thousands of years, people have been stargazing, looking up and wondering about the same stars that you can also see every night. Explain that, perhaps because the stars are so far away and there are so many of them, or perhaps because they make the night so beautiful, the stars have inspired people to imagine and dream as they gaze at the night sky.
- Explain that students have listened to a nonfiction, or true, read-aloud to learn facts about stars. Tell them that now they will listen to imaginative poems about stars.
- Discuss how a poem is different from a story. (*fewer words, not in full sentences, sometimes rhymes, has descriptive language, etc.*)
- Point out that according to one nursery rhyme, people can make a wish on a star and it will come true, especially if it's the first star they see in the evening.
- Show students the "Star Light, Star Bright" nursery rhyme you prepared in advance.
- Ask students if they have heard this poem before. Explain that they will learn a nursery rhyme about wishing on a star, using the echo technique.
- Tell students you will read the whole nursery rhyme while they listen and watch as you point to each word. Then you will repeat the first line and point to each word as you read it. You will stop and give students a chance to echo the words while you point to them again. Tell students you will continue doing this for each line of the rhyme.

- Follow this procedure with students:

  Star light, star bright
  First star I see tonight
  I wish I may, I wish I might
  Have the wish I wish tonight.

- Then ask students if they know any songs about stars. Take a few responses, and if "Twinkle, Twinkle, Little Star" does not get mentioned, bring it up.
- Explain that the words from "Twinkle, Twinkle, Little Star" actually come from a poem written over two hundred years ago (in 1806) by a woman who liked to gaze at the stars. The name of the poem was "The Star," and the woman's name was Jane Taylor.
- Explain that the poem is a lot longer than the song they know.
- Read the poem aloud, encouraging students to listen carefully to the verses that follow the famous first verse.

  Twinkle, twinkle, little star,
  How I wonder what you are!
  Up above the world so high,
  Like a diamond in the sky.

  When the blazing sun is gone,
  When he nothing shines upon,
  Then you show your little light,
  Twinkle, twinkle, all the night.

  Then the traveler in the dark,
  Thanks you for your tiny spark,
  He could not see which way to go,
  If you did not twinkle so.

  In the dark blue sky you keep,
  And often through my curtains peep,
  For you never shut your eye,
  Till the sun is in the sky.

  'Tis your bright and tiny spark,
  Lights the traveler in the dark:
  Though I know not what you are,
  Twinkle, twinkle, little star.

Speaking and Listening

Presenting

Entering/Emerging
Have students practice the beat of the poem.

Transitioning/Expanding
Have students echo most of the words to the poem.

Bridging
Have students echo all the words of the poem.

- Ask students if they have any questions about the poem, and answer their questions.
- Highlight the line "How I wonder what you are." Explain that over two hundred years ago, most people, with the exception of astronomers, really didn't know much about what stars were. Stargazers from long ago only knew what they could see with their own eyes: that stars were tiny, that they covered the night sky, and that they twinkled. Everything else they had to imagine.
- Ask students what words and phrases are used to describe stars in these poems. *(Answers may vary, but may include bright, twinkle, in the sky, comes out when the sun is gone, etc.)*
- Ask students to consider these descriptions and what they have learned about stars in the read-aloud, referencing the Idea Web for stars. How does this compare to what the poets wrote about stars? What is similar? What is different? *(Answers will vary, but may include that stars are bright; they don't actually twinkle; they are part of outer space, not Earth's atmosphere; they are always there but we can only see them at night; etc.)*

ASTRONOMY JOURNALS (5 MIN)

- Distribute students' astronomy journals, and remind students that they drew pictures of and wrote about objects in the sky the last time they used their journals.
- Remind students that when they draw or write what they see, they are recording their observations.
- Tell students that in today's journal entry, they will write about the fiction and nonfiction read-alouds they heard today.

Exit Pass

- Have students write one to three sentences comparing the fiction and nonfiction read-alouds they heard today.
- Collect students' journals to check that they are recording information on the appearance of stars while comparing texts.

End Lesson

Support

Some students may benefit from using the modified Astronomy Journal prompts on Activity Page 3.1. If students have difficulty thinking of comparisons, refer to the Idea Web for stars and the poems, and ask students: What can you see when you look in the sky at dusk or dark? What did you learn from the read-aloud "Stars"? What did people learn about stars in more recently? What did the poems have to say about stars?

Challenge

What would you tell Jane Taylor, the author of "The Star," about what stars actually are?

LESSON

4

ASTRONOMY

Stargazing and Constellations

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will describe the appearance of stars.
[SL.1.4]

Reading

Students will identify major constellations and important discoveries by astronomers.
[RI.1.2]

Language

Students will demonstrate an understanding of the Tier 2 word *ancient* and the saying "hit the nail on the head."
[L.1.4]

Reading

Students will create a model of a constellation.
[RI.1.2]

FORMATIVE ASSESSMENT

Exit Pass

Astronomy Journals Students will record their observations of constellations in a journal.
[W.1.8; RI.1.2]

LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
What Have We Already Learned?	Whole Group	10 min	❑ Idea Web for stars (optional)
Read-Aloud			
Purpose for Listening	Whole Group	30 min	❑ images of a scorpion and a bull (optional)
"Stargazing and Constellations"			
Comprehension Questions			
Word Work: *Ancient*			
This is a good opportunity to take a break.			
Application			
Sayings and Phrases: Hit the Nail on the Head	Whole Group	20 min	❑ chart paper ❑ images of hammer/nail and constellations ❑ scissors, drawing and writing tools ❑ Astronomy Journals ❑ Activity Page 4.1 (optional) ❑ Idea Web for stars (optional)
The Really Big Dipper			

ADVANCE PREPARATION

Application

- Be prepared to group students into seven groups and give each group a piece of chart paper and drawing tools. Students will draw a single star on each piece of chart paper, cut it out, and then will put them together on the wall or floor to form the Big Dipper. If you have enough students to create fourteen groups of at least two children each, consider having students make enough stars to make models of both the Big Dipper and the Little Dipper.

Note to Teacher

It is important to note the Big and Little Dippers are not constellations. Rather, they are groups of stars that are part of the constellations Ursa Major (Great Bear) and Ursa Minor (Little Bear), respectively.

Universal Access

- Display the Idea Web for stars you created in the previous lesson for students to reference.
- Gather images of a scorpion and a bull to show students during the read-aloud.

CORE VOCABULARY

advances, n. progress
Example: With advances in medicine, babies get shots to protect them from many terrible diseases.
Variation(s): advance

ancient, adj. very, very old; long, long ago
Example: In ancient times, Egyptians built the pyramids.
Variation(s): none

celestial bodies, n. any objects that can be found in space, including planets, stars, comets, or meteors
Example: The sun, the moon, and other stars are examples of celestial bodies.
Variation(s): celestial body

constellations, n. groups of stars in the night sky that seem to form certain shapes or outlines
Example: Last summer, my dad showed me how to find different constellations in the night sky.
Variation(s): constellation

myths, n. stories from ancient times that explain events or things in nature
Example: In ancient times, some people told myths about a sun god who ruled over the world.
Variation(s): myth

Vocabulary Chart for "Stargazing and Constellations"

Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Vocabulary	celestial bodies constellations *(constelaciones)*	ancient myths *(mitos)*	
Multiple Meaning		advances *(avances)*	
Sayings and Phrases	figured out has a tough time more than meets the eye		

Lesson 4: Stargazing and Constellations

Introducing the Read-Aloud

10M

Speaking and Listening: Students will describe the appearance of stars. **[SL.1.4]**

WHAT HAVE WE ALREADY LEARNED?

Check for Understanding

Turn and Talk: Describe a surprising fact you learned about stars during the previous read-aloud. *(Answers may vary, but may include that stars are really far away, really big, really hot, are around all the time even though we can only see them at night, and don't twinkle or fall through the sky.)*

- Ask students whose job it is to study the stars. *(astronomers)*
- Explain that astronomers, using observatories and telescopes, have learned that many of the things we might believe when we look at the stars are not actually true.
- Explain that in today's read-aloud, students will take a step back in time thousands of years to ancient times.
- Remind students that they learned about groups of people who lived in ancient times, such as the Mesopotamians, ancient Egyptians, Native Americans, and the Maya, Aztec, and Inca people. Remind students that these cultures also observed the stars and weather, but they believed things that were different from what we know now.

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging
Ask students simple yes/no questions (e.g., "Are stars really small?").

Transitioning/Expanding
Provide students with a specific sentences frame (e.g., "Stars are really small/big.").

Bridging
Encourage students to use key details to answer in complete sentences.

Challenge

Turn to a partner and answer this question: If you didn't know what you now know about stars, how might you explain what you saw when you looked up at the sky? *(Answers will vary.)* Now, pretend you are an astronomer, and tell your partner some facts about what they just described. *(Answers will vary.)*

- Help students recall examples of natural events, such as rain or an abundant harvest, that ancient people could not always predict or explain. Then remind students that many ancient people told stories, or myths, to explain how these events occurred.
- Tell students that in the same way, if ancient people could not predict or explain things they saw in the night sky (outer space), they told stories to explain these events or things in nature.

Lesson 4: Stargazing and Constellations

Read-Aloud

30M

Reading: Students will identify major constellations and important discoveries by astronomers.
[RI.1.2]

Language: Students will demonstrate an understanding of the word *ancient*.
[L.1.4]

PURPOSE FOR LISTENING

- Tell students that they will now learn about what ancient people saw when they looked at the stars. Explain to students that ancient people saw outlines of pictures in the way stars appeared in the night sky, and that people still look for these pictures today. Ask students to listen carefully for the name of these pictures made with stars.
- Then emphasize that the first astronomers used science to study the stars and learned many new things. Ask students to also listen for the names of two early astronomers who helped people understand the nature of the universe, developing new tools for studying the stars.

"STARGAZING AND CONSTELLATIONS" (15 MIN)

Show image 4A-1: Ancient Greeks under starry sky

Thousands of years ago, people had no telescopes or rocket ships. Although people back then did not have the tools and knowledge that we have today, they were just as curious about the stars and other **celestial bodies.** *or objects found in space* The **ancient** Greeks, Arabs, Romans, Chinese, Egyptians, Turks, Mayans, Babylonians, and countless others *who lived long, long ago* all studied the stars and tried to figure out what they were and why they were there.

Show image 4A-2: Group of ancient Arabs charting constellations

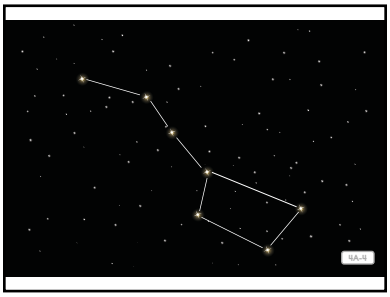
Although they did not know what the stars were made of or how far away they really were, the ancient people named the stars and mapped them out. *We still use these names today.* They figured out which stars appeared in the sky during certain times of year. And even though thousands of years have passed on Earth, the stars have basically remained the same. In other words, when you look up at the stars at night, you are seeing very nearly the same stars the ancient Greeks, Arabs, and countless others saw, as well! *Outer space has changed very little in all those years!*

Support

Point out the stars that make the outline of this constellation. Explain that this image is someone's imaginative idea of what the ancient Greeks saw when they looked at that set of stars, or constellation.

Show image 4A-3: Constellation in the night sky

The **ancient** Greeks believed that the stars had been placed in the sky by gods in order to tell stories and teach lessons. The Greeks identified certain groups of stars in the night sky that seem to form specific shapes. These shapes are called **constellations**. *That's the name for the pictures they saw in the stars.* In the United States, Europe, and many other parts of the world, we still call the stars by the names that the ancient Greeks or Arabs used so long ago.



Show image 4A-4: Big Dipper

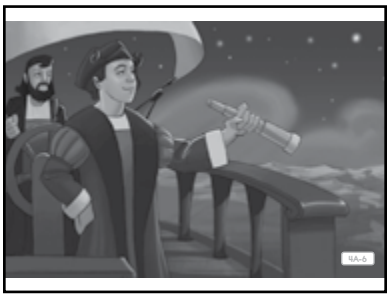
[The Big Dipper is not actually a constellation in itself, but part of a larger constellation called Big Bear. That is why it is referred to as a "group of stars" in this read-aloud.]

One of the first groups of stars that young stargazers in the United States learn about is also the easiest one to spot. The Big Dipper looks like a giant soup ladle up in the sky. *You might also think it looks like a pot with a handle. What does it look like to you?* The Big Dipper is made up of seven stars. The Big Dipper looks different in the sky depending on the time of year. *[Rotate the Flip Book as you read the following sentence.]* Sometimes the Big Dipper looks right side up, sometimes it looks upside down, and sometimes it appears to be standing on

its handle! That is not because the Big Dipper moves, but because the earth is rotating on its axis and orbiting around the sun.

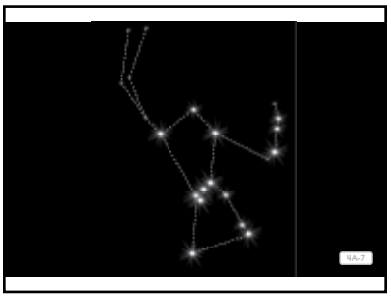
Show image 4A-5: Little Dipper

The Big Dipper has a friend called the Little Dipper. The Little Dipper also contains seven stars. The bright star at the end of the handle is special. It is called Polaris, or the North Star. Unlike other celestial bodies, the North Star basically stays in the same place in the sky as we observe it from Earth—always in the north.



Show image 4A-6: Sailors navigating sailing ship

Since ancient times, people have relied on this star to find their way in the world. Knowing which way is north is the first step to figuring out in which direction you are heading. Sailors often used to look for the North Star on starry nights out on the wide ocean. *Because Polaris is always in the north sky, sailors could use it like a compass to navigate ships north, south, east, or west.*



Show image 4A-7: Orion

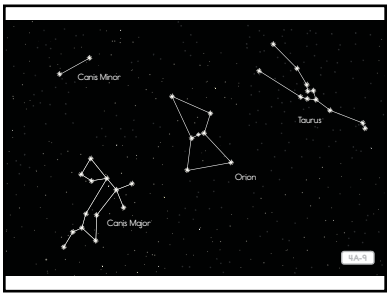
This picture shows one of the most famous constellations of all: Orion. Ancient Greeks told stories, or **myths**, about Orion, a famous hunter. *Myths are stories from ancient times that explain events or things in nature. What other myths have you heard this year?* The constellation Orion is known all over the world. The constellation itself contains eight main stars. Orion's Belt, made up of the three stars in a row across his body, is the easiest to spot. As you can see, it takes a little imagination to look at these stars and see a hunter. The single star in the upper left is imagined to be the beginning of a raised arm, which is holding a club or a sword. With his other arm, imagined to extend from another single star, he holds a shield. *[Point to the three stars on the right side of the image.]*

Show image 4A-8: Scorpio constellation

According to one myth, Orion bragged he was such a good hunter that he could kill all the animals on Earth. The gods decided to punish him by creating Scorpio, a giant scorpion that Orion could not defeat. *[Point to the tail in the bottom left of the image.] A scorpion is a poisonous, spider-like insect with a curved tail.*

Support

Show students images of a real scorpion and bull to compare with the constellations.



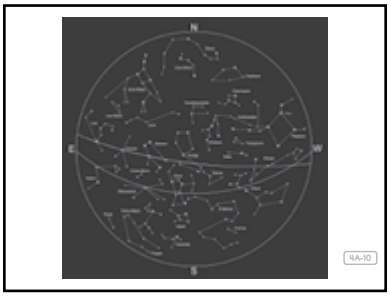
Show image 4A-9: Orion, Taurus, Canis Major, and Canis Minor

Not far from the Orion constellation is Taurus, which shows the head and horns of a mighty bull. It is often said that the hunter Orion is fighting the bull Taurus. So, according to the myths, Orion has a tough time up there: he is being chased by a giant scorpion at the same time he is fighting a giant bull!

Support

To have "a tough time" is the same as saying that Orion has a hard or difficult time.

Fortunately, Orion has a couple of friends: his two loyal hunting dogs, Canis Major and Canis Minor. *These are Latin words.* Canis *means dog,* major *means big, and* minor *means small. So what does Canis Major mean?* (big dog) *What does Canis Minor mean?* (small dog) These dogs follow Orion through the sky, helping him fight Taurus the Bull.



Show image 4A-10: Constellation chart

There are eighty-eight major constellations, and most people around the world use the same basic list. When these constellations were first named, most ancient people could only guess what stars actually were. Ancient people told stories and myths based on what they could see with their own eyes when they looked up at the sky. But we have learned that there is much more to space than meets the eye. In fact, sometimes when we look into outer space, our eyes can play tricks on us.

Support

To have more of something than meets the eye means that there is more than you might notice at first.

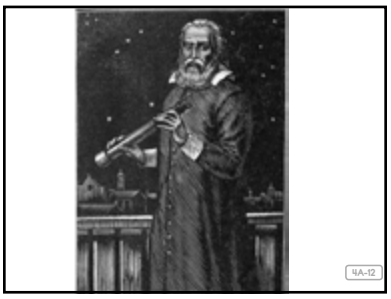
The first astronomers began using mathematics and science to provide different kinds of explanations than the myths that ancient people told to describe what they saw in the sky. Rather than make up stories, astronomers

developed hypotheses, or scientific explanations, based on facts they discovered about outer space. *A hypothesis is different from a story because a hypothesis can be tested.*

Show image 4A-11: Copernicus with model of Earth, showing it revolving around sun

For example, ancient people saw that the sun rose on one side of the sky in the morning and set on the other side of the sky in the evening. Seeing the sun's "movement" across the sky caused ancient people to believe that the sun moved while the earth stood still. Ancient Greeks and Arabs and, in fact, most people in the world, believed that everything in the universe—including the sun and all the stars—revolved around the earth. It took thousands of years before anyone believed that the opposite was true, that the earth in fact revolved around the sun. *Do you remember how we orbited the plastic hoop sun?* This discovery was made by an early astronomer named Nicolaus Copernicus.

Copernicus was the first to use science to explain that Earth actually revolves around the sun. Unfortunately, hardly anyone believed him at the time. That was about 500 years ago.

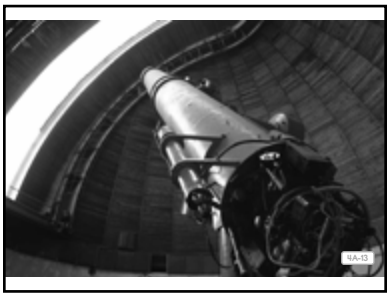


Show image 4A-12: Galileo with telescope

Another astronomer named Galileo came after Copernicus, and he believed what Copernicus said about the earth revolving around the sun. He invented telescopes that helped astronomers prove that Copernicus's theory was true. *What is a telescope?* (a tool that helps make distant objects appear closer) Although Galileo did not invent the first telescope, he did invent very powerful telescopes that helped him and other astronomers make many important discoveries about space. For this reason he is considered by many to be the father of modern astronomy.

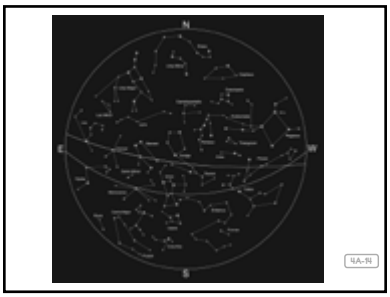
Challenge

Remember that when you look at the sky during the day, the sun looks like it is moving. Because of this, people until only a few hundred years ago believed that the sun revolved around the earth. What is the real reason why the sun looks like it is moving across the sky? *(Answers may vary, but should include that the earth is rotating.)*



Show image 4A-13: Modern telescope

Since the time of these early astronomers, people have gained an incredible amount of knowledge about the stars and the universe and now use tools like telescopes to expand that knowledge each day. Copernicus and Galileo would be amazed by the **advances** *or progress* people have made in astronomy over the past century. Compare this incredibly large modern telescope to the one Galileo was holding in the last picture. *[Point to the telescope, and flip back to the previous page to point to Galileo's telescope.] What is different about these two telescopes?* (one is much larger) Astronomers today use telescopes like this one to study the stars and other distant parts of outer space that Galileo may have never imagined.



Show image 4A-14: Constellation chart

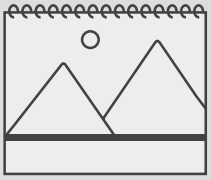
Yet even as we have gained new knowledge about outer space, our understanding of the stars is still built upon the stories and knowledge passed on by people for thousands of years. Next time you find a constellation in the sky, you will know that other stargazers have been studying and telling stories about that same group of stars for thousands and thousands of years.

COMPREHENSION QUESTIONS (10 MIN)

1. **Literal** The ancient Greeks believed that gods put certain groups of stars together in the sky in order to make pictures that would tell stories and teach lessons. What are these pictures called? (*constellations*)

Show images 4A-4, 4A-8, and 4A-9

Flip Book
4A-4, 4A-8, 4A-9



Check for Understanding

Turn and Talk: Name the constellation as I point to it. [Point to the constellation(s) in each image.] Turn to a partner and share one thing you remember about that constellation. [Ask several students to share.]

Show image 4A-4: Big Dipper

2. **Literal** Why is this group of stars called the Big Dipper? (*group of stars that looks like a ladle or pot*)
3. **Inferential** What is special about Polaris, the North Star? (I*t always stays in the north, making it a good star to use for navigation.*)
4. **Literal** What astronomer was the first to say that the earth revolved around the sun? (*Copernicus*)
5. **Literal** We also learned about another important astronomer, Galileo. What invention did he improve upon that helped astronomers make new discoveries? (*telescopes*)

WORD WORK: ANCIENT (5 MIN)

1. In the read-aloud you heard, "The ancient Greeks, Arabs, Romans, Chinese, Egyptians, Turks, Mayans, Babylonians, and countless others all studied the stars."
2. Say the word *ancient* with me.
3. If something is ancient, it is very, very old or from a very, very long time ago.
4. You may remember we studied ancient Egypt and Mesopotamia, two ancient civilizations from thousands of years ago.
5. Think of one thing in your life that was not around in ancient times. For example, you could say, "There were no televisions in ancient times." Try to use the word *ancient* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "There were no _____ in ancient times."]
6. What's the word we've been talking about?

Use an Antonyms activity for follow-up. We know that *ancient* means a long, long time ago, or very, very old. The opposite of *ancient*, or its antonym, is *modern*, which means what is happening right now, or is very new. Listen to the following examples. If I describe something about ancient times, say, "That is ancient." If I describe something about modern times, say, "That is modern."

- When people want to talk to someone who lives far away, they call them on the phone or write an e-mail. (*That is modern.*)
- Barley was used for trade in Mesopotamia. (*That is ancient.*)
- People keep their food fresh in a refrigerator or a freezer. (*That is modern.*)
- People told stories about a hunter named Orion to explain a set of stars in the sky. (*That is ancient.*)
- A person can choose to take recycling to a recycling bin. (*That is modern.*)
- People use cars, trains, and airplanes to get from one place to another. (*That is modern.*)

Language

Ana lyzing Language Choices

Entering/Emerging
Ask students whether a word is similar to *ancient* or the opposite of *ancient*.

Transitioning/Expanding
Have students identify words that are the opposite of *ancient*.

Bridging
Challenge students to make a sentence for a word that is the opposite of *ancient*.

Lesson 4: Stargazing and Constellations

Application

20M

Language: Students will demonstrate an understanding of the saying "hit the nail on the head."
[L.1.4]

Reading: Students will create a model of a constellation.
[W.1.8]

SAYINGS AND PHRASES (5 MIN)

Hit the Nail on the Head

- Ask students if they have ever heard the saying "hit the nail on the head." Have students repeat the saying.
- Write the saying on a chalkboard, a piece of chart paper, or a whiteboard.
- Repeat the saying and ask students what tool you usually use to hit a nail. *(hammer)* Then explain that the flat top of the nail is called the head. Draw a quick sketch of a nail on chart paper, a chalkboard, or a whiteboard, and point out the head.
- Explain that the words of the saying mean that when you are hammering, you're supposed to hit the nail on the head. Hitting the nail in another spot won't work; the only way to get it right and drive the nail into a piece of wood is to hit the nail on the head.
- Explain to students that people have used this saying for years, not just to describe hammering, but to describe people who have said something that is right, or who have made the right conclusion and didn't miss the point.
- Remind students that Copernicus was the first astronomer to prove that the sun does not revolve around the earth; rather, the earth revolves around the sun. Explain that he got it right, even though no one believed him at the time, and even though it would be years before other astronomers would agree with him.
- Then tell the students that instead of saying that Copernicus got it right, we can say that Copernicus "hit the nail on the head." Copernicus hit the nail on the head when he said that the earth orbits the sun, because he got it right.

Support

Show students an image of a hammer hitting a nail.

Speaking and Listening

Evaluating Language Resources

Entering/Emerging
Have students identify the literal applications of "hit the nail on the head."

Transitioning/Expanding
Have students identify the literal and figurative applications of "hit the nail on the head."

Bridging
Challenge students to create their own sentences using "hit the nail on the head" appropriately.

Check for Understanding

One-Word Answer: Listen as I tell you a short little story about two people. When I am done, tell me which person gets it right when he or she talks, hitting the nail on the head.

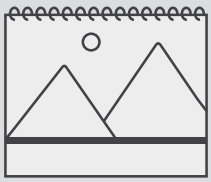
Joe and Mary stand in their backyard one night and both look up at the stars. Joe says, "The stars are so tiny!" Mary says, "Actually, the stars are huge; they're just really far away."

One of these children got it right when describing the stars. Who hit the nail on the head: Joe or Mary? *(Mary)*

- Remind students that the next time a friend, parent, or teacher gets something right, instead of saying "exactly," "that's it," or "you got it," you can say, "you hit the nail on the head!"

THE REALLY BIG DIPPER (15 MIN)

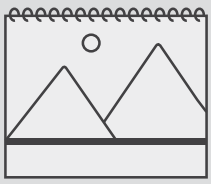
Flip Book 4A-3–4A-5 and 4A-7–4A-9



Show images 4A-3–4A-5 and 4A-7–4A-9

- Review the constellations and groups of stars that students learned about in today's read-aloud. Ask students to name each constellation as you show it. *(Big Dipper, Little Dipper, Orion, Scorpio, Taurus, Canis Major, and Canis Minor)*
- Remind students that these constellations were identified by ancient people who could only look at the stars with the "naked eye," that is, without anything else to help them see the stars more clearly. Then ask them the name of the tool astronomers look through to magnify stars, or make them appear larger. *(telescope)*

Flip Book 3A-6



Show image 3A-6

- Explain that sometimes it is hard to believe that the tiny, twinkling stars we see at night are actually huge balls of gas, like our sun.
- Tell students that today they will work as a class to draw a model of the Big Dipper, a famous group of stars. However, instead of drawing little dots for the stars, they will draw each of the seven stars in the Big Dipper as if they saw it through a telescope, like a real astronomer might see it, just like what they see in this image.

- Divide students into the groups you prepared in advance, and give each group a large piece of chart paper.
- Encouraging the use of image 3A-6 as a model, have each group work together to draw and cut out one large star from their piece of chart paper. Remind students that stars can be red or blue and are not solid, but gaseous.
- Before they begin, tell students that asking questions is one way to make sure that everyone knows what to do. Have students repeat the directions and then think of a question to ask their neighbor about the directions. For example, a student could ask, "What should we do first?" Tell students to turn to their neighbor, and ask their question now. Call on several students to share their questions with the class.
- As students work, circulate around the room. Ask groups to describe their stars and encourage the use of domain-related vocabulary.
- When all the stars have been cut out, tell students that you will use the image of the Big Dipper from the Flip Book to create a huge model of the Big Dipper, using the magnified stars they drew and cut out.
- Use as large a floor space as you have available to replicate the shape of the Big Dipper as shown in image 4A-4.
- Encourage students to look for the Big Dipper in the night sky the next time they are able to stargaze. Remind students to think about just how large those stars are the next time they see tiny little lights in the night sky.

Exit Pass

- In their journals, have students record, in one to three sentences, what they learned about stargazing and constellations.
- Collect students' journals to evaluate their understanding of stargazing and constellations.

End Lesson

Support

Some students may benefit from using the modified Astronomy Journal prompts on Activity Page 4.1.

LESSON

5

ASTRONOMY

The Moon

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will identify major constellations and important discoveries made by astronomers.
[SL.1.4]

Reading

Students will explain the appearance and identify four phases of the moon.
[RI.1.7]

Language

Students will demonstrate an understanding of the Tier 2 words *clockwise* and *counterclockwise*.
[L.1.5, L.1.5c]

Language

Students will practice using the conjunction *because*.
[L.1.1, L.1.1g]

Reading

Students will identify four phases of the moon.
[RI.1.2]

FORMATIVE ASSESSMENT

Activity Page 5.2	**Phases of the Moon** Students will identify four phases of the moon. **[RI.1.2]**

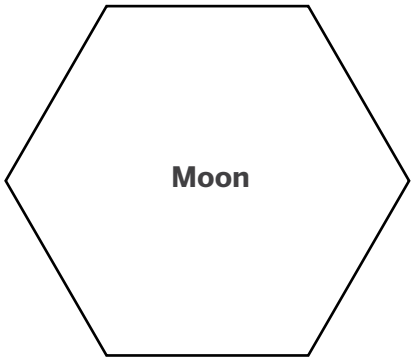
LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
What Have We Already Learned?	Whole Group	10 min	❑ images that reflect and absorb light (optional)
Essential Background Information or Terms			
Read-Aloud			
Purpose for Listening	Whole Group	30 min	❑ video clip showing the phases of the moon (optional) ❑ Image Cards 3–6 ❑ learning clock
"The Moon"			
Comprehension Questions			
Word Work: *Counterclockwise*			
This is a good opportunity to take a break.			
Application			
Syntactic Awareness Activity	Independent Whole Group	20 min	❑ Activity Pages 5.1, 5.2 ❑ scissors, tape, and brads ❑ card stock (optional)
Phases of the Moon			

ADVANCE PREPARATION

Read-Aloud

- Gather a learning clock to demonstrate *clockwise* and *counterclockwise*.
- Prepare and display an Idea Web for the moon. After you have filled it out, display it near the other Idea Webs for this domain. Alternatively, you may access a digital version in the digital components for this domain.



Application

- Be prepared to have students create a moon dial using Activity Page 5.1. This will involve cutting, taping, optionally affixing to cardstock, and placing a brad in the center of each dial. If you would like to save class time, you can cut out the pieces in advance and just have students piece them together.

Note to Teacher

The purpose of syntactic awareness activities is to help students understand the direct connection between grammatical structures and the meaning of text. These syntactic activities should be used in conjunction with the complex text presented in the read-alouds.

Universal Access

- Find age-appropriate video clips showing the phases of the moon.
- Gather items that reflect light (e.g., mirrors, shiny metal, water, clothing with reflective strips, etc.) and items that absorb light (e.g., dark clothing, unfinished wood, opaque things, etc.).

CORE VOCABULARY

appearance, n. the way something looks
Example: A tree's appearance changes as the seasons change, and its leaves turn brown and fall off.
Variation(s): appearances

counterclockwise, adv. moving in a circle toward the left, the opposite direction from the way clock hands move
Example: To loosen a screw, you have to put a screwdriver into it and turn it counterclockwise.
Variation(s): none

craters, n. large holes
Example: There were large craters in the middle of the road, so drivers had to drive carefully around them.
Variation(s): crater

crescent, n. a shape of the visible moon; curved with two pointed ends
Example: My banana was shaped like a crescent.
Variation(s): crescents

reflecting, v. bouncing
Example: I thought everything looked magical with candlelight reflecting off the walls of the room.
Variation(s): reflect, reflects, reflected

Vocabulary Chart for "The Moon"

Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Vocabulary	craters *(cráter)*	counterclockwise appearance *(apariencia)* crescent	
Multiple Meaning		reflecting *(reflejando)*	
Sayings and Phrases	right-hand side once in a blue moon man in the moon		

Lesson 5: The Moon

Introducing the Read-Aloud

10M

Speaking and Listening: Students will identify major constellations and important discoveries made by astronomers.
[SL.1.4]

WHAT HAVE WE ALREADY LEARNED? (5 MIN)

- Tell students that they will listen to a nonfiction read-aloud that gives information about the moon. Explain to students that nonfiction texts give facts and information about a real topic. In nonfiction texts, there are often photographs and text features such as maps, diagrams, tables, and labels. Explain to students that in the read-aloud about the moon they will see both photographs and diagrams used.
- Ask students what the difference between nonfiction and fiction is. (*nonfiction gives information and facts and fiction tells a story*)
- Ask students what tool astronomers use to study objects in outer space. (*telescope*)
- Remind students that they already learned that long ago, before astronomers had powerful telescopes, ancient people told stories to explain things about the earth, the sun, and the stars. Explain to students that ancient people also believed many things about the moon that were not accurate.
- Remind students that sometimes the way objects in outer space look or appear to us on Earth may lead us to draw conclusions that are not correct.

Check for Understanding

Turn and Talk: What did many ancient people believe about the movement of the earth? *(They believed the sun revolved around the earth.)* Were they correct? Explain your reasoning. [Ask several students to share.] *(No, we now know that it is the earth that revolves around the sun, and it is the earth's movement that makes it seem like the sun is moving across the sky.)*

Speaking and Listening

Exchanging Information and Ideas

Entering/Emerging
Ask students simple yes/no questions (e.g., "Did many ancient people believe the sun revolved around the earth?").

Transitioning/Expanding
Provide students with a specific sentence frame (e.g., "Many ancient people believed . . . ").

Bridging
Encourage students to use key details to answer in complete sentences.

- Remind students that when people observe the stars from Earth, they may think that stars twinkle and are small, but thanks to powerful telescopes that now allow us to see the stars in outer space more clearly, we now know that the stars are really enormous, shine steadily, and do not twinkle or blink.
- Also, remind students that sometimes people see a streak of light in the night sky and think it is a "shooting star" moving across the sky. Ask students what these bright lights actually are. (*meteors*)
- Point out that people don't always come to the right conclusions or answers when they look at celestial bodies in the sky with the naked eye.

ESSENTIAL BACKGROUND INFORMATION OR TERMS (5 MIN)

- Tell students that in today's read-aloud, they will hear that the moon does not have its own light. Rather, the light you see when you look at the moon is actually light from the sun reflecting off the moon.
- Ask students if they know what the word *reflecting* means.
- Explain that *reflecting* means bouncing off something.
- Dim the lights in the room and shine a flashlight on different materials. Tell students that when light reflects off something, it bounces off that thing.
- Show students how light reflects and doesn't reflect off various items. Have students tell you whether the light is reflecting or not, being sure to use the word *reflecting* in their response.

Lesson 5: The Moon

Read-Aloud

30M

Reading: Students will explain the appearance and identify four phases of the moon. **[RI.1.7]**

Language: Students will demonstrate an understanding of the words *clockwise* and *counterclockwise*. **[L.1.5, L.1.5c]**

PURPOSE FOR LISTENING

- Tell students that in today's read-aloud, they will hear about what people believed in the past about the moon because of the way it appeared when they looked at it from Earth. Ask students to listen carefully to find out what is true, or correct, about the moon's appearance and what were misunderstandings people had or old stories that people made up about the moon.

"THE MOON" (15 MIN)

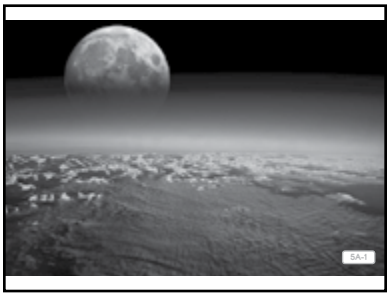
Reading

Offering Opinions

Entering/Emerging
Provide students sentence frames using a small set of learned phrases (e.g., "I think people believed . . .").

Transitioning/Expanding
Provide students sentence frames using an expanded set of learned phrases (e.g., "I think people believed these ideas about the moon because . . .").

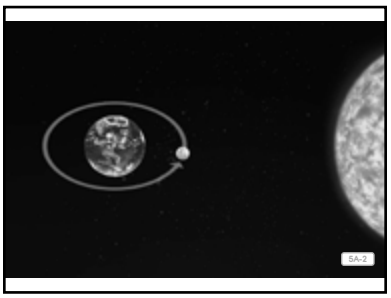
Bridging
Provide minimal support and guidance for open responses.



Show image 5A-1: View of Earth and moon
Earth's closest celestial neighbor is featured in this photograph. What is this famous celestial body called? It's the moon. *Describe what you see in the picture. How does the moon look?*

People have been looking at the moon and wondering about it for thousands and thousands of years, and they have invented all kinds of stories about it. Some ancient myths explain that the moon was the sun's sister. Other people said the moon was a giant face looking down on Earth. Some children's stories even said that the moon was made of cheese! *Why do you think people had these ideas about the moon?*

In fact, the moon is basically just a big, cold, dark rock. You heard it right: although the moon sometimes appears to be shiny and bright in the night sky, the moon does not produce any light of its own. It is not a star, like the sun, but just a rock. *So even though it looks like light is shining brightly from the moon, it is not; our eyes are playing tricks on us!* The light you see when you look at the moon is actually light from the sun **reflecting** *or bouncing* off it. *[Point to the moon in the illustration.] So where is this light coming from?*

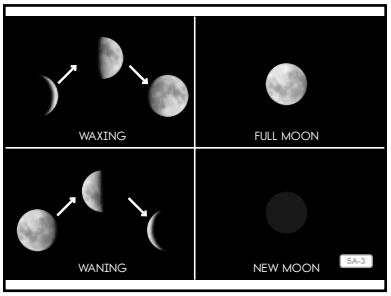


Show image 5A-2: Diagram of moon orbiting Earth

While Earth orbits, or revolves around, the sun, the moon orbits, or revolves around, Earth. Do you remember how long it takes for Earth to orbit, or go all the way around, the sun? *[Pause for responses.]* It takes about 365 days, or one year. Can you guess how long it takes for the moon to orbit Earth? *[Pause for responses.]*

It takes a little more than twenty-seven days, or about a month, for the moon to make a complete trip around the earth. But the moon also rotates on its axis as it orbits Earth. *So the moon rotates on its axis and orbits the earth just like the earth rotates on its axis and orbits the sun.* In fact, the moon rotates exactly once as it orbits Earth exactly once. This remarkable feature keeps the same side of the moon always facing Earth. That means we never see the back of the moon when we look up in the sky.

The **appearance** of the moon *or the way it looks to us on Earth* changes depending on where it is in its orbit. Follow the arrows in this diagram and you can see that the moon orbits Earth in a **counterclockwise** motion. *Counterclockwise is this direction. [Trace your finger along the orbit.]* The sun is over on the right-hand side of this diagram.



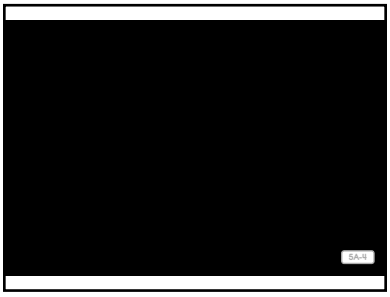
Show image 5A-3: Lunar phases

This image gives you a better idea of what the moon really looks like during each of its phases.

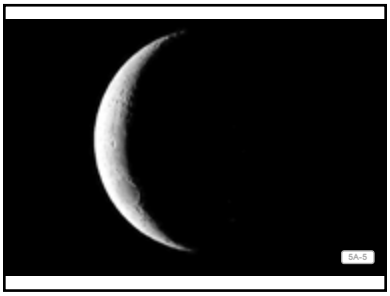
During the first half of its orbit, the moon is said to be waxing, meaning that, over the course of several nights, more and more of it becomes visible from Earth. Then, halfway through its cycle, the full moon appears, meaning that the side facing the earth is also facing the light of the sun.

As the moon completes the last half of its orbit, less and less of it is visible each night. During this time we say that the moon is waning; less of the moon is seen. By the time it completes its cycle, it appears as little more than a shiny sliver of light in the sky.

On other nights, it looks like there is no moon at all! Remember how the moon does not make any light of its own? Well, sometimes the moon is between the sun and the earth, and the side of the moon facing the earth does not reflect any sunlight. When this happens, the side of the moon facing the earth is dark, and it looks like there is no moon in the sky.



Show image 5A-4: New moon
This is called a new moon. *So when there's a new moon, we can't actually see it, because no light is reflecting off the moon toward us.* The moon never looks exactly the same from one night to the next. The moon does not change its shape. It is always a big, round rock. Instead, it only appears to change shape depending on how sunlight hits the moon during its orbit.



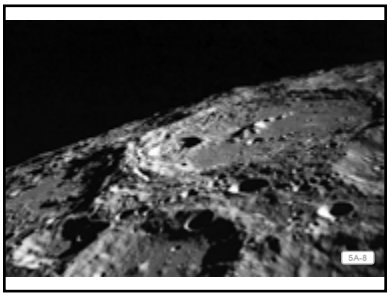
Show image 5A-5: Crescent moon
On certain nights, you can only see a sliver or small piece of the moon. This is called a **crescent** moon. *[Trace your finger down the curve.] See how the crescent shape is curved like a banana and comes to a point at the ends? What do we call the moon when it looks like a thin, curved sliver?*

Show image 5A-6: Half moon
On other nights, it looks like someone sliced the moon in half. *[Drag your finger down the center line.]* This is called a half moon. *Does the moon really change shape in the night sky or does it just look like it changes shape?* Remember, the moon only looks like it is changing shape. It is always a big, round rock, but it can look different during its orbit depending on how the light reflects off it.

Show image 5A-7: Full moon

Halfway through its cycle, the moon looks like this. This is called a full moon because the full, round moon is shining brightly in the night sky. Because it takes only twenty-seven days for the moon to complete its orbit around Earth, and most months in the calendar have about thirty days, it is possible for a full moon to appear twice in the course of one calendar month every once in a while. *The few extra days each month add up over time.* When this happens, it is called a "blue moon." But this is rare; it only happens every few years. So, if you hear someone say that something only happens "once in a blue moon," they mean that it does not happen very often.

Some people say they see what looks like a man's face when they look at the full moon. That is why people sometimes talk about the "man in the moon" as though there really were a face on the moon. Can you see what appears to be two eyes, a nose, and a mouth on this moon? Of course, in reality, there is no face on the moon; it's just a big, round rock. *What do we call the moon when it looks like a big circle?*



Show image 5A-8: Moon close-up

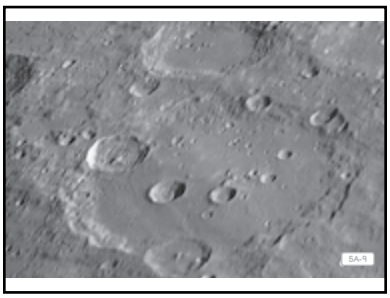
Let's take a closer look at the moon.

People sometimes see what looks like a man's face in the moon because of dark areas on the moon's surface. *[Point to the dark areas of the moon.]* These dark areas are places where, a long time ago, lava from inside of the moon poured out onto the moon's surface. These areas no longer have lava in them, but the holes left behind reflect sunlight differently than the rest of the moon's surface. So when you look up at a full moon, you can see some of the deep and dark holes across the moon's surface.

When you take a close-up look, you can see that the moon's surface is also covered with hundreds and thousands of **craters** *or big holes*. To understand why these craters are there, you need to know a few more facts about the moon. Unlike Earth, the moon has no atmosphere. There is not a protective bubble of air around the moon, nor does the moon have any water, soil, plants, or any other signs of life whatsoever.

Support

Show students a video clip showing the phases of the moon.



Show image 5A-9: Close-up of large craters
Without an atmosphere, the moon has nothing to protect it from all the rocks and debris that zoom through outer space. These strike Earth all the time, but when they hit the atmosphere, most of them burn up in a streak of light known as a meteor. *What do some people call a meteor?* (a shooting star) Rocks and debris, however, do not burn up when they hit the moon. They just crash right into the moon's surface and leave what are known as impact craters. *An impact is a crash.*

In a later read-aloud, you will learn the amazing, true story about real men on the moon—not just lava lakes that look like a man's face, but actual men who traveled to the moon and walked around on it. *Do you know what we call these people who travel in space?* How do you think they got there? *[Pause for responses.]* Keep listening over the next couple of days, and you will learn the answers.

Challenge

Encourage students to look at the moon tonight and identify what phase it is in. You may wish to have students track the moon throughout the month to watch it wax and wane.

Check for Understanding

Turn and Talk: What are some of the stories or sayings people say about the moon? Turn to a partner and tell one. Then respond to your partner by explaining why the moon appears this way. Make sure to cite specifics from the read-aloud to support your answer.

COMPREHENSION QUESTIONS (10 MIN)

As students answer the following questions, add relevant information to the Idea Web for the moon.

1. **Literal** When we look at the moon at night, it looks like it is glowing. Is it really glowing? (*no*) Why does the moon look lit up? (*It reflects the light from the sun.*)

2. **Literal** The earth orbits the sun. What does the moon orbit? (*the earth*)
   - **Literal** The earth takes a year to complete its orbit around the sun. About how long does the moon take to orbit around the earth? (*a month*)

Show Image Cards 3–6

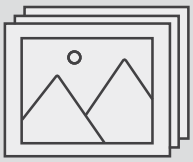
3. **Literal** You heard that the appearance of the moon changes throughout its orbit because more or less of the sun's light reflects off it. These changes in the moon's appearance are called phases. Name each of the phases of the moon pictured here. [Show students each card and ask them to name the phase of the moon.]

4. **Literal** Many people have said that the moon looks like it has a face, and there are many stories about the "man in the moon." What are those dark spots? (*lava lakes, or dark areas caused when lava from inside the moon poured onto its surface*)

5. **Literal** What happens when meteors hit the moon? (*They make big holes.*) What are these holes called? (*craters*) Why isn't the earth covered with craters? (*The earth's atmosphere burns up most meteors before they hit land.*)

6. **Inferential** *Think Pair Share:* You heard about some ways that the moon is not like the earth. The earth's atmosphere supports the plants and animals that live on Earth. Is there life (any plants or animals) on the moon? (*no*) Why not? (*The moon doesn't have an atmosphere.*)

Image Cards 3–6



WORD WORK: COUNTERCLOCKWISE (5 MIN)

1. In today's read-aloud you heard, "Follow the arrows in this diagram and you can see that the moon orbits Earth in a counterclockwise motion."
2. [Motion with your finger in a counterclockwise direction.] Say the word *counterclockwise* with me.
3. Counterclockwise is moving in a circle to the left, which is the opposite direction of the way the hands of a clock move.
4. The moon orbits the earth in a counterclockwise direction. Earth orbits the sun in a counterclockwise direction.
5. [Show students a learning clock.] Using this clock, who can make the minute hand of this clock move counterclockwise? What are the two things we learned about that have a counterclockwise orbit? (*the moon, Earth*)
6. What's the word we've been talking about?

Use a Movement activity for follow-up. [Have students form a circle.] We will now play a game called "Clockwise/Counterclockwise." Remember that clockwise means moving in the same direction as the hands on a clock would move. [Have students move, staying in a circle, in a clockwise direction.] Counterclockwise means moving in the opposite direction as the hands on a clock. [Have students move in a counterclockwise direction around the circle.] I am going to say "clockwise" or "counterclockwise," and then you move in that direction.

Lesson 5: The Moon

Application

Language: Students will practice using the conjunction *because*.
[L.1.1, L.1.1g]

Reading: Students will identify four phases of the moon.
[RI.1.2]

SYNTACTIC AWARENESS ACTIVITY (5 MIN)

Conjunction Because

- Tell students conjunctions used to connect words and phrases. We use the word *because* to join two parts of a sentence. One part tells us what happened and the other part tells us why something happened, or the cause.
- Tell students you will reread a part of the read-aloud and emphasize the word *because* as you read:

  This is called a full moon because the full, round moon is shining brightly in the night sky.

- Tell students that in this sentence the word *because* tells us why this is called a full moon. *(This is called a full moon because the full, round moon is shining.)*
- Tell students the word *because* tells us the cause, or the reason for something. Give students another example.

  Pedro's mom had to drive him to school because he missed the bus.

- Ask students why Pedro's mother had to drive him to school. *(Pedro's mom had to drive him to school because he missed the bus.)*
- Ask students which word tells why something happened. *(because)* Give students another example*:*

  We had no school today because it snowed.

- Ask students why there was no school today. *(because it snowed)*

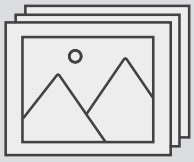
Check for Understanding

Imagining: Work with your partner to imagine a reason why the following situations happened, using the word *because*. Be sure to answer in complete sentences. *(Answers may vary for all.)*

- My friend missed the bus because . . .
- There was no school today because . . .
- I received an award because . . .

PHASES OF THE MOON (15 MIN)

Image Cards 3–6



Show Image Cards 3–6

- Review the following phases of the moon with students: new moon, crescent moon, half moon, and full moon. Point out that as the moon is waxing, more of it becomes visible. As the moon is waning, less of it becomes visible.
- Tell students that from our view on Earth, the moon goes through these phases in a cycle.
- Ask students if they know what a cycle is. Tell students a cycle is when something repeats, or happens over and over again in the same order. So the moon goes through each phase in the same order over and over.
- Ask students what shape the moon is during each of its phases. (*sliver/crescent moon, half circle/half moon, circle/full moon)*
- Tell students they will create their own moon dial. Explain that a dial is something that is moveable and shows information on its front side. Their moon dial will show the different phases of the moon.

Activity Page 5.1

- Have students cut out the two circles for their dial on Activity Page 5.1. If necessary, help them paste the circles on card stock. Be sure that a triangular shape is cut out from the top circle.
- Have students write their name on the dial. You may also have them decorate the top circle.

- Have students cut out the six images showing the phases of the moon and place them in order. Tell students they will first show the moon waxing, so the first half will have the right side of the moon showing. Then after the full moon they will show the moon waning, so the second half will have the left side of the moon showing.
- Once students have the images in the correct order, have them paste the images onto the bottom circle of the dial.
- Finally, help students poke a hole through the circles and insert the brad.
- Have students use their moon dial by moving their dial in a counterclockwise direction to walk through the phases of the moon with their partner.

Check for Understanding

Image Answer: Answer the following questions by turning your moon dials to reveal the correct image(s):

- Which phase of the moon is a crescent moon?
- Which phase is a half moon?
- Which phase is a full moon?
- Which phase is a new moon?

- Have students turn to Activity Page 5.2
- Explain that this sheet shows four different phases of the moon. Ask students to listen to the directions and write the appropriate number in the blank:
  - Write the number "1" on the line beside the new moon.
  - Write the number "2" beside the crescent moon.
  - Write the number "3" beside the half moon.
  - Write the number "4" beside the full moon.

End Lesson

Speaking and Listening

Reading/Viewing Closely

Entering/Emerging
Prompt students to identify the image that relates to a given phase of the moon.

Transitioning/Expanding
Ask students to identify the direction they should turn their dial to show a waxing/waning moon.

Bridging
Challenge students to share with a partner why they chose a certain direction to turn their dial to show a waxing/waning moon.

Challenge

Using the moon dial, show the moon waxing. Show the moon waning.

Activity Page 5.2

Grade 1 | Knowledge 6

Pausing Point

NOTE TO TEACHER

You should pause here and spend two days reviewing, reinforcing, and/or extending the material taught thus far.

It is highly recommended you use the Mid-Domain Assessment to assess students' knowledge of the content taught thus far in the *Astronomy* domain. You may also choose to do any combination of the following activities in any order, or create other activities that will help review, reinforce, and/or extend the material taught thus far.

CORE CONTENT OBJECTIVES UP TO THIS PAUSING POINT

- Explain that the sun, moon, and stars are located in outer space
- Explain that the sun is a source of energy, light, and heat
- Classify the sun as a star
- Identify the earth's rotation, or spin, as the cause of day and night
- Recognize that other parts of the world experience nighttime while we have daytime
- Explain sunrise and sunset
- Explain that Earth orbits the sun
- Describe stars as large, hot, distant, and made of gas
- Recognize the Big Dipper
- Identify four phases of the moon—new, crescent, half, full
- Explain that the moon orbits the earth

MID-DOMAIN ASSESSMENT

The Earth, Sun, and Moon

Activity Page PP.1

Directions: I am going to read statements that refer to either the earth, the sun, or the moon. If what I read to you describes something about Earth, circle the first picture in the row. If what I read to you describes something about the sun, circle the second picture in the row. If what I read to you describes something about the moon, circle the last picture in the row.

1. This celestial body is your home—the planet on which you live. *(Earth)*
2. This celestial body does not generate, or give off, any heat or light; it is just a big, cold rock. *(moon)*
3. This celestial body orbits around the sun. *(Earth)*
4. This celestial body is actually a star. *(sun)*
5. This celestial body revolves, or orbits, around the earth. *(moon)*

Phases of the Moon

Activity Page PP.2

Directions: Identify four phases of the moon by circling the correct image phase on Activity Page PP.2 as I say it.

1. Full moon
2. New moon
3. Crescent moon
4. Half moon

ACTIVITIES

Journal Share

Materials: Astronomy Journals

- Have students exchange journals. Allow students to read their partner's journal.
- Have students pretend they are ancient people and just found these journals.
- Encourage students to talk with a partner, present to the class, or write a summary statement in response to what they just learned from the journal.

Image Review

- Show the Flip Book images from any read-aloud again, and have students retell the read-aloud using the images.

Key Vocabulary Brainstorming

Materials: Chart paper, chalkboard, or whiteboard

- Give students a key domain concept or vocabulary word such as *sun* or *star*. Have them brainstorm everything that comes to mind when they hear the word, such as, *made of gas*, *far away*, *big*, etc. Record their responses on chart paper, a chalkboard, or a whiteboard for reference.

Class Book: The Sun

Materials: Drawing paper; drawing tools

- Tell the class or a group of students that they are going to make a class book to help them remember what they have learned about the sun.
- Have students brainstorm important facts about the sun.
- Have each student choose one idea to draw, and then have them write a caption for the picture. Bind the pages to make a book to put in the class library for students to read again and again.
- You may wish to suggest other topics for students to draw and write about:
  - objects found in outer space compared to those within the earth's atmosphere
  - a comparison of the size of the earth to that of the sun
  - a constellation or constellations presented in the read-aloud
  - the four phases of the moon

Domain-Related Trade Book or Student Choice

Materials: Trade book

- Read a trade book to review a particular person, event, or concept; refer to the books listed in the digital components for this domain. You may also choose to have students select a read-aloud to be heard again. Ask students to talk about the similarities and differences between the trade book and some of the read-alouds they have heard.

Image Cards 1, 2, 6

Riddles for Core Content

Materials: Image Cards 1, 2, and 6

- Ask the students riddles such as the following to review core content.

Note: Use Image Cards 1 (Earth), 2 (Sun), and 6 (Full Moon) to reiterate the images after they answer the riddle.

- I am your home. *(Earth)*
- I am the closest star to the earth. *(sun)*
- I orbit, or revolve around, the sun. *(Earth)*
- I orbit, or revolve around, the earth. *(moon)*
- It looks like I rise every morning and set every night. *(sun)* That's right, the sun looks like it rises and sets each day because the earth is rotating.
- Sometimes I look like a circle, and other times I look like half a circle or even just a sliver in the sky. *(moon)*

Sequencing the Moon's Phases

- Remind students that they learned that we can see different amounts of the moon depending on where it is in orbit and how much sunlight is reflecting off it.
- Remind students that the moon has four phases: new, crescent, half, and full. Then have four volunteers act out the phases of the moon.
- For a new moon, have a student hold his or her arms close to his or her body. For a crescent moon, have a second student put his or her arms overhead with elbows close together. For a half moon, have another student put one arm straight up and meet it with the other curved arm, reducing the space between the two arms to half. For a full moon, have a fourth student make a large circle with his or her arms overhead.
- Encourage students in the "audience" to use their moon dials to identify what phases the volunteers are acting out.

Day and Year Game

- On the playground or in a large indoor space, tell students you will play a game to practice the two ways Earth moves relative to the sun: rotating and orbiting.
- Remind students that Earth's rotation on its axis creates day and night, and Earth's orbit around the sun creates our year.
- Stand in the center of the space. Tell students that you are pretending to be the sun and they are each going to pretend to be Earth.
- When you say "day," they are to spin around in place, counterclockwise, pretending to rotate like Earth does every twenty-four hours.
- When you say "year," they are to run around you, the sun, counterclockwise, in an orbit.

Challenge

Have students order themselves to show a waxing or waning moon.

Relative Sizes of Sun and Earth

Materials: Large sheet of yellow paper (bulletin board or butcher paper); chart paper, chalkboard, or whiteboard

- Remind students that the sun is much, much bigger than Earth.
- Draw a circle on chart paper, a chalkboard, or a whiteboard, and draw a diameter across its center. Explain that this line is called a diameter.
- Tell students that a diameter is the width of a circle measured by a straight line. Explain that the diameter, or width, of the sun is 110 times bigger than the diameter of the Earth. Tell students that you will make a picture of the Earth and of the sun in order to appreciate how much larger the sun is compared to Earth.
- Make a circle one-half inch in diameter. Tell students that this represents Earth.
- Then using a large sheet of yellow paper, make a circle that is four and a half feet in diameter. Tell students that this represents the sun.

More Constellations

Materials: Star stickers

- Using a constellation chart as a guide, affix star stickers in the shapes of various constellations on the ceiling or on the underside of a large table in your classroom.
- Go "stargazing" with students, and see how many constellations they can recognize.

On Stage: Stargazers and Astronomers

- Divide students into two groups: a group of astronomers, and a group of stargazers. Tell each group that you will give them a time of day. First, the stargazers will pretend to look up in the sky and describe exactly what they would see at that time of day. Then the astronomers will look through their pretend telescopes and explain to the stargazers what is really happening in space.

1. **noon**
   Stargazers: The sun is right over our heads.
   Astronomers: Our side of Earth is facing the sun.
2. **night**
   Stargazers: The sun is gone and the moon is out.
   Astronomers: Our side of Earth is facing away from the sun.

3. **sunrise**
   Stargazers: The sun is coming up; there are colors in the sky.
   Astronomers: We are rotating toward the sun.

4. **sunset**
   Stargazers: The sun is setting; there are colors in the sky.
   Astronomers: We are rotating away from the sun.

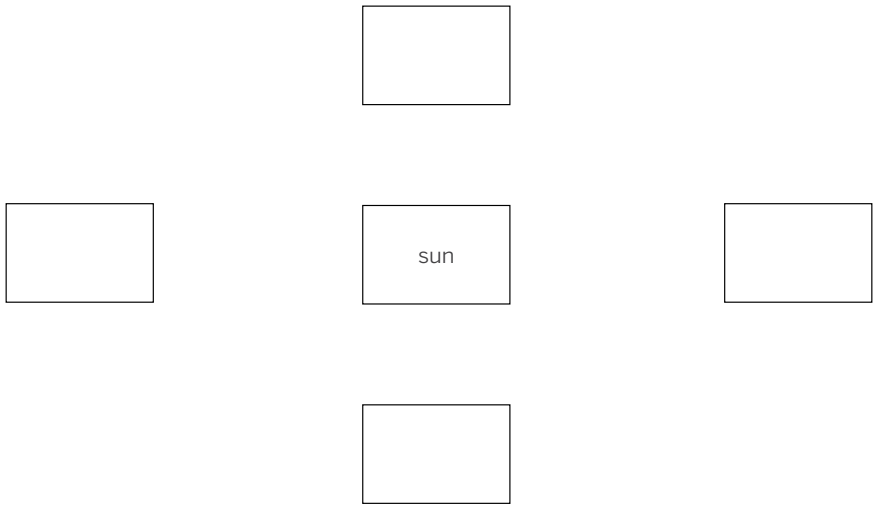
Vocabulary Instructional Activity
Horizontal Word Wall: Major/Minor

Materials: long horizontal chart paper; words written on index cards: *major, minor, big, important, giant, small, unimportant, tiny*

- In the read-aloud you heard, "Fortunately, Orion has a couple of friends: his two loyal hunting dogs, Canis Major and Canis Minor."
- Say the word *major* with me. Say the word *minor* with me.
- *Major* refers to something that is large or that means a lot. *Minor* refers to something that is little or something people don't really care about as much.
- Tell students they will make a Horizontal Word Wall for the words *major* and *minor*. Emphasize to students that you will be placing words on the Horizontal Word Wall, but they are not expected to be able to read the words because they are still learning all the rules for decoding. Emphasize that you are writing the words so that you don't forget them and that you will read the words to students.
- Place *minor* on the far left side of the chart and *major* on the far right of the chart. Now hold up, individually, each of the other word cards (*big*, *important*, *giant*, *small*, *unimportant*, *tiny*) in random order, read the word to students, and then have student volunteers place each of the cards on the line near *major* or *minor*, depending on which word has a more similar meaning to the new word. Provide real-world examples of the words, such as "I have a major pain in my leg." "I have a minor pain in my leg." or "Students spend a major part of their day in a classroom." "Students spend a minor part of their day in the cafeteria."
- Have students talk with their neighbor, using the different words on the Horizontal Word Wall. Remind students to use complete sentences.

Earth-Moon Relay

- This activity is best completed outdoors or in a large indoor space, such as a gym. If neither option is feasible, be sure to create a space in your classroom large enough for students to walk around in a circle. Make five signs that will be taped to the floor: "sun," and four blank cards. Put the sun sign down in the center of the space, and put the four blank cards on the floor in a circle, or if space permits, an ellipse. The floor should look like this:



- Tell students that they have learned a lot about how the earth and the moon move in space. Announce that they will get to act out these movements, playing the roles of the sun, Earth, or moon.
- First, ask for two volunteers to stand back to back in the center of the circle, holding a hula hoop over both of them to act as the sun. Remind students that the sun is huge, which is why you want to use a hula hoop and more than one student. Also remind students that the sun doesn't orbit and that they need to stand stationary on the sign.

Step 1: Earth orbits sun

- Remind students that the earth orbits, or revolves, around the sun. Hold up the globe and tell students that it represents the earth. Ask for four volunteers to carry the globe around the sun. Explain that, because you want to give everyone a turn, you will do this activity as a relay. Define *relay* for them by saying, "In a relay, one person goes part of the distance and tags or passes something to the next person to continue for them. In this relay, we will pass the earth."
- Have each volunteer stand on one of the blank cards. Give the globe to the student standing on the card nearest to you, and have him or her slowly walk counterclockwise, handing the globe over to the person standing on the next

blank sign before stepping out of the circle. Have them continue until the globe makes one full orbit.

Step 2: Earth spins and orbits sun

- Then remind students that the earth moves in two ways: it orbits, but it also rotates or spins on its axis. Ask if anyone wants to try orbiting the sun again, spinning the globe at the same time. Take four new volunteers. You may also want to choose new volunteers for the sun.
- Have each volunteer stand on one of the blank cards. Give the globe to the student standing on the nearest blank card and have him or her slowly walk counterclockwise, spinning the globe at the same time. When s/he reaches the person standing on the next blank card, s/he should carefully hand the globe over and step out of the circle. Have students continue until the globe makes one full orbit.

Step 3: Moon orbits Earth

- Remind students that, in today's read-aloud, they heard that the moon orbits the earth. Remind students that the same side of the moon always faces the earth. Demonstrate this motion by walking around one student, side-stepping so that your body remains facing them in the center.
- Then direct students to find a partner to practice the moon's orbit. Allow students playing the "sun" to participate in this activity as well. One partner will play the earth, standing still while the moon walks around the earth. Remind students that the "moon" will have to step sideways in its orbit so it can remain facing the earth the whole time.

Step 4: Moon orbits the earth while the earth orbits the sun

- Now remind students that they just practiced the moon's orbit while the earth was standing still. However, the earth never stands still. Tell them that they will now put together all of the movements they've practiced.
- Have some new volunteers stand in the center to play the role of the sun. Ask four new volunteers to play the role of the earth again as you did in Step 2, walking in an orbit while spinning the globe in relay style. Tell students that you will play the part of the moon, orbiting the earth while the earth is orbiting the sun. Making a wide berth around the student holding the globe, continue orbiting the "earth" as the globe changes hands. Remember to face the globe at all times.
- If time permits and students want to try it, have four students play the role of the moon, orbiting the person who is holding the globe, from one blank card to the next.

Challenge

Ask how many times the earth spins as it goes around the sun once. Remember, each spin is a day, and the whole orbit takes a year.

LESSON

6

ASTRONOMY

History of Space Exploration and Astronauts

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will identify four phases of the moon.
[SL.1.2]

Reading

Students will describe the experiences of the first astronauts.
[RI.1.2]

Language

Students will demonstrate an understanding of the Tier 2 word *launch*.
[L.1.5, L.1.5c]

Writing

Students will identify and write opinion statements.
[W.1.1]

FORMATIVE ASSESSMENT

Exit Pass

Astronomy Journals Students will describe the experiences of the first astronauts in a journal.
[W.1.1]

LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
What Have We Already Learned?	Whole Group	10 min	❑ Image Cards 3–6 ❑ board/chart paper
Making Predictions About the Read-Aloud			
Read-Aloud			
Purpose for Listening	Whole Group	30 min	❑ world map or globe ❑ video clip of a rocket launch (optional)
"History of Space Exploration and Astronauts"			
Comprehension Questions			
Word Work: *Launch*			
This is a good opportunity to take a break.			
Application			
Opinion Writing	Independent	20 min	❑ Opinion Statement Poster ❑ astronomy journals ❑ drawing or writing tools ❑ Activity Page 6.1 (optional)
Astronomy Journals			
Take-Home Material			
Family Letter			❑ Activity Page 6.2

ADVANCE PREPARATION

Application

- Prepare and display an enlarged version of the following Opinion Statement Poster. Alternatively, you may access a digital version in the digital components for this domain.

Opinion Statement
I think dogs are the best pets because they are loyal and love to play.

Universal Access

- Gather a video clip of a rocket launch to share with students after the read-aloud.

CORE VOCABULARY

astronaut, n. a person who is trained to travel into space
Example: An astronaut has to train for many years before he or she travels in space.
Variation(s): astronauts

launch, v. to lift or push an object forcefully
Example: In the afternoon, they planned to launch the rocket into the air.
Variation(s): launches, launched, launching

rockets, n. engines that are used to send things through the air or space
Example: The rockets shot straight up into the air.
Variation(s): rocket

spacecraft, n. a vehicle for traveling in space
Example: A spacecraft has many strong layers to protect the astronauts as they travel to space.
Variation(s): none

technology, n. the use of new scientific discoveries to solve common problems
Example: My mom said that all telephones used to be connected by a wire to the wall, but that technology has changed a lot since then.
Variation(s): technologies

Vocabulary Chart for "History of Space Exploration and Astronauts"

Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Vocabulary	astronaut *(astronauta)* rockets spacecraft	technology *(tecnología)* launch	
Multiple Meaning			
Sayings and Phrases	using their imaginations by no means out of reach at a heated pace you can bet		

Lesson 6: History of Space Exploration and Astronauts

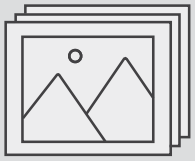
Introducing the Read-Aloud

10M

Speaking and Listening: Students will identify four phases of the moon. **[SL.1.2]**

WHAT HAVE WE ALREADY LEARNED? (5 MIN)

Image Cards 3–6



Show Image Cards 3–6

- Review the previous read-aloud about the moon by asking students to tell you what they have learned about the moon.
- Highlight the moon's rotation and its orbit around the earth.
- Remind students that the moon rotates and orbits the earth just as the earth rotates and orbits the sun.

Check for Understanding

Image Answer: Identify the phase of the moon that is shown on each card. [Show Image Card 3 *(new moon)*, Image Card 4 *(crescent moon)*, Image Card 5 *(half moon)*, and Image Card 6 *(full moon)*.]

MAKING PREDICTIONS ABOUT THE READ-ALOUD (5 MIN)

Support

Remind students that making predictions is more than just trying to guess what happens next. When making a prediction, the reader should think carefully about what they have already learned or heard and use that information to form their prediction.

- Read the title of today's read-aloud to students: "History of Space Exploration and Astronauts."
- Have students describe what space exploration might mean. How might people explore space?
- Then ask students if they know what an astronaut is. Define astronaut as someone who is trained to travel into space.
- Ask students to predict how and why space travel might have begun, and what it was like for the first astronauts.
- Write students' predictions on the board/chart paper.

Lesson 6: History of Space Exploration and Astronauts

Read-Aloud

30M

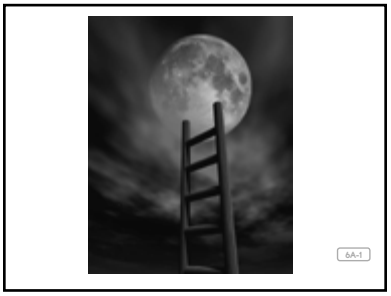
Reading: Students will describe the experiences of the first astronauts. **[RI.1.2]**

Language: Students will demonstrate an understanding of the Tier 2 word *launch.* **[L.1.5, L.1.5c]**

PURPOSE FOR LISTENING

- Tell students to listen carefully to find out whether or not their predictions about space exploration are correct.

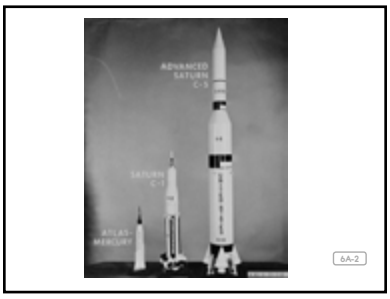
"HISTORY OF SPACE EXPLORATION AND ASTRONAUTS" (15 MIN)



Show image 6A-1: Ladder to the moon

Ever since they first gazed up at the stars, people have wondered if it was possible—and what it would be like—to travel into outer space. For most of human history, the idea of traveling into space was considered to be impossible. Space, most people thought, was out of reach, and there was no way humans would ever be able to go there. Still, this did not keep people from using their imaginations and coming up with creative ideas for space travel.

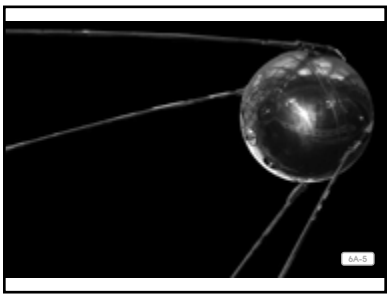
The Chinese invented the first **rockets** *engines that push things into the air* hundreds of years ago using gunpowder—the same type of explosive used to fire guns and cannons. Lighting the gunpowder would **launch** the rocket *lifting or pushing it forcefully* into the air. Eventually people thought about using rockets to go all the way to outer space. It was not until about one hundred years ago that scientists started to make serious advances in rocket **technology** *or started to apply the discoveries they made in rocket science.*



Show image 6A-2: Rockets *The rockets you see here are some of those early rockets incorporating new technology.*
By the 1950s, *probably around the time your grandparents were born or just a little bit before then* rocket technology had improved to the point that people began to think seriously about space travel and exploration.

Show image 6A-3: Newspaper about early space travel
Back then, there was a nation called the Soviet Union, which no longer exists today, but which consisted of Russia and other countries near Russia. *[Point to Russia on a world map or globe.]* At the time, the United States was the only other nation in the world as large or as strong as the Soviet Union. *[Point to the United States on the world map or globe.]* The leaders of the Soviet Union and the United States each wanted to show the world that theirs was the more powerful country by being the first to launch a rocket into outer space.

Show image 6A-4: Rocket launch
This photo shows scientists in the United States launching the first rocket from Cape Canaveral, Florida, in 1950. This was just a test to see whether this type of rocket engine worked. This was the first of hundreds of rockets to be launched from Cape Canaveral.



Show image 6A-5: Sputnik 1
The Soviet Union succeeded in putting the first man-made object in orbit on October 4, 1957, by launching a satellite called Sputnik 1. A satellite is any object that moves in a constant orbit around another object in space. *Some satellites teach us about space by taking photographs.*

Challenge

If a satellite is any object that moves in orbit around another. could the moon be considered a satellite? Explain your reasoning.

Sputnik 1 was carried into space aboard a rocket and then released. *It didn't have an engine like a rocket, so it couldn't get into space by itself.* It orbited Earth for several months before reentering the atmosphere and burning up. *That's what happens to meteors that hit the earth's atmosphere, too.*

After the success of Sputnik 1, the "Space Race" between the United States and the Soviet Union had begun. *It wasn't a real race with a start and finish line, but both countries wanted to be the first to go to space.* Each country wanted to prove that it had a better space program than the other country. For several years, the Soviet Union continued to lead in the Space Race. The leaders and people of each country took the Space Race very seriously; it was not a game, but a true matter of national pride.

Show image 6A-6: Explorer launch

The United States developed a space program called the National Aeronautics and Space Administration, or NASA for short. The scientists at NASA hurried to try to catch up to the progress the Soviets had made. A few months after the Soviet Union launched Sputnik 1, NASA scientists in the United States launched a satellite of their own, Explorer 1, pictured here. *[Point to the rocket containing the satellite in image.]*

Show image 6A-7: Yuri Gagarin

The Space Race continued at a heated pace into 1961, *So both countries were trying hard to win for eleven years.* when Soviet Yuri Gagarin [/yoo*ree/ * /gug*ər*in/] became the first person to go into space and return safely. This picture of Gagarin was taken on the way to the launch pad for his historic journey. You can bet that he was feeling very nervous at that point. *Why might he be nervous?*

Support

National pride means good feelings about your country, or patriotism. The word *pride* here means the feeling of happiness you get when you do something well. The word *pride* can also refer to a group of lions.

Show image 6A-8: Alan Shepard

The Americans were close behind. A couple of months after Gagarin made his famous flight, a man named Alan Shepard became the first American to travel into space. This picture was taken shortly before Shepard boarded the Freedom 7 **spacecraft**. *A spacecraft is a vehicle used for traveling beyond Earth's atmosphere.* Notice that, like Gagarin, Shepard was wearing a helmet and a special suit. Space travelers need special gear like this in order to survive the extreme conditions of outer space, where there is no air, and where the temperatures can be both incredibly hot and incredibly cold. *There's also air inside the suit so astronauts can breathe.*

Show image 6A-9: Rescuing Shepard

Returning from outer space is just as dangerous as launching into outer space. *because you crash into the atmosphere on the way back, like meteors do*. This photo shows the Freedom 7, Alan Shepard's ship, after his flight. Shepard is inside that little capsule *a small, closed space that keeps a pilot or astronaut safe when traveling or landing*! When his flight was finished, the capsule reentered the atmosphere and a parachute opened to lower it gently to Earth. Shepard landed in the ocean, as planned, and the capsule floated there until a helicopter came to recover him.

Show image 6A-10: Astronauts training

Space travelers like Alan Shepard are called **astronauts**. The word *astronaut* comes from two Greek words: *astro*, meaning "star"; and *naut*, meaning "sail." So, an astronaut is a "star sailor" *or a person who is trained to travel into space*. Although being an astronaut can certainly be one of the most interesting jobs in the world, it is by no means an easy job.

Astronauts spend years in training to prepare for journeys into outer space. Astronauts must be healthy and strong because space travel can be very difficult. Astronauts are stuffed into tiny spaces and launched into space in a

rocket powered by thousands of gallons of powerful fuel. It is scary and it is uncomfortable, but astronauts put up with it.

This picture shows astronauts undergoing training. These Apollo 17 astronauts are learning to use equipment for their mission.

Early NASA astronauts also spent hours and hours running in place on treadmills, soaking their feet in ice water, and undergoing a number of other difficult, painful tests intended to make them tough. They had to be tough to be astronauts.

COMPREHENSION QUESTIONS (10 MIN)

Check for Understanding

Turn and Talk: Before the read-aloud, you predicted how and when space travel might have begun. Were your predictions correct? Turn to a partner and explain. (*Answers may vary.*)

1. **Inferential** In the 1950s, the Soviet Union and the United States competed to see who could go to space first. What did we call this competition? (*the Space Race*)
2. **Literal** The Soviet Union was the first country to launch an object into space: the satellite, Sputnik 1. How did they get it into space? (*They launched a rocket carrying it.*)
3. **Literal** The United States wanted to catch up to the Soviet Union, so they started the NASA program and launched a satellite into space, too. Then both countries launched something else, even more important, into space. What did they send next? (*people; astronauts*)
   - **Literal** What is an astronaut? (*a person who travels in space*)
   - **Inferential** You heard that being one of the first astronauts was not an easy job. What were some of the challenges astronauts faced? (*Training was difficult, such as treadmill and ice water tests. Space travel was unknown and risky.*)
4. **Evaluative** *Think Pair Share:* Would you have wanted to be one of the first astronauts to go up in space? Why or why not? (*Answers may vary.*)

Reading

Exchanging Information and Ideas

Entering/Emerging
Ask students simple yes/no questions (e.g., "Did the Soviet Union and the United States compete against one another to see who could get into space first?").

Transforming/Expanding
Provide students with a specific sentence frame (e.g., "The competition was called _____.").

Bridging
Encourage students to use key details to answer in complete sentences.

Challenge

If neither country had succeeded in sending someone to space, do you think they would have kept trying? Explain your answer.

WORD WORK: LAUNCH (5 MIN)

1. In the read-aloud you heard, "Lighting the gunpowder would launch the rocket into the air."
2. Say the word *launch* with me.
3. *Launch* means to lift or push an object forcefully.
4. I pretend my table is a runway when I launch my paper airplane into the air.
5. Tell about an object that you can launch. Try to use the word *launch* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "You can launch a _____."]
6. What's the word we've been talking about?

Use a Dramatization activity for follow-up. Let's pretend that our bodies are real rockets. First, make sure that there is room around you. Then crouch down on the ground. I will count down from ten and when I say, "Blast off," launch your rocket into the air without hitting any other rockets. Ready? OK, here we go! 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, blast off!

Lesson 6: History of Space Exploration and Astronauts

Application

20M

Reading: Students will identify and write opinion statements.
[W.1.1]

OPINION WRITING (10 MIN)

- Tell students that today they will write an opinion statement in their journal.
- Ask students if they know what an opinion is. Explain that an opinion is your personal view or belief (i.e., what you think about something).
- Give an example of an opinion (e.g., "I think dogs are the best pets."). Explain to students that not everyone thinks dogs are the best pets; some people prefer cats or rabbits or other pets. So, saying dogs are the best pets is an opinion.

Check for Understanding

Thumbs Up/Thumbs Down: Are the following examples of opinions?

- There is a _____ at the front of the classroom. [Fill in the blank with something that applies.] *(thumbs down)*
- I think hot summer days are the best! *(thumbs up)*
- I need air to breathe. *(thumbs down)*
- Washing the car is the most fun chore. *(thumbs up)*
- Science is my favorite subject. *(thumbs up)*

- Explain that when writing a longer text, such as a paragraph that states an opinion, the writer tells his or her opinion and then gives reasons for it.
- For example, a writer might follow up her opinion, "I think dogs are the best pets." with more information. For example, she might say, "I think dogs are the best pets because they are loyal and love to play."

- Refer to the statement you prepared in advance. Point out the opinion *(dogs are the best pets)*, the two reasons *(dogs are loyal; dogs love to play)*, and the conjunction *because*.
- Ask students to recall what the conjunction *because* tells us in a sentence. *(the cause, or the reason for something)* Explain to students the will use the word *because* to explain the reason for their opinion.
- Have students take turns sharing their favorite kind of pet and giving two reasons why. Remind students to use the conjunction *because* to introduce the reasons why they like this kind of pet.
- Tell students they will write an opinion statement about the read-aloud they heard today.

ASTRONOMY JOURNALS (10 MIN)

- Remind students that they have been pretending to be astronomers by recording what they learn and observe in their astronomy journals.
- Ask students what an astronaut is. *(a person who is trained to travel into space)*
- Tell students you want them to answer one important question with their opinion: What do you think is the most difficult part of being an astronaut?
- Have students share their opinion statement, including two reasons and using the linking word *because*, with a partner orally before writing.
- Ask several students to share their opinion statements with the class.

Exit Pass

- In their journals, have students write their opinion statements in their journals.
- Collect students' journals to evaluate their understanding of space exploration and astronauts, and ensure that they include an opinion, two reasons, and use the linking word *because*.

Support

Some students may benefit from using the modified astronomy journal prompts on Activity Page 6.1.

Challenge

Answer the following questions with another opinion statement: What is the best part about being an astronaut? Which is a better job: astronaut or astronomer?

Writing

Writing

Entering/Emerging
Have students dictate a response to an adult to record.

Transitioning/Expanding
Have students dictate a response to a peer to record.

Bridging
Students will independently write a detailed opinion statement on topic.

End Lesson

Lesson 6: History of Space Exploration and Astronauts

Take-Home Material

FAMILY LETTER

- Send home Activity Page 6.2.

Activity Page 6.2

LESSON

7

ASTRONOMY

Exploration of the Moon

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will describe the experiences of the first astronauts.
[SL.1.1]

Reading

Students will describe the first landing on the moon.
[RI.1.3]

Language

Students will demonstrate an understanding of the Tier 2 word *determined*.
[L.1.5, L.1.5c]

Language

Students will identify and use possessive pronouns.
[L.1.1, L.1.1b]

Writing

Students will write an opinion statement about landing on the moon.
[W.1.1]

FORMATIVE ASSESSMENT

Exit Pass

Astronomy Journals Students will write an opinion statement about landing on the moon.
[W.1.1]

LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
What Have We Already Learned?	Whole Group	10 min	
Personal Connections			
Read-Aloud			
Purpose for Listening	Whole Group	30 min	❑ video clip of Apollo 11 (optional)
"Exploration of the Moon"			
Comprehension Questions			
Word Work: *Determined*			
This is a good opportunity to take a break.			
Application			
Syntactic Awareness Activity	Independent	20 min	❑ Opinion Statement Poster ❑ astronomy journals ❑ Activity Page 7.1 (optional)
Astronomy Journals			

ADVANCE PREPARATION

Application

- Display the Opinion Statement Poster you prepared in Lesson 6. Alternatively, a digital version may be accessed in the digital components for this domain.

Note to Teacher

The purpose of syntactic awareness activities is to help students understand the direct connection between grammatical structures and the meaning of text. These syntactic awareness activities should be used in conjunction with the complex text presented in the read-alouds.

Universal Access

- Gather a video clip of Apollo 11 to show students after the read-aloud.

CORE VOCABULARY

determined, adj. committed to making something happen
Example: I walked fast because I was determined to get to school on time.
Variation(s): none

disaster, n. a sudden, terrible event
Example: The tornado was a disaster for our town.
Variation(s): disasters

historic, adj. famous or important in history
Example: The day representatives from the thirteen colonies signed the Declaration of Independence was a historic day.
Variation(s): none

missions, n. special jobs
Example: My dad said we needed to complete our missions of cleaning the house and car before we could play.
Variation(s): mission

nervously, adv. feeling worried
Example: My grandmother watched her favorite team's football game nervously.
Variation(s): none

Vocabulary Chart for "Exploration of the Moon"

Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Vocabulary		disaster historic *(histórico/a)* nervously *(nerviosamente)*	
Multiple Meaning		determined *(determinado/a)* missions *(misiónes)*	
Sayings and Phrases	"The Eagle has landed." little room for error were glued to their		

Lesson 7: Exploration of the Moon

Introducing the Read-Aloud

10M

Speaking and Listening: Students will describe the experiences of the first astronauts.
[SL.1.1]

WHAT HAVE WE ALREADY LEARNED? (5 MIN)

- Review the previous read-aloud about space exploration and the first astronauts by asking students the following questions:
  - Which two countries were in a space race? *(United States, Soviet Union)*
  - The Soviet Union launched the first object into space. What did they send? *(a satellite, Sputnik 1)*
  - Did the first astronauts land anywhere in space? *(No, they were launched into space, orbited the earth, and landed back on Earth.)*

Check for Understanding

Think-Share: How would you describe the experiences of the first astronauts? *(Answers will vary.)*

- Remind students that in other read-alouds, they learned that the sun and other stars are too far away and too hot to visit. Ask, students what celestial body is close enough to Earth to visit, and is made of rock instead of gas. *(the moon)*
- Explain that today's read-aloud will teach students about the first astronauts to visit the moon.

PERSONAL CONNECTIONS (5 MIN)

- Emphasize that traveling to the moon for the first time required astronauts to be brave.
- Ask students if they remember learning in Core Knowledge Language Arts in Kindergarten about Christopher Columbus and the time he traveled to the New World for the first time. If so, ask students what made Columbus brave for going on his journey.
- Point out that today it might not seem very brave to cross an ocean in a ship. But, unlike Columbus, if we wanted to cross the ocean we could ask people who have done it before what it was like. Being one of the first meant that Christopher Columbus had many questions that he couldn't answer, such as:
  - Would his ships be strong enough for the voyage?
  - What dangers would he face on his trip over the ocean? (The crew worried about sea monsters and falling off the edge of the world.)
  - Would he actually get to Asia, his goal? (In fact, he didn't get to Asia after all.)
- In much the same way, the first people to go to the moon didn't have anyone to ask what it would be like. Ask students to imagine what concerns or fears the first astronauts may have felt before going into space. Some concerns may have been
  - Would their spacecraft be able to handle the trip?
  - What dangers would they face on their trip through space?
  - Would they actually get to the moon?
  - What would they discover if they did land on the moon?
- Ask students to think about whether or not they would have decided to travel to the moon, knowing some of these unanswered questions.

Speaking and Listening

Offering Opinions

Entering/Emerging
Provide students sentence frames using a small set of learned phrases (e.g., "I think I would/would not have traveled to the moon.").

Transitioning/Expanding
Provide students sentence frames using an expanded set of learned phrases (e.g. "I think I would/would not have traveled to the moon because . . . ").

Bridging
Provide minimal support and guidance for open responses.

Lesson 7: Exploration of the Moon

Read-Aloud

15M

Reading: Students will describe the first landing on the moon.
[RI.1.3]

Language: Students will demonstrate an understanding of the Tier 2 word *determined*.
[L.1.5, L.1.5c]

PURPOSE FOR LISTENING

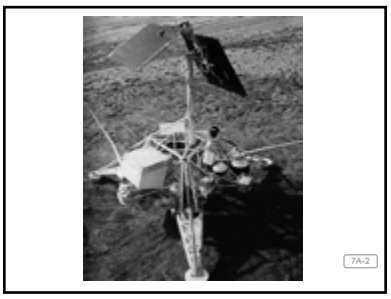
- Tell students to listen carefully to identify steps scientists took to find out what the trip would be like before sending the astronauts to the moon.

"EXPLORATION OF THE MOON" (15 MIN)

Show image 7A-1: JFK

This was the president of the United States many years ago. Who is the current president of the United States?

In 1961, the president of the United States, John F. Kennedy, announced that the United States would send astronauts to the moon within ten years. This seemed impossible to many people, but President Kennedy and the NASA scientists were **determined** to succeed. *They were committed to making it happen.* Thus, they started the Apollo Program in order to send people to the moon. But there was a lot of work to be done before anyone could get anywhere near the moon. *They didn't have much information about what it would be like to visit.*



Show image 7A-2: Surveyor 1

Surveyor 1 was the first spacecraft Americans sent to the moon, but it was an unmanned spacecraft, that is, a spacecraft without any people aboard. The purpose of Surveyor 1 was to survey *or study* the moon's surface. It carried equipment to study the land, temperature, and other things NASA scientists needed to know before sending people to the moon. *This would help them answer questions about what they would discover when they landed.*

Support

Why do you think President Kennedy and the NASA scientists were so determined to send people to the moon? *(Answers may vary, but should include mention of the Space Race.)*

Show image 7A-3: Apollo 4 launch

The Apollo program involved many **missions**. *or jobs that needed to be done to accomplish what they wanted to do* The first mission, Apollo 1, was a **disaster**. *A disaster is a sudden, terrible event.* The spacecraft caught on fire before they had a chance to launch it. After that, however, the Apollo scientists had many successes. First, there were unmanned missions to test various rockets and systems. *These missions would help answer questions about whether their spacecraft could handle the trip.* This picture shows Apollo 4, an unmanned mission to test a rocket engine. This is the type of engine that would eventually carry men to the moon.

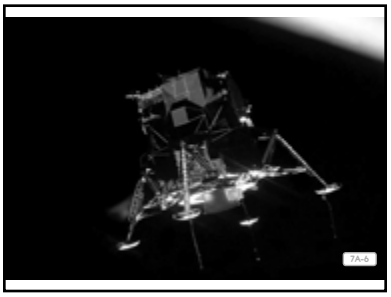
Show image 7A-4: Apollo 7 crew

Next came manned missions, *or missions with people* but these astronauts did not get to go to the moon. Instead, they were practicing and testing equipment to make sure everything would work properly. This photo shows the crew of the Apollo 7 mission.

Show image 7A-5: Apollo 11 crew

Finally, on July 16, 1969, Apollo 11 was launched from the Kennedy Space Center in Florida. There were three astronauts aboard: *[Point to the three astronauts in the center of this image.]* Neil Armstrong, Michael Collins, and Buzz Aldrin. This picture was taken shortly before they went on their **historic** mission. *It was historic because it was important and many people would remember it for many years.*

It took four days for Apollo 11 to travel the 239,000 miles from Earth to the moon. *Does that sound like a long time? You heard in an earlier read-aloud that it would take thousands of years to travel to some stars.* During the launch, the astronauts were sitting in the very top of the rocket. Once it reached outer space, the part they were in broke off from the rocket and continued on toward the moon. The rocket was not needed once the ship reached outer space. *The rocket's job was done after it launched the spacecraft beyond the earth's atmosphere.*



Show image 7A-6: Eagle in orbit

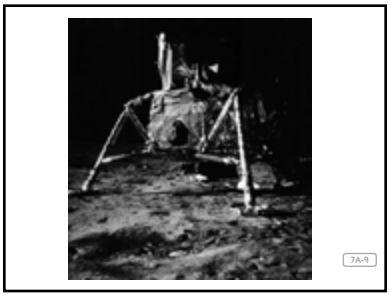
Michael Collins was the pilot for the command module, which drove the lunar module close to the moon but did not actually land there. The lunar module, called the Eagle, was attached to the command module during the journey from Earth to the moon. *In fact, the word* lunar *is used to describe anything that is related to the moon.* Once they got close enough to the moon, however, the Eagle broke off from the command module and landed on the surface. *So the spacecraft had three parts at launch, but only the lunar module [point to the picture] actually landed on the moon.* The command module orbited the moon as Buzz Aldrin and Neil Armstrong descended *or went down* towards the surface of the moon.

Show image 7A-7: Mission control

This is mission control, where NASA scientists on the ground talk to and help astronauts in space. Meanwhile, as the Eagle approached the surface, hundreds of scientists back at mission control were watching their computers **nervously** *or worried about what might happen* to make sure everything went as planned. There is little room for error *or mistakes* in space travel. The NASA scientists monitored every single part of the ship, making sure every fuse and wire was working properly.

Show image 7A-8: TV news broadcast

At the same time, people all over America were glued to their television sets *watching the news*, also nervously waiting to see what would happen. The Eagle was equipped with television cameras, so everyone back home could see and hear everything that was happening 239,000 miles away on the moon! The moon landing excited people all over the world. *Remember the "Space Race" with the Soviet Union? The United States was the first country in the world to send people to the moon.*



Show image 7A-9: The Eagle has landed
It took longer than expected, but finally Neil Armstrong announced the famous words, "The Eagle has landed." Great sighs of relief and cheers went up from mission control and in living rooms across America.

Show image 7A-10: Armstrong stepping onto the moon
Next, Neil Armstrong prepared to leave the Eagle and step out onto the moon. This picture shows what Americans back home saw on their television sets. As you can see, the picture was not very clear, but if you look closely you can see Armstrong about to set foot on the moon's surface.

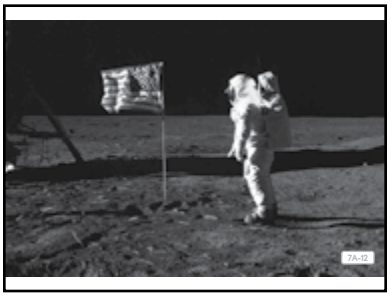
Armstrong stepped down and landed on the fine, soft dust of the moon's surface. With his first step he said, "That's one small step for a man, one giant leap for mankind." What did Neil Armstrong mean? *[Pause for responses.]* He meant that he himself had taken a small step—from the Eagle's ladder onto the moon—but that step represented a huge leap in terms of the advances humans had made by landing on the moon.

Show image 7A-11: Buzz Aldrin
Buzz Aldrin followed Armstrong down the ladder. Both astronauts wore special spacesuits designed to endure the harsh temperatures on the moon's surface.

The astronauts conducted experiments to help future astronauts and scientists. The first thing they noticed was their mobility, or how different it felt to walk and move around. The moon has very little gravity compared to Earth. Here on Earth, when you jump up you come straight back down—not so on the moon. When you hop on the moon, you stay up for a few seconds and come down rather slowly. *Can you imagine hopping up in the air and staying up there for a bit? Imagine how far you could jump!*

Support

Have students practice jumping up and down, softly, to reinforce this idea.



Show image 7A-12: The flag

The astronauts collected samples of the moon's dust and rocks. Then they planted an American flag in the moon's soil. *Explorers often planted flags to claim the new land for their home countries. Columbus planted the Spanish flag when he landed in the New World.* They had prepared the flag beforehand by inserting wires in it so that it would be firm but appear to be waving, even though there is no wind on the moon.

Five more Apollo missions landed successfully on the moon after that first mission. In the end, the Apollo astronauts brought back a total of 842 pounds of moon rocks. Many of these rocks are on display in museums around the world.

Apollo 17, launched in 1972, was the last mission to reach the moon. Nobody has returned to the moon since. That is bound to change as humans continue to explore outer space. *[If additional manned lunar missions have occurred since 1972, mention them here.]*

COMPREHENSION QUESTIONS (10 MIN)

1. **Inferential** An unmanned mission is a task to be completed on a spacecraft with no people on it. Why did NASA send unmanned missions to the moon before manned ones? (*to first make sure that it was safe for people*) What were the purposes of these unmanned missions? (*to study the temperature and surface of the moon; test the rockets and equipment*) Before the unmanned missions, how did astronomers get most of their information about the moon? (*telescopes*)
2. **Literal** You learned that the Apollo 11 spacecraft had three parts: the rocket, the command module, and the lunar module (or Eagle). Which part launched it into space? (*rocket*) Which part held the pilot who orbited the moon without landing? (*command module*) Which part landed on the moon? (*the lunar module, also called the Eagle*)
3. **Inferential** You learned that scientists at mission control and people at home were nervous and excited as they watched the spacecraft approach the moon. Why do you think they were nervous? (*worried something would go wrong*) Why do you think they were excited? (*The first person on the moon was big news.*)

Reading

Exchanging Information and Ideas

Entering/Emerging
Ask students simple yes/no questions (e.g., "Does an unmanned spacecraft have people in it?").

Transitioning/Expanding
Provide students with a specific sentence frame (e.g., "NASA sent unmanned missions to the moon because . . . ")

Bridging
Encourage students to use key details to answer in complete sentences.

4. **Inferential** You learned that astronauts brought back over 842 pounds of moon rocks. Why do you think they brought back so many rocks from the moon? (*to study them, and to find out what they're made of*)

Check for Understanding

Think Pair Share: Neil Armstrong stepped off the ladder and said, "That's one small step for a man, one giant leap for mankind." In the read-aloud, we heard that humans made a giant leap by sending people to the moon. Why do you think this was a big accomplishment? (*Answers may vary.*)

WORD WORK: DETERMINED (5 MIN)

1. In the read-aloud you heard, "President Kennedy and the NASA scientists were determined to succeed [in sending astronauts to the moon]."
2. Say the word *determined* with me.
3. *Determined* means committed to a decision or a plan of action.
4. I am determined to do well in school.
5. Tell about something you are determined to do. Try to use the word *determined* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "I am determined to . . . "]
6. What's the word we've been talking about?

Use a Making Choices activity for follow up. Listen to the following sentences people might say. If you think the person talking is determined to succeed, say, "He is determined." If you think the person talking is not determined, say, "He is not determined."

- I will keep on trying until I get it. (*He is determined.*)
- It's too hard; forget it. (*He is not determined.*)
- I will never give up. (*He is determined.*)
- It doesn't matter that much to me. (*He is not determined.*)
- I will achieve my goal. (*He is determined.*)

Lesson 7: Exploration of the Moon

Application

20M

Language: Students will identify and use possessive pronouns.
[L.1.1, L.1.1b]

Writing: Students will write an opinion statement about the first landing on the moon.
[W.1.1]

SYNTACTIC AWARENESS ACTIVITY (10 MIN)

Possessive Pronouns My, Your, His, Her, Our, Their

- Tell students that you will read pairs of sentences to them. Students should listen carefully to hear what the words *my*, *your*, *his*, *her*, *our*, and *their* replace in each sentence pair. Whenever you see a person's name in brackets, please replace that name with the name of a student in your classroom.

Possessive Pronoun	Sentence 1	Sentence 2	Replacement
My	[Point to yourself and use your name as you say the sentence.] [Ms. Gilbert's] watch is blue.	My watch is blue.	The word *my* replaces [Ms. Gilbert's]
Now, you try: Work with your neighbor to create a sentence to describe something that belongs to you, using the word *my*. Use this sentence starter to help you begin: "My _____ is..."			
Your	[Point to a student close by and use their name as you say the sentence.] [Aida's] shirt is red.	Your shirt is red.	The word *your* replaces [Aida's].
Now, you try: Work with your neighbor to create a sentence to describe something that belongs to your neighbor, using the word *your*. Use this sentence starter to help you begin: "Your _____ is..."			
His	[Speak to a student close by and tell him or her about a male student in the classroom.] [Enrique's] hair is brown.	His hair is brown.	The word *his* replaces [Enrique's].

Support

There may be variations in the sentences created by your class. Allow for these variations, and restate students' sentences so that they are grammatical.

Possessive Pronoun	Sentence 1	Sentence 2	Replacement
Now, you try: Work with your neighbor to create a sentence to describe something that belongs to a male student, using the word *his*. Use this sentence starter to help you begin: "His _____ is..."			
Her	[Speak to a student close by and tell him or her about a female student in the classroom.] [Marletty's] eyes are brown.	Her eyes are brown.	The word *her* replaces [Marletty's].
Now, you try: Work with your neighbor to create a sentence to describe something that belongs to a female student, using the word *her*. Use this sentence starter to help you begin: "Her _____ is..."			
Our	[Gesture to everyone in the classroom, including yourself, and use your name.] [Ms. Gilbert's and Aida's and Enrique's and Marletty's] classroom is a fun place!	Our classroom is a fun place.	The word *our* replaces [Ms. Gilbert's and Aida's and Enrique's and Marletty's].
Now, you try: Work with your neighbor to create a sentence to describe something that belongs to a group to which you belong, using the word *our*. Use this sentence starter to help you begin: "Our _____ is..."			
Their	[Speak to a student close by and talk about two students in the classroom.] [Aida's] and [Enrique's] shoes are black.	Their shoes are black.	The word *their* replaces [Aida's and Enrique's].
Now, you try: Work with your neighbor to create a sentence to describe something that belongs to a group to which you don't belong, using the word *their*. Use this sentence starter to help you begin: "Their _____ is..."			

- Read the following letter, which contains many of the words just practiced.
- Encourage students to remember the words they just practiced are *my*, *your*, *his*, *her*, *our*, and *their*.
- Ask students to stand up or raise their hand when they hear you say one of those words. The possessive pronouns have been highlighted for you:

Dear First Graders,

Our fifth-grade class is studying astronomy, too, just like **your** class. **My** favorite part of the astronomy unit has been learning about astronauts and all of **their** fantastic adventures. You might like to hear about Sally Ride, a famous astronaut. In 1983, she became the first woman to travel in space. She even used a robot arm to fix a satellite while in space! Later, Sally wrote children's books to encourage girls and boys to study science and space travel. Thanks to **her** hard work, kids all over are excited about space and science and know that they, too, can travel in space one day if they work hard and stay focused on **their** goals!

Happy learning,

Josefa

ASTRONOMY JOURNALS (10 MIN)

Check for Understanding

Think of a Word: Think of what the astronauts in today's lesson accomplished. [Pause.] Now, think of one word that describes how they might have felt while doing it. [Ask several students to share.] *(Answers may vary, but may include* worried, nervous, excited, brave.*)*

- Tell students that today they will write about what it would be like to go to the moon.
- Have students write about what they might do or see or feel if they actually went to the moon as an astronaut, using the following sentence starters:
  - "If I went to the moon, I would . . . "
  - "The best part about going to the moon would be . . . "
  - "The worst part about going to the moon would be . . . "
- Referring to the Opinion Statement Poster, remind students their opinion statements should include two reasons and use the conjunction *because*.
- Remind students that they can use the information they learned about the moon and astronauts in the most recent read-alouds to complete their sentences.
- As students work, circulate around the room, encouraging the use of read-aloud vocabulary in their sentences.

Support

Some students may benefit from using the modified Astronomy Journal prompts on Activity Page 7.1.

Writing

Writing

Entering/Emerging
Have students dictate their response to an adult.

Transitioning/Expanding
Have students dictate their response to a peer.

Bridging
Have students independently write one to three detailed sentences on topic.

Exit Pass

- Collect students' journals to evaluate their understanding of space exploration, astronauts, and the moon. Check that students include an opinion, two reasons, and use the conjunction *because*.

End Lesson

LESSON

8

ASTRONOMY

The Solar System, Part I

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will review how a planet differs from a star.
[SL.1.1]

Reading

Students will identify the inner planets that make up our solar system.
[RI.1.2]

Language

Students will demonstrate an understanding of the Tier 2 word *abundant*.
[L.1.5, L.1.5c]

Writing

With assistance, students will use a chart to organize information about the planets and write briefly about their observations.
[W1.1, W.1.8]

FORMATIVE ASSESSMENT

Exit Pass

Astronomy Journals Students will record their observations of the inner planets in a journal.
[W.1.8]

LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
What Have We Already Learned?	Whole Group	10 min	❑ Flip Book image 2A-4 ❑ board/chart paper
What Do We Know?			
Read-Aloud			
Purpose for Listening	Whole Group	30 min	
"The Solar System, Part I"			
Comprehension Questions			
Word Work: *Abundant*			
This is a good opportunity to take a break.			
Application			
Planets Chart	Whole Group	20 min	❑ instrumental music for the song, "Oh My Darling, Clementine" (optional) ❑ Image Cards 1, 7, 8, and 9 ❑ Planets Chart ❑ astronomy journals ❑ Activity Page 8.1 (optional)

ADVANCE PREPARATION

Introducing the Read-Aloud

- Be prepared to record what students know and wish to know about planets on the board/chart paper. If a student's response includes inaccurate factual information, record it nonetheless and acknowledge the response by saying something like, "So you think that Pluto is a planet? We'll have to listen very carefully to our read-alouds and find out if that's true!" Refer to this list in the following lesson as well.

Application

- Prepare and display a Planets Chart to record what students have learned about planets. You will place an image card in the second column of the chart, so it must be large enough to accommodate those eight 8 1/2 x 11 cards. Alternatively, a digital version of this chart may be accessed in the digital components for this unit.

Planets Chart			
Position and Name	**Image Card**	**Fact 1**	**Fact 2**

Note to Teacher

During Lessons 8 and 9, students will learn about the planets that make up our solar system. Before the read-aloud in this lesson, students will be asked to share what they already know about planets. Record this information on the board/chart paper, along with what students hope to learn, akin to the K (know) and W (wonder) of a KWL chart. Students will record what they learned (L) in a separate chart, however—the Planets Chart.

Universal Access

- Find instrumental music to the tune of "Oh My Darling, Clementine" to accompany the planets song in the Application.

CORE VOCABULARY

abundant, adj. plentiful; more than enough
Example: The farmers celebrated their abundant harvest with a town fair.
Variation(s): none

accomplish, v. to achieve something
Example: We can accomplish our goal of winning the game if we work together.
Variation(s): accomplishes, accomplished, accomplishing

inner, adj. close to the center; inside
Example: The inner circles of the spider's web were smaller than the outer circles.
Variation(s): none

solar, adj. related to the sun
Example: My mom has a solar-powered wristwatch that works by using energy from the sun.
Variation(s): none

unique, adj. one of a kind
Example: Each person in the world is different from every other person, so we say that each person is unique.
Variation(s): none

Vocabulary Chart for "The Solar System, Part I"

Type	**Tier 3** **Domain-Specific Words**	**Tier 2** **General Academic Words**	**Tier 1** **Everyday Speech Words**
Vocabulary	solar *(solar)*	abundant *(abundante)* accomplish unique *(único/a)* inner	
Multiple Meaning			
Sayings and Phrases	up there have in common		

Start Lesson

Lesson 8: The Solar System, Part I

Introducing the Read-Aloud

10M

Speaking and Listening: Students will review how a planet differs from a star. **[SL.1.1]**

WHAT HAVE WE ALREADY LEARNED? (5 MIN)

Show image 2A-4: Orbit diagram

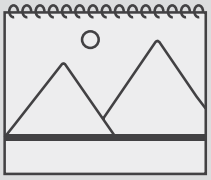
- Tell students that for the next two lessons they will learn about several planets.
- Remind students that they learned that a planet is different from a star.

Check for Understanding

Recall: How does a planet differ from a star? (*A star is made up of gas and gives off heat and light; a planet does not have its own heat or light.*)

- Tell students that they have already learned about one planet and the star it revolves around. Ask students which planet and star they have already learned about. (*the earth and the sun*)

Flip Book 2A-4



Speaking and Listening

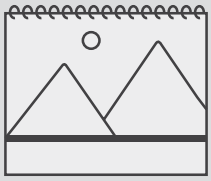
Exchanging Information and Ideas

Entering/Emerging
Ask students simple yes/no questions (e.g., "Is a planet different from a star?").

Transitioning/Expanding
Provide students with a specific sentence frame (e.g., "Planets are . . . while stars are . . . ").

Bridging
Encourage students to use key details to answer in complete sentences.

Flip Book 8A-2



WHAT DO WE KNOW? (5 MIN)

Show image 8A-2: Diagram of the solar system

- Tell students that in the next two read-alouds they will learn about the planets that make up our solar system.
- Ask students if they have ever heard the names of any other planets.
- Tell students to turn to a neighbor and talk for a minute, telling everything he or she knows about planets. Then have the partner talk for a minute as well.
- Encourage pairs to share some of the ideas they discussed about planets. Record these ideas on the board/chart paper.
- Then ask students what they would like to learn about planets. Record these ideas on a different section of the board/chart paper. Keep this list on display for the next lesson.

Lesson 8: The Solar System, Part I

Read-Aloud

30M

Reading: Students will identify the inner planets that make up our solar system. **[RI.1.2]**

Language: Students will demonstrate an understanding of the Tier 2 word *abundant*. **[L.1.5, L.1.5c]**

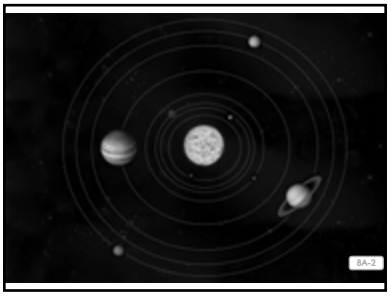
PURPOSE FOR LISTENING

- Tell students that after the read-aloud, you will be filling out a chart with information about all the planets they learn about today. Tell students to listen carefully for facts about each planet, especially facts about how each planet is unique or different from the others.

"THE SOLAR SYSTEM, PART I" (15 MIN)

Show image 8A-1: People stargazing

For thousands of years, stargazers have known that the sun, moon, and stars are not the only celestial bodies in the night skies above Earth. Ancient stargazers recognized that there are other planets up there as well. *Remember that a planet is a large celestial body that revolves around a star for light and heat.* What they did not know is that these planets, like Earth, revolve around the sun. Astronomers now know of eight major planets, including Earth, that revolve around the sun. *The other day, you heard the word* major *and its antonym, or opposite,* minor. *What does the word* major *mean?* (big or important) In addition, there are a number of dwarf planets—or little planets.



Show image 8A-2: Diagram of the solar system

The word ***solar*** is used to describe something that is related to the sun. For example, solar energy refers to the heat and light that come from the sun. Planets and other celestial bodies that orbit the sun make up what is

known as the solar system. *So what do we call the sun and the planets that orbit it? What does the word* lunar *refer to?* (the moon)

This diagram shows the eight major planets in our solar system. About the only thing these eight planets have in common is the fact that they all orbit the same sun on their own special path. Beyond that, each planet is **unique** *one of a kind and different from any other*. The first four planets you will learn about are called the **inner** planets *or the ones near the center of the solar system*: Mercury, Venus, Earth, and Mars.

Challenge

Which planet is circled in this diagram? *(Earth)*

Show image 8A-3: Mercury

Mercury is the closest planet to the sun and the smallest of the eight major planets in the solar system. *Being the smallest and closest to the sun makes Mercury unique.* Mercury can be seen from Earth, but it is hard to spot. You can only see it in the early morning or early evening.

Support

Turn back to image 8A-2 to show students how much smaller Mercury is than the other planets.

Most of the planets in the solar system are named after Roman gods and goddesses. *Remember that the names of constellations also came from Greek and Roman myths.* The planet Mercury is named after the Roman god Mercury. In mythology, the god Mercury was very fast, so it makes sense that this planet is named after him. It takes just eighty-eight Earth days for Mercury to complete a revolution around the sun, so it is a quick little planet. *Remember that Earth takes 365 days to orbit the sun. So if Mercury only takes eighty-eight days, which planet is faster?* Unlike Earth, Mercury does not rotate much. It spins on its axis just one and a half times during its revolution around the sun.

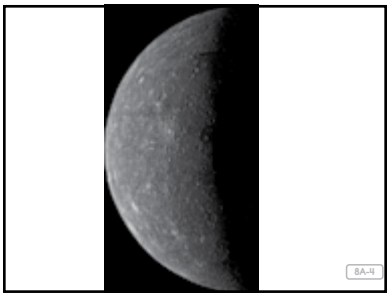
Reading

Reading/Viewing Closely

Entering/Emerging
Prompt students to identify and describe the image.

Transitioning/Expanding
Encourage students to identify and describe the image using key details.

Bridging
Encourage students to identify and describe the image using key details and domain vocabulary.

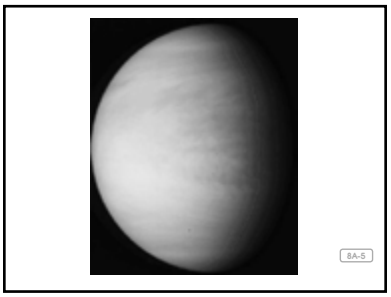


Show image 8A-4: Close-up of Mercury

Describe what you see in this close-up picture of Mercury.

At first glance, you might notice that Mercury looks a lot like our moon with its rocky, heavily cratered surface. Mercury has some of the largest known crater impacts in the solar system, meaning that it has been hit by some very large rocks. In fact, some craters are about fifty miles wide.

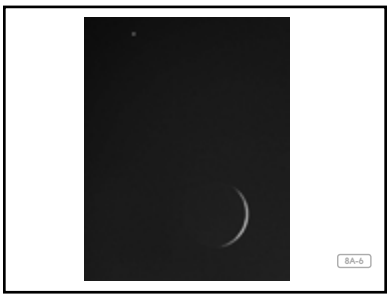
Mercury has no atmosphere to protect it like Earth does. *Like they do to our moon, rocks and debris just crash right into Mercury's surface, making the craters.* And because it is so close to the sun, the surface of Mercury is very, very hot or very, very cold. Temperatures on the surface facing the sun can range anywhere from 300 degrees to nearly 1,400 degrees Fahrenheit *On Earth, we consider ninety degrees Fahrenheit to be hot.* while the surface facing away from the sun can be as low as 350 degrees below zero. *Thirty-two degrees Fahrenheit is the temperature at which water freezes on Earth.*



Show image 8A-5: Venus

Venus is the second planet from the sun. It is named after the Roman goddess of love. Aside from the sun and the moon, Venus is the brightest celestial object that you can see from Earth. *Being the brightest object in our night sky makes Venus unique.*

It takes Venus roughly 225 Earth days to revolve around the sun. However, like Mercury, Venus does not rotate on its axis very fast. In fact, Venus actually rotates in the opposite direction that Earth does.



Show image 8A-6: Venus viewed from Earth

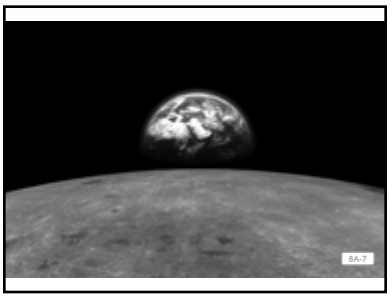
[Point to Venus in the image.] What else do you see in this image? (the moon)

Venus is sometimes referred to as the "morning star" or the "evening star" because it often appears as a bright object in the evening sky or as a bright object in the morning sky. Venus is also known as Earth's sister planet because it is the closest planet to Earth, and the two planets are roughly the same size. *Being a sister planet to Earth is another fact unique to Venus.*

Beyond that, however, Earth and Venus have very little in common. Venus's atmosphere consists of a very thick layer of clouds, so it is difficult for astronomers to study its surface. We do know, however, that the surface is very hot and dry. Venus's thick, cloudy atmosphere traps much of the sun's energy, meaning temperatures on the planet can soar to above 800 degrees Fahrenheit! *That's really hot! You also learned the word* atmosphere *when we first started studying astronomy. What does* atmosphere *mean?* (the bubble of gas that surrounds a planet)

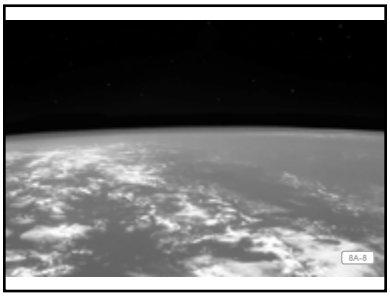
Support

Recall from *Early American Civilizations* that the Mayans, who did not have a telescope or other modern technologies, thought that Venus was a star.



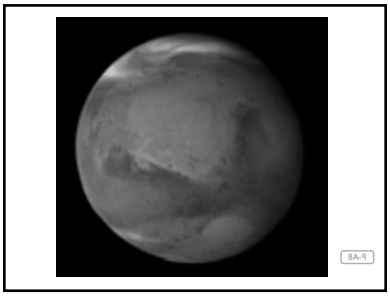
Show image 8A-7: Earth from moon *What are the first two planets we've learned about so far? Hint: the smallest and first planet closest to the sun* (Mercury)*; the brightest and second-closest planet to the sun* (Venus).

You should recognize the planet in this photo. It's your home planet, Earth, the third planet from the sun. Earth is the only planet that does not take its name from a Roman or Greek god. The word *earth* is an ancient word that originally meant "ground." When the word earth was invented, the people living here did not even know that it was a planet. This photo was taken by the astronauts of the Apollo 8 mission. They did not get to land on the moon, but they flew around it.



Show image 8A-8: Earth's surface

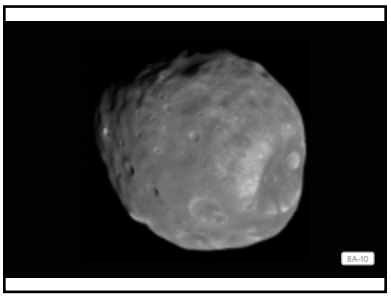
One of the most important factors that sets Earth apart from other planets is the **abundant** supply of water. *That means there is more than enough or plenty of water.* Water is essential for life; without water, there could not be any living things like people, plants, or animals. Although some other celestial bodies in our solar system have some water, Earth is the only planet whose surface is mostly liquid water. Earth is also the only planet with an abundance of oxygen in the air, and oxygen is also essential for life. *Its supply of water and oxygen makes Earth unique. So after Mercury and Venus comes planet Earth, where we live.*



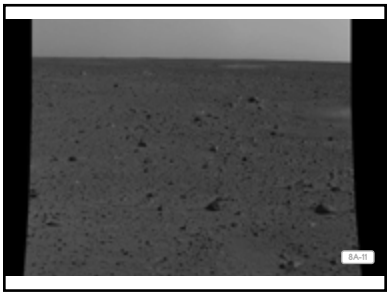
Show image 8A-9: Mars

Mars is the fourth planet from the sun. Mars is named after the Roman god of war. Mars is often referred to as the Red Planet because of its color. *Its red color makes Mars unique. Here the word* color *means the tone you see when you look at something, such as red, blue, or green.* You can see Mars from Earth, and even without a telescope you can identify it by its reddish tint.

The farther you get from the sun, the colder it is and the longer it takes to complete a revolution, or make one trip around the sun. It takes Mars 687 Earth days to revolve around the sun. It is interesting, though, that Mars rotates on its axis at about the same speed as Earth.



Show image 8A-10: Phobos
Mars has two moons, but they are small and oddly shaped. One of them is pictured here. Astronomers believe that these moons are actually large asteroids, or space rocks, that became trapped in orbit as they passed by Mars billions of years ago.



Show image 8A-11: Mars surface
Because Mars is relatively close to Earth, astronomers from NASA have been able to send several spacecraft to explore that planet. NASA has sent several unmanned spacecraft to orbit Mars. NASA has also managed to send several small robotic vehicles, called rovers, to explore Mars's surface. The photo you see here is the first color photo ever taken on another planet! It was snapped by the Spirit Exploration Rover. Most of the rocky surface of Mars is covered in a layer of rust, which is a reddish-brown color. The rust explains why Mars appears to be red.

NASA scientists hope to be able to send astronauts to Mars, but it may be many, many years before technology exists that might allow them to **accomplish** this *or achieve this goal*. Perhaps, if you decide to be an astronaut when you grow up, you will be the first person to set foot on Mars. It will not be easy to put a person on Mars, but people used to think it was impossible to go to the moon, too. *Mars is also unique because it is a celestial body we might be able to visit one day.*

COMPREHENSION QUESTIONS (10 MIN)

1. **Literal** You heard that the word *solar* means something related to the sun. What is the solar system? (*group of planets and other celestial bodies that orbit the sun*)

2. **Inferential** How many planets are in our solar system? (*eight*) What do all the planets have in common? (*They orbit the sun.*) You heard that orbiting the sun is about the only thing all eight planets have in common. What does this mean? (*Orbiting the sun is about the only way in which they are the same; in other ways they are all unique or very different from one another.*)

Show image 8A-2: Diagram of the solar system

Check for Understanding

Point to It: [Have students come up and point to each of the inner planets as you name them: Mercury, Venus, Earth, Mars.]

- **Literal** You learned that all eight planets orbit the sun. Why don't they bump into each other? (*They all have their own path, or orbit*.) You learned that the first four planets are Mercury, Venus, Earth, and Mars. Why are they called the inner planets? (*They are closest to the sun.*) A planet's year is how long it takes the planet to orbit the sun. Which planet has the shortest year, meaning it takes the shortest time to go around the sun? (*Mercury*)

3. Ask the following questions about the planets learned about today:

Show image 8A-3: Mercury

- **Literal** This is the first planet in the solar system, known for being the smallest and the closest to the sun. What is the name of this planet? (*Mercury*)

Show image 8A-5: Venus

- **Literal** This is the second planet in the solar system, known for being the brightest planet as seen from Earth. What is the name of this planet? (*Venus*)

Show image 8A-7: Earth from moon

- **Inferential** This is the third planet in the solar system, known for having lots of water, oxygen, and life. The third planet is the most important one to us. What is the name of this planet? (*Earth*) Why is it most important to us? (*We live on it.*)

Show image 8A-9: Mars

- **Literal** This is the fourth planet in the solar system, known as the Red Planet. What is the name of this planet? (*Mars*)

4. **Evaluative** Which planet do you think has the longest year, meaning it takes the longest time to go around the sun? [Point to the outer planets in succession until students identify the outermost one.]

WORD WORK: ABUNDANT (5 MIN)

1. In today's read-aloud you heard, "One of the most important factors that sets Earth apart from other planets is the abundant supply of water."
2. Say the word *abundant* with me.
3. When you say something is abundant, you mean you have a plentiful amount or more than enough of it.
4. When there is a lot of rain and good soil, farmers expect an abundant crop.
5. Do you have an abundant supply of anything? Try to use the word *abundant* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "I have an abundant supply of _____."]
6. What's the word we've been talking about?

Use an Antonyms activity for follow-up. You know that *abundant* means having more than enough of something, or having plenty of it. The opposite of *abundant* is *scarce*, which means not having enough of something, or having very little. Listen to the following examples. If I describe an amount that is plentiful, say, "That is abundant." If I describe an amount that is very little, say, "That is scarce."

- the number of stars in the sky (*That is abundant.*)
- the amount of rain in the desert (*That is scarce.*)
- the amount of light from the sun (*That is abundant.*)
- the number of grains of sand on the beach (*That is abundant.*)
- the amount of the moon you can see when it is a crescent moon (*That is scarce.*)

Lesson 8: The Solar System, Part I

Application

20M

Writing: With assistance, students will use a chart to organize information about the planets and write briefly about their observations.
[W.1.1, W.1.8]

Support

Play instrumental music to the tune of "Oh My Darling, Clementine" to accompany the planets song.

PLANETS CHART

- To the tune of "Oh My Darling, Clementine," sing the following song to students to help them remember the planets in our solar system they have learned about thus far.

  Do you know the solar system?
  It's our home in outer space.
  Planets orbit round the sun, while
  It shines brightly in one place.

  First is Mercury, small and speedy,
  Second, Venus, shining bright.
  Third is Earth, a home for people.
  Fourth is Mars, a rusty sight.

- Repeat the words and encourage students to sing along.
- Tell students that together you will make a chart of all the planets in our solar system. Explain that you will write down two facts they learned today about each of the first four planets: Mercury, Venus, Earth, and Mars. Then you will complete the chart with the rest of the planets during the next lesson.
- Display the planets chart you prepared in advance.
- Ask students the names of the four planets in order from the sun. *(Mercury, Venus, Earth, Mars)* Record this information in the first column and add the appropriate Image Cards to the second column.
- Ask students to share two facts about each planet, and add the facts to the chart.
- You may want to turn back to the images in the read-aloud to help students recall facts for each planet. Sample responses are included below:

Planets Chart			
Position and Name	**Image Card**	**Fact 1**	**Fact 2**
1. Mercury	*Image Card 7: Mercury*	*craters*	*smallest planet*
2. Venus	*Image Card 8: Venus*	*sister to Earth*	*brightest planet in the sky*
3. Earth	*Image Card 1: Earth*	*covered in water*	*oxygen supports life*
4. Mars	*Image Card 9: Mars*	*red*	*we may visit one day*

Exit Pass

- Explain to students that they will be writing an opinion about what inner planet they want to visit and why.
- Write the sentence frame "I want to visit the inner planet _____ because _____," on the board.
- Model for students an example of this by saying "I want to visit the inner planet Mercury because there are many craters I would want to visit."
- Have students write one to three sentences about the inner planet that they would want to visit.
- Collect students' journals to evaluate their understanding of inner planets and opinions.

End Lesson

Support

Some students may benefit from using the modified Astronomy Journal prompts on Activity Page 8.1.

Writing

Writing

Entering/Emerging
Have students dictate their response to an adult.

Transitioning/Expanding
Have students dictate their response to a peer.

Bridging
Have students independently write one to three detailed sentences on topic.

LESSON

9

ASTRONOMY

The Solar System, Part II

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will review the inner planets of our solar system.
[SL.1.1]

Reading

Students will identify the outer planets of our solar system.
[RI.1.2]

Language

Students will demonstrate an understanding of the Tier 2 words *categorize*, *inner*, and *outer*.
[L.1.5, L.1.5c]

Writing

With assistance, students will use a chart to organize information about the planets and write briefly about their observations.
[W.1.1, W.1.8]

FORMATIVE ASSESSMENT

Exit Pass

Astronomy Journals Students will record their observations of the outer planets in a journal.
[W.1.8]

LESSON AT A GLANCE

	Grouping	Time	Materials
Introducing the Read-Aloud			
What Have We Already Learned?	Whole Group	10 min	❑ instrumental music for the song "Oh My Darling, Clementine" (optional) ❑ know/wonder lists ❑ Planets Chart ❑ board/chart paper
Read-Aloud			
Purpose for Listening	Whole Group	30 min	❑ image of Uranus on its axis (optional)
"The Solar System, Part II"			
Comprehension Questions			
Word Work: *Categorize*			
This is a good opportunity to take a break.			
Application			
Planets Chart	Independent	20 min	❑ instrumental music for the song "Oh My Darling, Clementine" (optional) ❑ Planets Chart ❑ Image Cards 10–13 ❑ astronomy journals ❑ Activity Page 9.1 (optional)

ADVANCE PREPARATION

Introducing the Read-Aloud

- Refer to the lists of things students already know and would like to know about planets.
- Display the Planets Chart you created in the previous lesson.

Application

- Prepare to add Image Cards 10–13, as well as facts about the remaining four planets, to the Planets Chart during the Application activity.

Universal Access

- Gather or prepare an image showing Uranus on its axis to share with students during the read-aloud.
- Find instrumental music to the tune of "Oh My Darling, Clementine" to accompany the planets song in the Application.

CORE VOCABULARY

categorize, v. sort; put into a group with other similar objects
Example: My teacher asked me to categorize this stack of books as fiction or nonfiction for our classroom library.
Variation(s): categorizes, categorized, categorizing

outer, adj. far from the center; outside
Example: The outer part of the earth's surface is the part we live on.
Variation(s): none

probes, n. tools for exploring things that cannot be seen easily
Example: Probes have collected a lot of information about the surface of Mars.
Variation(s): probe

violent, adj. dangerously rough
Example: When I was wrestling with my brother and he got hurt, my mom said we were being too violent.
Variation(s): none

Vocabulary Chart for "The Solar System, Part II"

Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday Speech Words
Vocabulary		categorize *(categorizer)* violent outer	
Multiple Meaning	probes		
Sayings and Phrases	the naked eye outer reaches		

Start Lesson

Lesson 9: The Solar System, Part II

Introducing the Read-Aloud

10M

Speaking and Listening: Students will review the inner planets of our solar system.
[SL.1.1]

WHAT HAVE WE ALREADY LEARNED?

Check for Understanding

One-Word Answer: Ask students to recall the name of one of the four inner planets they learned about in the last read-aloud. (*Mercury, Venus, Earth, Mars*)

- Sing the planets song with students to review the first four major planets discussed in the previous read-aloud. The song is sung to the tune of "Oh My Darling, Clementine":

  Do you know the solar system?
  It's our home in outer space.
  Planets orbit round the sun, while
  It shines brightly in one place.

  First is Mercury, small and speedy,
  Second, Venus, shining bright.
  Third is Earth, a home for people.
  Fourth is Mars, a rusty sight.

- Read the Planets Chart you developed in the previous lesson. Ask students why these planets are called the inner planets. (*They are closest to the sun.*)

Support

Play instrumental music to the tune of "Oh My Darling, Clementine" to accompany the planets song.

Speaking and Listening

Presenting

Entering/Emerging
Have students practice the beat and rhythm of the song.

Transitioning/Expanding
Have students sing along with most of the words of the song.

Bridging
Have students sing along with all the words of the song.

- Remind students that there are eight planets in the solar system, meaning that there are four planets left to learn about today. Explain that the planets they will learn about today are called the outer planets.
- Ask students if they have heard of any additional planets in addition to the ones they learned about in the previous read-aloud. Record this information on the list of things students already know about planets that you created in Lesson 8.
- Then ask students what other questions they have about planets. Record this information on the list of things they would like to know about planets that you created in Lesson 8.

Lesson 9: The Solar System, Part II

Read-Aloud

30M

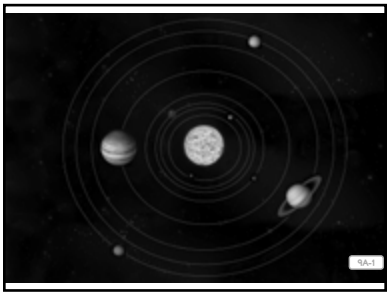
Reading: Students will identify the outer planets of our solar system.
[RI.1.2]

Language: Students will demonstrate an understanding of the Tier 2 words *categorize, inner,* and *outer*.
[L.1.5, L.1.5c]

PURPOSE FOR LISTENING

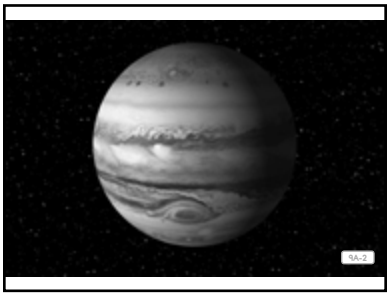
- Tell students to listen carefully to learn the name of each planet and what makes it unique, so they can add these facts to the Planets Chart.

"THE SOLAR SYSTEM, PART II" (15 MIN)



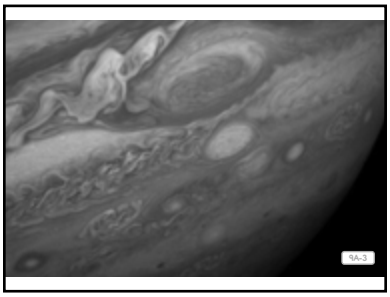
Show image 9A-1: Solar system diagram
In the last read-aloud you learned about the four inner planets of our solar system: Mercury, Venus, Earth, and Mars. Now you will learn about the **outer** planets—Jupiter, Saturn, Uranus [/yər*aen*us/], and Neptune, as well as the famous dwarf planet, Pluto. *These planets are farthest from the sun, on the outside part of the solar system.*

The first important difference between the inner planets and the outer planets is that the inner planets are all made up of rocks and metals, whereas the outer planets are made of different types of gases. *You learned about gases when we began our study of astronomy. What are gases?*

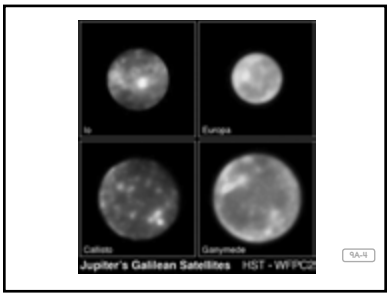


Show image 9A-2: Jupiter
The planet Jupiter is the fifth planet from the sun. In Roman mythology, Jupiter was the king of the gods—the strongest and most powerful of all. The largest planet in our solar system is named after him. *Being the largest planet makes Jupiter unique.* Jupiter is so big that you could stuff about 1,300 planet Earths inside of it.

It takes Jupiter nearly twelve Earth years to make one revolution around the sun. However, Jupiter rotates on its axis faster than any other planet in the solar system. This massive planet rotates all the way around on its axis in less than ten hours. Jupiter is made mostly of hydrogen and other gases. Because of its fast rotation and the mixing of its gases, Jupiter is an extremely **violent** *or dangerously rough*, stormy place.

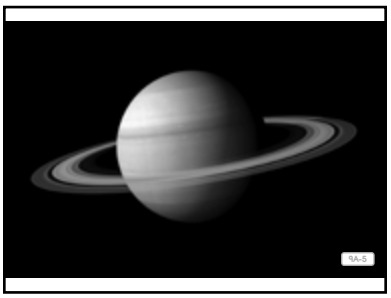


Show image 9A-3: Red spot
The best-known feature on Jupiter is its large, red spot. This spot is actually a massive storm. *This stormy, red spot makes Jupiter unique, and it helps us remember what the planet looks like.* The storm is so big that you could fit three planet Earths inside of it! Jupiter can be seen with the naked eye from Earth, and sometimes you can see its red spot with an ordinary telescope.



Show image 9A-4: Jupiter's moons
There are at least sixty-three moons in orbit around Jupiter. *How many moons does Earth have? Jupiter has sixty-three moons going around it!* Most of them are very small. However, four of these moons are well-known. They were all discovered first by the famous astronomer Galileo. These are easily visible with a pair of binoculars. Each is interesting in its own way, particularly Europa, the small one in the upper right. *[Point to Europa.]*

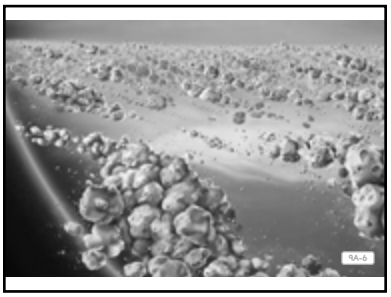
Europa is slightly smaller than our own moon, and yet—for many astronomers—it is one of the most fascinating celestial bodies in the solar system. Europa's surface is covered in ice, and its atmosphere contains a lot of oxygen. Many astronomers believe that beneath Europa's ice there is an ocean of liquid water. This means that maybe—just maybe—there is some form of life on this distant little moon. *So far, the only place in the solar system that we know has life is our own planet Earth.*



Show image 9A-5: Saturn

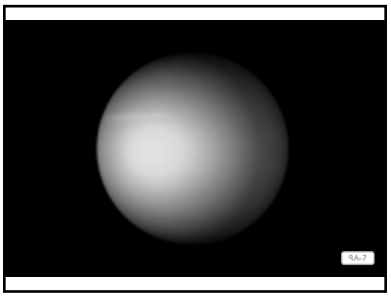
The next planet in the solar system is Saturn, the sixth planet from the sun. It is the second-largest planet in the solar system, although it is much smaller than Jupiter. Saturn is famous for its rings. It is not the only planet with rings, but no other planet has rings like Saturn's. *Its rings make Saturn unique and easy to recognize.* This incredible photo was taken by an unmanned orbiter in 2004.

Saturn has several layers with different types of clouds, and it is quite stormy, though not as stormy as its neighbor Jupiter. *These layers and clouds are part of the planet. Remember, outer planets are made of gases. What are inner planets made of?* Because it is so far from the sun, it takes Saturn nearly thirty Earth years to make one complete orbit. Different parts of Saturn rotate at different speeds, but for the most part Saturn rotates on its axis very quickly, taking a little over ten hours to complete one rotation.



Show image 9A-6: The rings, close-up

The rings of Saturn are always moving around the planet. They are made up mainly of ice and a few other types of materials. The rings are basically huge collections of dust with some larger chunks here and there. Nobody is sure how the rings got there. Some astronomers believe the rings formed when one of Saturn's moons exploded and the debris *or broken pieces* became trapped in orbit. Others say the material in the rings is left over from the time when Saturn was formed billions of years ago. You can see Saturn from Earth during certain times of our year, and with an ordinary telescope you can see the rings.



Show image 9A-7: Uranus

The seventh planet, Uranus, has the coldest atmosphere of any planet in the solar system. *Its cold atmosphere makes Uranus unique.* Because it is so far from the sun, it takes Uranus eighty-four Earth years to make one complete orbit. Uranus is mostly made of hydrogen, but its atmosphere also contains a lot of ice and other substances not found

Challenge

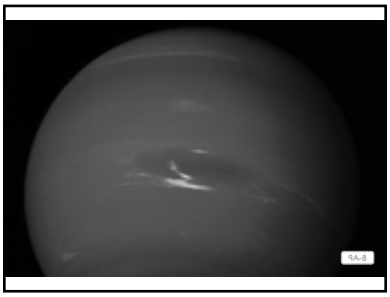
Why might you only be able to see Saturn at certain times of our year? *(The orbits and rotations of Earth and Saturn put them at different places at different times.)*

on Jupiter or Saturn. Uranus is named after a Greek god of the sky, making it the only planet other than Earth that is not named after a Roman god. Although it is possible to see Uranus from Earth with the naked eye, you really have to know where and when to look for it because it appears very dim, or not very bright, from here on Earth.

Support

Show a picture of Uranus's axis, or draw a diagram on the board/chart paper.

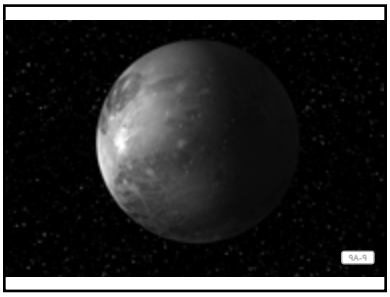
Uranus has one very special characteristic: it rotates on its side! You can't see it in this image, but in comparison to Earth and the other planets, Uranus's axis is sideways, as though someone turned the planet on its side. *Lying on its side makes Uranus unique.*



Show image 9A-8: Neptune

The planet Neptune is the eighth and final major planet in the solar system. In Roman mythology, Neptune was the god of the sea, so this is a fitting name, given the planet's beautiful, blue color. *Its blue color and its distance from the sun make Neptune unique. What was the red planet you heard about yesterday?* (Mars) Astronomers still do not know exactly why Neptune is blue, and it will probably be a while before they figure it out. That is because Neptune is nearly three billion miles from the sun, making it very difficult and expensive to send unmanned **probes** to explore it. *Probes are tools designed to collect information in outer space and send it back to Earth.*

It takes Neptune nearly 165 Earth years to orbit the sun. The planet is never visible to the naked eye from Earth, and you will need a fairly powerful telescope to get a good view of its beautiful color.



Show image 9A-9: Pluto

Not so very long ago, students in school were taught that there were nine planets in the solar system, including Pluto. In fact, ever since Pluto was discovered in 1930, it has been considered a planet. However, in 2006, astronomers decided to **categorize** Pluto as a dwarf planet, one of several such bodies in our solar system. *They decided to sort planets into two groups: dwarf, meaning "little"; and regular. Categorizing Pluto as a dwarf planet means they put Pluto in the dwarf planet group.*

In Roman mythology, Pluto was the god of the underworld, a dark and dreary place. This is a good name for such a cold and distant dwarf planet. Pluto is about four billion miles from the sun, so it is extremely cold and dark out there. The planet is made almost entirely of frozen nitrogen. Most nitrogen found on earth is a gas but out in the depths of space it is frozen. It takes Pluto about 243 Earth years to orbit the sun.

We have a lot to learn about Pluto and other celestial bodies in the outer reaches of the solar system, but it is not easy to explore this area. For now, this is about the best photo we have of Pluto, and it was taken from three billion miles away by a special spacecraft called the Hubble Space Telescope. So far, Pluto remains unexplored. A special probe was launched toward Pluto in the year 2003, but it will not reach the planet until 2015. *What do probes do?*

COMPREHENSION QUESTIONS (10 MIN)

Check for Understanding

Recall: You learned that the inner planets are all made of metal and rock. What are all the outer planets made of? (*gases*)

1. Ask students the following questions about the outer planets:

Show image 9A-2: Jupiter

- **Literal** This is the fifth planet in the solar system, known for being the largest planet, and having a red spot and sixty-three moons. What is the name of this planet? (*Jupiter*)

Show image 9A-5: Saturn

- **Literal** This is the sixth planet in the solar system, known for the rings around it. What is the name of this planet? (*Saturn*)

Show image 9A-7: Uranus

- **Literal** This is the seventh planet in the solar system, known for being the coldest planet and for rotating on its side. What is the name of this planet? (*Uranus*)

Show image 9A-8: Neptune

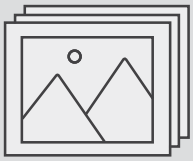
- **Literal** This is the eighth or last planet in the solar system, known as the blue planet. What is the name of this planet? (*Neptune*)

2. **Inferential** *Think Pair Share:* Astronomers believed for seventy-six years that Pluto was the ninth planet in our solar system. Astronomers found other celestial bodies in deep space that were like Pluto, and they came up with a new category that they called dwarf, or small, planet. Why do you think they took so long to make this change? (*Pluto is so far away; we haven't learned much about deep space.)*

WORD WORK: CATEGORIZE (5 MIN)

1. In the read-aloud we heard, "[A]stronomers decided to categorize Pluto as a dwarf planet."
2. Say the word *categorize* with me.
3. When you categorize something, you sort it or put it in a group with other things like it.
4. You might categorize your clothes by putting shirts in one drawer of your dresser and pants in another.
5. Pretend you had a collection of colorful buttons in different shapes and sizes. What is one way you could categorize them? Try to use the word *categorize* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "I could categorize the buttons by . . . "]
6. What's the word we've been talking about?

Image Cards 1, 7–13



Language

Analyzing Language

Entering/Emerging
Have students point to the category to which a given planet belongs.

Transitioning/Expanding
Have students name and place the planet card in the correct category.

Bridging
Have students explain their choice as they name and place the planet card in the correct category.

Show Image Cards 1 and 7–13

Use an Image Card activity for follow-up. [Take Image Cards 1 and 7–13 and show them to students. Then show Flip Book image 8A-2, the diagram of the solar system, and show students that the images on the Image Cards are of the same planets that are on the diagram. Write two category names on chart paper, a chalkboard, or a whiteboard: "Inner" and "Outer."] We know that to categorize means to sort or put objects in groups based on what they have in common. Let's take these eight planet Image Cards and categorize them by inner planets (the ones you learned about in the previous lesson that are closer to the sun) and outer planets (the ones you learned about today that are farther from the sun). We can use this diagram of the solar system if you forget where each planet goes. The groups we make will be called categories. Who would like to come up and categorize one of these planets, putting it in the right category? [Call on volunteers to sort the planets. During the activity, use the word *categorize* frequently and encourage each volunteer to use it in a sentence, such as "I categorized Mercury as an inner planet."]

Lesson 9: The Solar System, Part II

Application

20M

Writing: With assistance, students will use a chart to organize information about the planets and write briefly about their observations.
[W.1.1, W.1.8]

PLANETS CHART

- To the tune of "Oh My Darling, Clementine," sing the following song to students to help them remember the planets in our solar system.

  Do you know the solar system?
  It's our home in outer space.
  Planets orbit round the sun, while
  It shines brightly in one place.

  First is Mercury, small and speedy,
  Second, Venus, shining bright.
  Third is Earth, a home for people.
  Fourth is Mars, a rusty sight.

  Fifth is Jupiter, big and stormy.
  Sixth is Saturn, with its rings.
  Seventh, Uranus, is tilted.
  Eighth is Neptune, ocean king.

  Every planet is unique but
  They all orbit 'round the sun.
  I know all about the planets
  But the Earth's my favorite one.

- Repeat the words, and encourage students to sing along.
- Tell students that together you will complete the chart of all the planets in our solar system you began in the last lesson. Remind students that they have written down two facts they learned about each of the first four planets: Mercury, Venus, Earth, and Mars. Today you will write facts for the rest of the planets in the solar system.
- Display the Planets Chart you prepared in Lesson 8.

Support

Play instrumental music to the tune of "Oh My Darling, Clementine" to accompany the planets song.

Challenge

Have students write an opinion statement, identifying which planet they think is the most interesting and why.

Support

Some students may benefit from using the modified Astronomy Journal prompts on Activity Page 9.1.

Writing

Writing

Entering/Emerging
Have students dictate their responses to an adult.

Transitioning/Expanding
Have students dictate their responses to a peer.

Bridging
Have students independently write one to three detailed sentences on topic.

- Ask students the names of the four outer planets in order from the sun. *(Jupiter, Saturn, Uranus, Neptune)* Record these names in the first column and add the appropriate Image Cards to the second column.
- Ask students to share two facts about each planet, and add the facts to the chart.
- You may want to turn back to the images in the read-aloud to help students recall facts for each planet. Sample responses are included below:

Planets Chart

Position and Name	Image Card	Fact 1	Fact 2
1. Mercury	Image Card 7: Mercury	craters	smallest planet
2. Venus	Image Card 8: Venus	sister to Earth	brightest planet in the sky
3. Earth	Image Card 1: Earth	covered in water	oxygen supports life
4. Mars	Image Card 9: Mars	red	we may visit one day
5. Jupiter	*Image Card 10: Jupiter*	*stormy, has red spot*	*largest (with 63 moons)*
6. Saturn	*Image Card 11: Saturn*	*rings*	*has lots of layers of clouds*
7. Uranus	*Image Card 12: Uranus*	*coldest atmosphere*	*lies on its side*
8. Neptune	*Image Card 13: Neptune*	*blue*	*farthest from sun*

Exit Pass

- Explain to students that they will be writing an opinion about what outer planet they want to visit and why.
- Write the sentence frame "I want to visit the outer planet _____ because _____." on the board.
- Model for students an example of this by saying "I want to visit the outer planet Saturn because I want to be able to see its rings up-close."
- Have students write one to three sentences about the outer planet that they would want to visit.
- Collect students' journals to evaluate their understanding of outer planets and opinions.

End Lesson

Domain Review

NOTE TO TEACHER

You should spend one day reviewing and reinforcing the material in this domain. You may have students do any combination of the activities provided in either whole group or small group settings.

CORE CONTENT OBJECTIVES

- Explain that the sun, moon, and stars are located in outer space
- Explain that the sun is a source of energy, light, and heat
- Classify the sun as a star
- Identify the earth's rotation, or spin, as the cause of day and night
- Recognize that other parts of the world experience nighttime while we have daytime
- Explain sunrise and sunset
- Explain that Earth orbits the sun
- Describe stars as large, hot, distant, and made of gas
- Recognize the Big Dipper
- Identify four phases of the moon—new, crescent, half, full
- Explain that the moon orbits the earth
- Explain the first landing on the moon by American astronauts
- Indicate that there are eight planets in our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune)

REVIEW ACTIVITIES

Image Review

- Show the Flip Book images from any read-aloud again, and have students retell the read-aloud using the images.

Domain-Related Trade Book or Student Choice

Materials: Trade book

- Read a trade book to review a particular event or concept; refer to the books listed in the digital components for this unit. You may also choose to have students select a read-aloud to be heard again.

Key Vocabulary Brainstorming

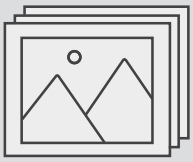
Materials: Chart paper, chalkboard, or whiteboard

- Give students a key domain concept or vocabulary word such as *astronaut* or *planet*. Have them brainstorm everything that comes to mind when they hear the word, such as rocket, helmet, spacesuit, etc. Record their responses on chart paper, a chalkboard, or a whiteboard for reference.

Image Card Review

Materials: Image Cards 1, 7–13

Image Cards 1, 7–13



- Hold the planet Image Cards in your hand, fanned out like a deck of cards. Ask a student to choose a card but not show it to anyone else in the class.
- The student must then give a clue about the picture s/he is holding. For example, for Saturn, a student may say, "This planet has rings."
- The rest of the class will guess which planet is being described.
- Proceed to another card when the correct answer has been given.

Class Book

Materials: Drawing paper; drawing tools

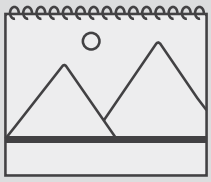
- Tell the class or a group of students that they are going to make a class book to review what they have learned about space exploration or about the planets.
- Have students brainstorm important facts about one of these two topics. Have each student choose one idea to draw a picture of and then write a caption for the picture.
- Bind the pages to make a book to put in the class library for students to read again and again.

Riddles for Core Content

- Ask students riddles such as the following to review core content:
  - I am the planet closest to the sun. Which planet am I? *(Mercury)*
  - I used to be the ninth planet, but now I am categorized as a dwarf planet. Which celestial body am I? *(Pluto)*
  - We are the outer planets, Jupiter, Saturn, Uranus, and Neptune. What are we made up of? *(gas)*
  - I orbit around the earth. What am I? *(the moon)*

Multiple Meaning Word Activity: Color

Poster 4M



Show Poster 4M: Color

- Have students hold up one or two fingers to indicate which image on the poster shows this meaning: "Mars is often referred to as the Red Planet because of its color."
- Tell students that c*olor* can also mean something else. *Color* can also mean to draw or fill in a picture with crayons, markers, or colored pencils. Have students hold up one or two fingers to indicate which image on the poster shows this meaning.
- Point to the image of the rainbow. With a partner, have students talk about what they think of when they see this kind of color. Call on a few partners to share what they came up with. *(When I see this type of color, I think of red, blue, green, yellow, etc.)*
- Point to the image of the child coloring. With a partner, have students talk about what they think of when they see this kind of color. Call on a few partners to share what they came up with. *(When I see this type of color, I think of crayons, a picture, having fun, etc.)*

The Solar System

Activity Page DR.1

- Tell students this is an activity page about the solar system.
- Read the labels with students and discuss what the diagram shows.
- Guide students as needed to read and answer the questions.
- Invite students to color the diagram, reminding them that scientists often refer to Mars as "the red planet," Neptune as "the blue planet," and that Jupiter has a red spot on it.

Grade 1 | Knowledge 6

Domain Assessment

NOTE TO TEACHER

This domain assessment evaluates each student's retention of domain and academic vocabulary words and the core content targeted in *Astronomy*. The results should guide review and remediation the following day.

There are three parts to this assessment. You may choose to do the parts in more than one sitting if you feel this is more appropriate for your students. Part I (vocabulary assessment) is divided into two sections: the first assesses domain-related vocabulary, and the second assesses academic vocabulary. Parts II and III of the assessment address the core content targeted in *Astronomy*.

PART I

Activity Page DA.1

Directions: I am going to ask a question using a word you have heard in the read-alouds. If the answer to the question is "yes," circle the thumbs up. If the answer to the question is "no," circle the thumbs down. I will ask each question two times. Let's do the first question together.

1. **Atmosphere:** Is the earth's atmosphere the part that is far, far away from Earth and contains the moon? *(thumbs down)*
2. **Orbit:** Does the earth travel in an orbit around the sun? *(thumbs up)*
3. **Planet:** Is a planet a small object that provides its own light and heat? *(thumbs down)*
4. **Telescopes:** Do scientists use telescopes to look at objects in the same room as them? *(thumbs down)*
5. **Constellations:** If you look up in the sky on a clear night, could you see constellations, or groups of stars, that look like pictures? *(thumbs up)*
6. **Astronaut:** Is an astronaut someone who travels in outer space? *(thumbs up)*
7. **Launch:** Has the United States launched a rocket into space? *(thumbs up)*
8. **Solar:** Are things associated with the moon called solar? *(thumbs down)*

Directions: I am going to ask more questions using other words you have heard and practiced. If the answer to the question is "yes," circle the thumbs up. If the answer to the question is "no," circle the thumbs down. I will read each question two times.

9. **Ancient:** Is a new bicycle considered ancient? *(thumbs down)*
10. **Counterclockwise:** [Draw a counterclockwise circle.] Is this counterclockwise? *(thumbs up)*
11. **Determined:** Would a student who is determined to get good grades do all his homework and do his best in class? *(thumbs up)*
12. **Inner:** Is an inner planet closer to the sun than an outer planet? *(thumbs up)*
13. **Major:** Does *major* mean small or unimportant? *(thumbs down)*

PART II

Activity Page DA.2

Directions: Listen to the following sentences about planets in our solar system. On your page you will see each of these planets labeled in their location from the sun. I will read each sentence, then read each of the planet names going outward from the sun. Place the number of the sentence I read below the planet to which it belongs. Each planet will have one sentence, and only one sentence, which belongs with it. I will read all the sentences twice. Let's do the first one together.

1. I am the planet on which we live. *(Earth)*
2. I am known as the "Red Planet," and astronauts may be able to visit me one day. *(Mars)*
3. I am the largest planet and have a big red spot, which is actually a storm. *(Jupiter)*
4. I am the smallest planet and closest to the sun. *(Mercury)*
5. I am the planet with big, beautiful rings. *(Saturn)*
6. People call me Earth's sister planet and the brightest planet, and I can be seen in Earth's sky. *(Venus)*
7. I lie on my side and I'm the only planet other than Earth not named after a Roman god. *(Uranus)*
8. I am a blue planet and the farthest from the sun. *(Neptune)*

PART III

Directions: I am going to read statements that refer to either the earth, the sun, or the moon. If what I read to you describes something about Earth, circle the first picture in the row. If what I read to you describes something about the sun, circle the second picture in the row. If what I read to you describes something about the moon, circle the last picture in the row.

1. This celestial body is your home—the planet on which you live. *(Earth)*
2. This celestial body has phases named after how much is seen of it: new, crescent, half, and full. *(moon)*
3. This celestial body is the only planet known to have enough water and oxygen to support life. *(Earth)*
4. This celestial body is the star that allows life to survive on Earth. *(sun)*
5. This celestial body was visited by astronauts from Earth. *(moon)*

Culminating Activities

NOTE TO TEACHER

Please use these final two days to address class results of the Domain Assessment. Based on the results of the Domain Assessment, you may wish to use this class time to provide remediation opportunities that target specific areas of weakness for individual students, small groups, or the whole class.

Alternatively, you may also choose to use this class time to extend or enrich students' experience with domain knowledge. A number of enrichment activities are provided to provide students with opportunities to enliven their experiences with domain concepts.

REMEDIATION

Remediation opportunities include:

- targeting Review Activities
- revisiting lesson Applications
- rereading and discussing select read-alouds
- reading the corresponding lesson in the Language Studio

ENRICHMENT

Domain-Related Trade Book or Student Choice

Materials: Trade book

- Read an additional trade book to review a particular event or concept; refer to the books listed in the digital components for this unit.
- You may also choose to have students select a read-aloud to be heard again.

Relative Distances in the Solar System

Materials: Masking tape; measuring tape

- Take the students outside or to a large indoor space, such as a hallway.
- Write the word "sun" on a piece of masking tape or paper, and place it on the floor.

- Using the information in the chart below, mark out to scale the distances the eight planets are from the sun. This activity will reinforce the vast distances in space and will help students see why the inner and outer planets are broken into two groups.
- Depending upon how much space you have, you may want your unit of measure to be feet, so that Mercury is five inches from the sun, Venus is eight inches from the sun, Earth is one foot from the sun, etc.
- If your students are familiar with the metric system, a simpler unit of measure would be one meter.

Planet	Distance from the Sun, Using Bode's Law
Mercury	0.4
Venus	0.7
Earth	1.0
Mars	1.6
asteroid belt	2.8
Jupiter	5.2
Saturn	10.0
Uranus	19.6
Neptune	38.8

Mnemonic for Planets

Materials: Writing paper, writing tools

- Explain that one way people remember the names of the planets in order is to memorize a sentence with words that start with the same letters as the planets do.
- As a group or individually, have students develop a new sentence for remembering the sequence of the eight planets. You may want to provide students with the first initials in sequence: M, V, E, M, J, S, U, and N.

You Were There: In Outer Space

- Have students pretend that they were one of the first astronauts who traveled to space or to the moon, or that they were one of the hundreds of scientists at mission control.
- Ask students to describe what they saw and heard. For example, for the first walk on the moon, students may talk about the four days it took to travel there; landing on the fine, soft dust of the moon's surface; what they might say once there; etc.
- Consider also extending this activity by adding group or independent writing opportunities associated with the "You Were There" concept. For example, ask students to pretend they are newspaper reporters describing the moon landing and write a group news article describing the event.

Teacher Resources

Grade 1	Knowledge 6

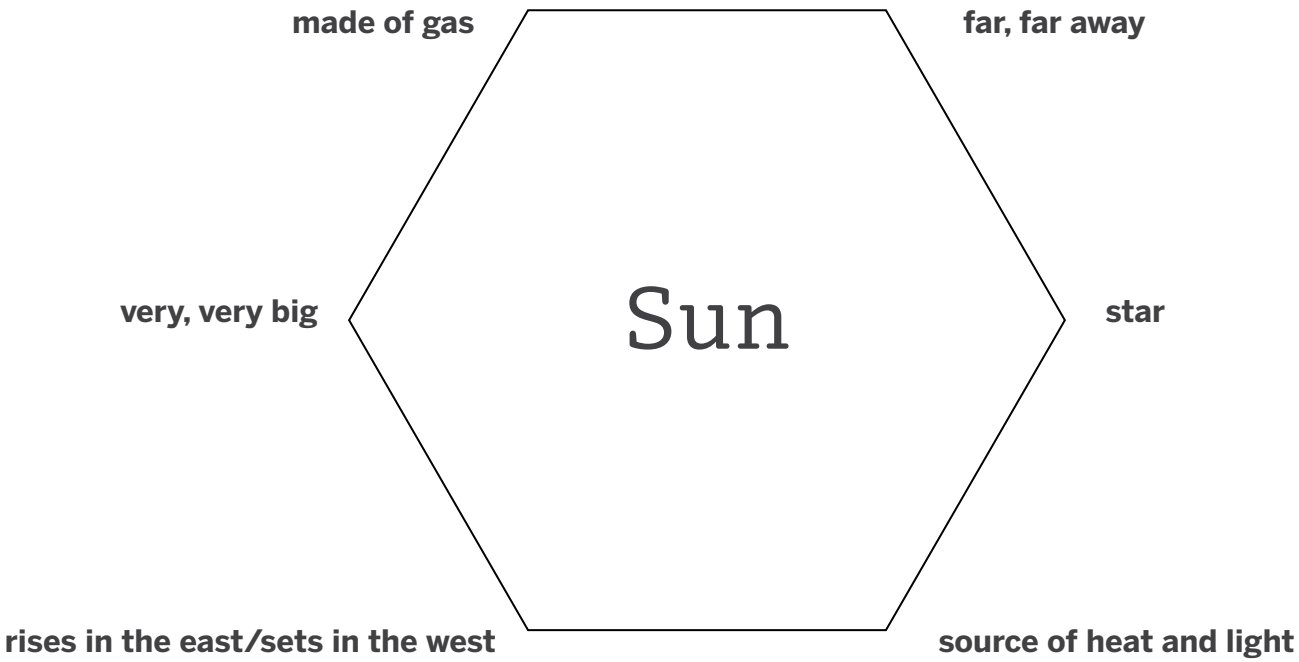
Teacher Guide

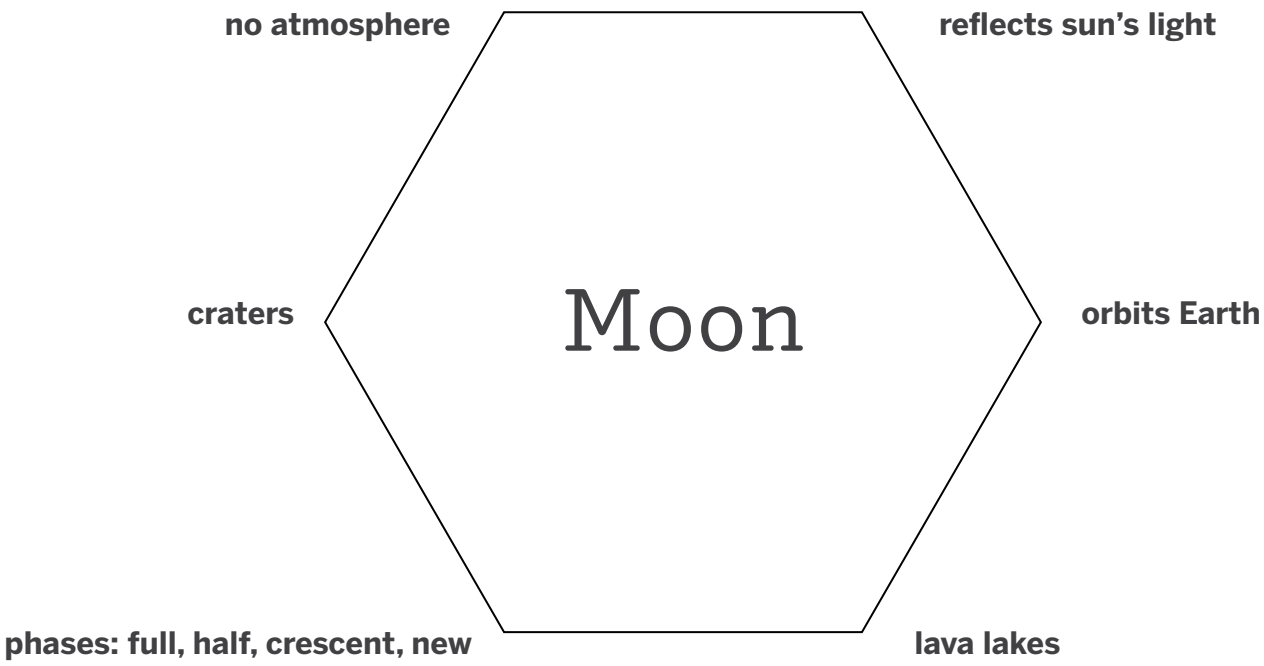
Grade 1 | Knowledge 6

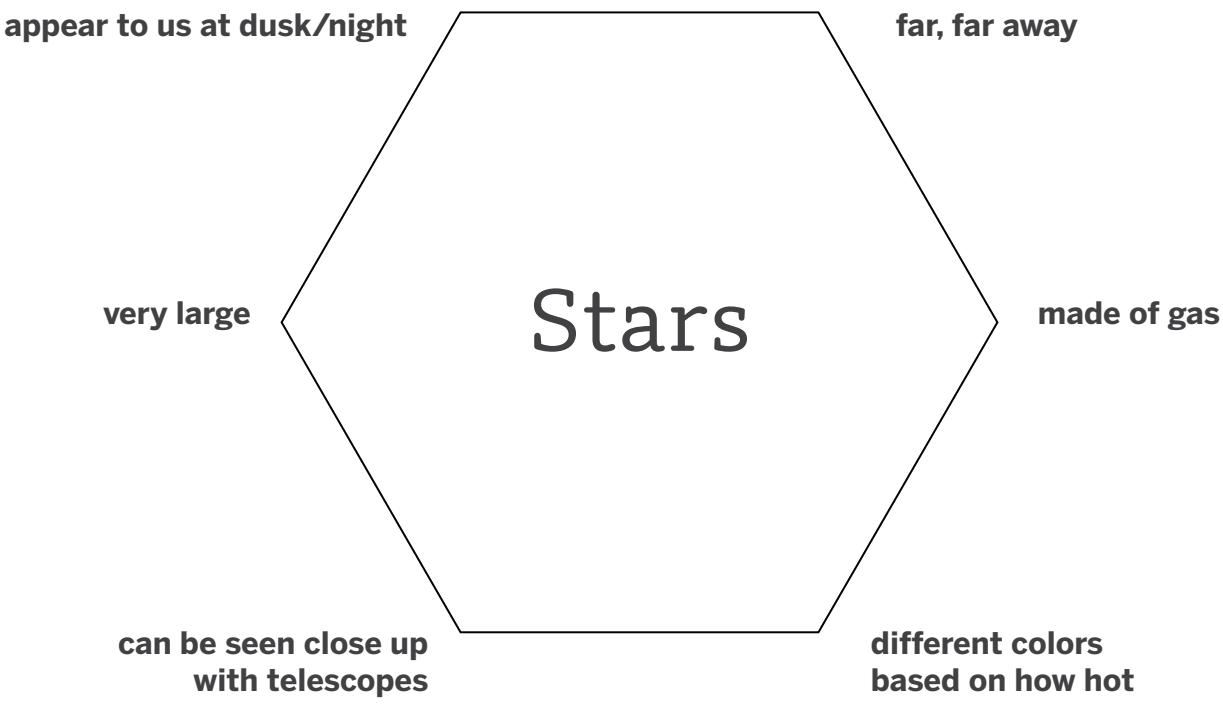
Teacher Resources

In this section you will find:

- Suggestions for Idea Webs
- Activity Book Answer Key


made of gas
far, far away
very, very big
Sun
star
rises in the east/sets in the west
source of heat and light


no atmosphere
reflects sun's light
craters
Moon
orbits Earth
phases: full, half, crescent, new
lava lakes


appear to us at dusk/night
far, far away
very large
Stars
made of gas
can be seen close up with telescopes
different colors based on how hot

ACTIVITY BOOK ANSWER KEY

NAME: _____

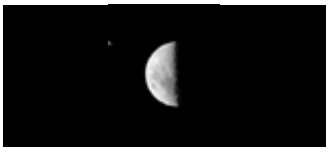
DATE: _____

5.2 **Activity Page**

1 _____

2 _____

3 _____



4 _____

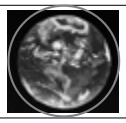
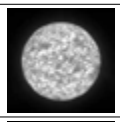
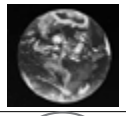
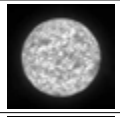
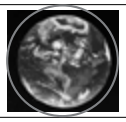
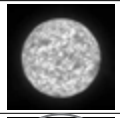
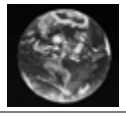
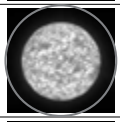
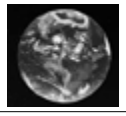
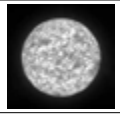
Knowledge 6 Astronomy 181

Knowledge 6

NAME: _____

DATE: _____

PP.1 **Assessment**

	Earth	Sun	Moon
1.			
2.			
3.			
4.			
5.			

Directions: Listen to your teacher's directions.

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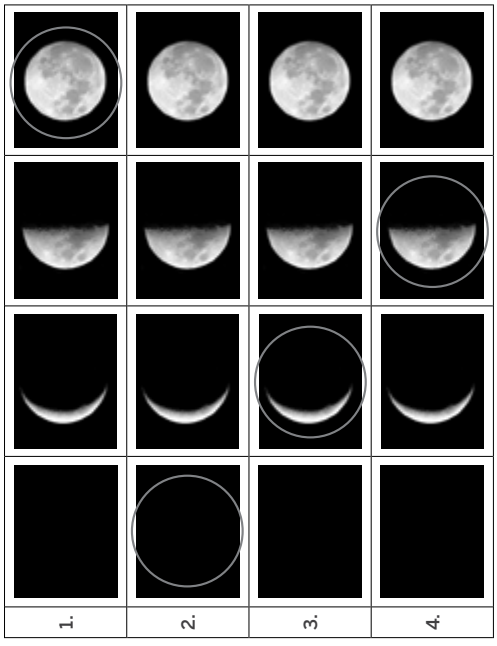
Knowledge 6

NAME: _____

DATE: _____

PP.2 **Assessment**



1.	2.	3.	4.

Directions: Listen to your teacher's directions.

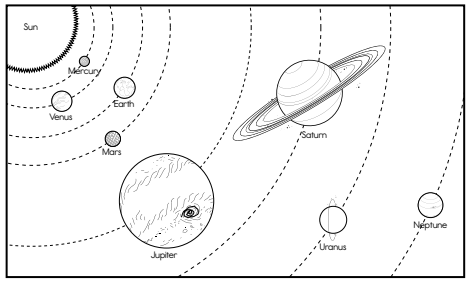
Knowledge 6 Astronomy 185

Knowledge 6

NAME: _____

DATE: _____

DR.1 **Assessment**



Directions: Read and answer each question using the diagram. You may wish to color the diagram to reflect what you know about the colors of certain planets in the solar system.

1. How many planets orbit the sun?

   8

2. Which planet is closest to the sun?

   Mercury

3. Is Mars larger or smaller than Earth?

   smaller

4. Which planet is famous for its rings?

   Saturn

Knowledge 6 Astronomy 197

Knowledge 6

NAME: _____

DATE: _____

DA.1 Assessment

Directions: Listen to your teacher's instructions.

NAME: _____

DATE: _____

DA.2 Assessment

Directions: Listen to your teacher's instructions.

NAME: _____

DATE: _____

DA.3 Assessment

Directions: The pictures show the earth, the sun, and the moon. If what I read to you describes something about the earth, circle the first picture in the row. If what I read to you describes something about the sun, circle the second picture in the row. If what I read to you describes something about the moon, circle the last picture in the row.

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