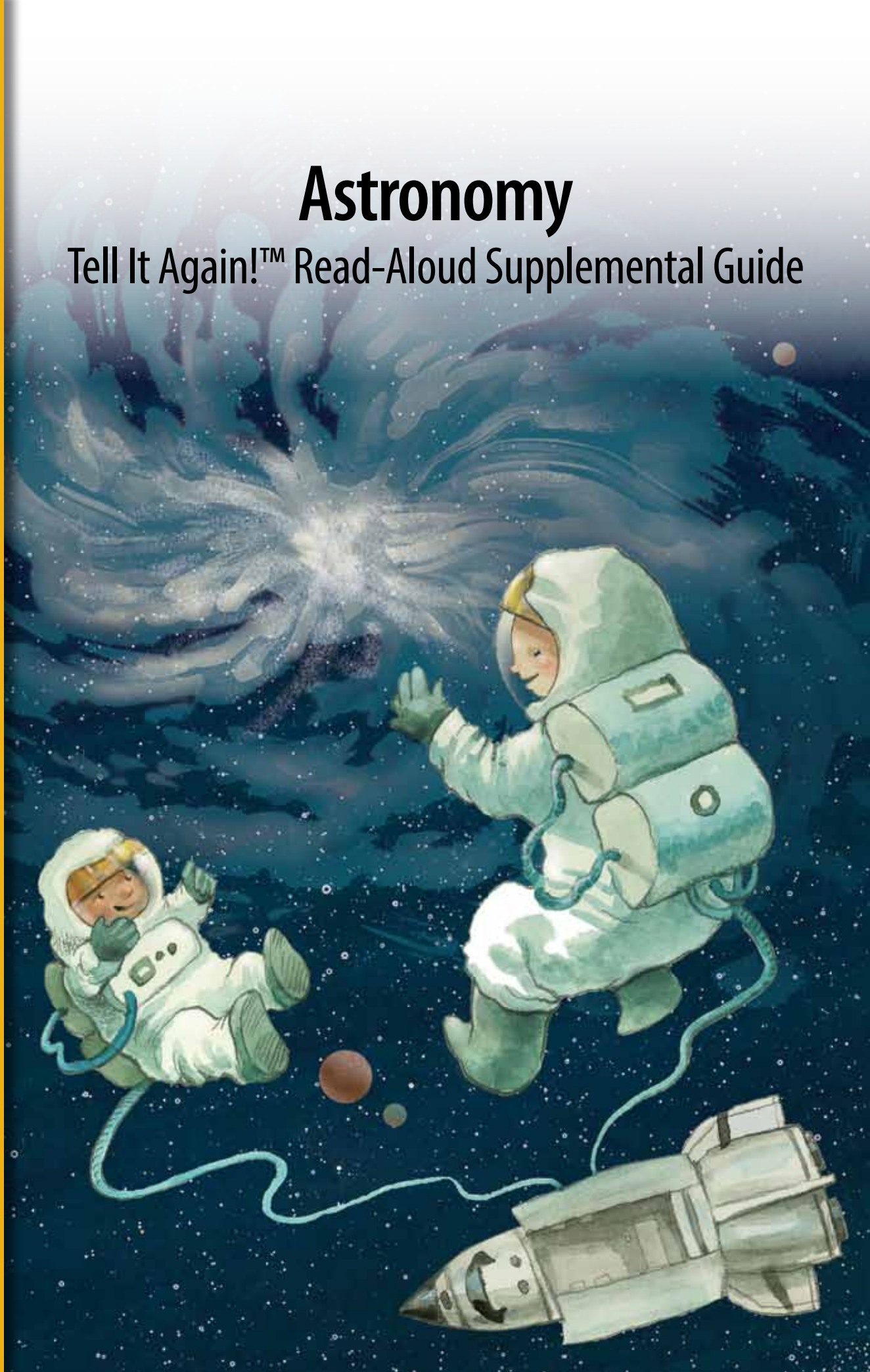
Astronomy

Tell It Again!™ Read-Aloud Supplemental Guide



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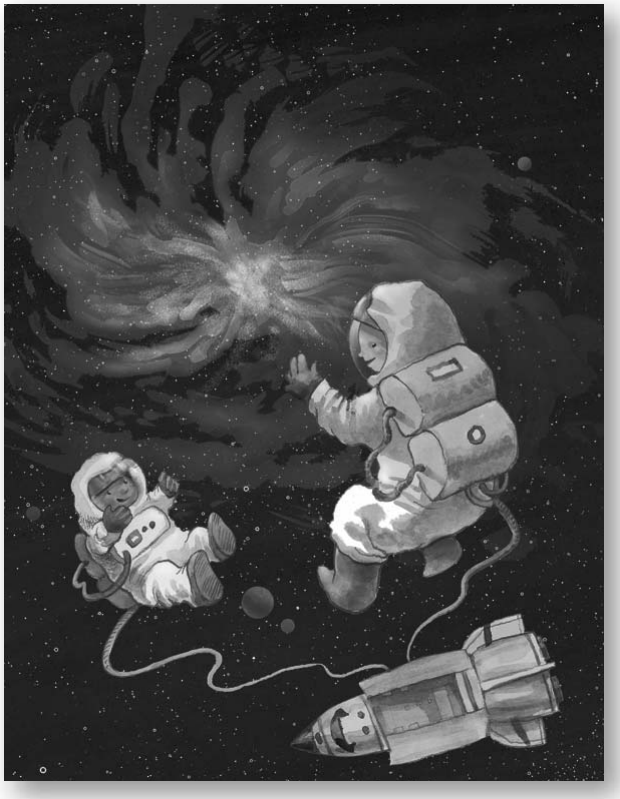

Astronomy

Transition Supplemental Guide to the Tell It Again!™ Read-Aloud Anthology

Listening & Learning™ Strand

GRADE 1

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Transition Supplemental Guide to the Tell It Again!™ Read-Aloud Anthology

Preface to the Transition Supplemental Guide

This preface to the *Transition Supplemental Guide* provides information about the guide's purpose and target audience, and describes how it can be used flexibly in various classroom settings.

Please note: The *Supplemental Guides* for the first three domains in Grade 1 contain modified read-alouds and significantly restructured lessons with regard to pacing and activities. These early *Supplemental Guides* provided step-by-step, scaffolded instruction with the intention that students receiving instruction from teachers using the *Supplemental Guide* for the first part of the year would be ready to participate in regular Listening & Learning lessons, and that teachers who have used the *Supplemental Guide* for the first part of the year would be equipped with the instructional strategies to scaffold the lessons when necessary. This shift from the full *Supplemental Guide* to the *Transition Supplemental Guide* affords teachers more autonomy and greater responsibility to adjust their execution of the lessons according to the needs of their classes and individual students.

Transition Supplemental Guides for the remaining domains will still contain Vocabulary Charts and *Supplemental Guide* activities such as Multiple Meaning Word Activities, Syntactic Awareness Activities, and Vocabulary Instructional Activities. However, the *Transition Supplemental Guides* do not have rewritten read-alouds and do not adjust the pacing of instruction; the pacing and read-aloud text included in each *Transition Supplemental Guide* is identical to the pacing and read-aloud text in the corresponding *Tell It Again! Read-Aloud Anthology.* We have, however, augmented the introductions and extensions of each lesson in the *Transition Supplemental Guides* so teachers have additional resources for students who need greater English language support. As a result, there are often more activities suggested than can be completed in the allotted time for the introduction or extension activities. Teachers will need to make informed and conscious decisions in light of their particular students' needs when choosing which activities to complete and which to omit. We strongly recommend that teachers preview the Domain Assessment prior to teaching this domain; this will provide an additional way to inform their activity choices.

Intended Users and Uses

This guide is intended to be used by general education teachers, reading specialists, English as a Second Language (ESL) teachers, special education teachers, and teachers seeking an additional resource for classroom activities. This guide is intended to be both flexible and versatile. Its use is to be determined by teachers in order to fit the unique circumstances and specific needs of their classrooms and individual students. Teachers whose students would benefit from enhanced oral language practice may opt to use the *Transition Supplemental Guide* as their primary guide for Listening & Learning. Teachers may also choose individual activities from the *Transition Supplemental Guide* to augment the content covered in the *Tell It Again! Read-Aloud Anthology*. For example, teachers might use the Vocabulary Instructional Activities, Syntactic Awareness Activities, and modified Extensions during small-group instruction time. Reading specialists and ESL teachers may find that the tiered Vocabulary Charts are a useful starting point in addressing their students' vocabulary learning needs.

The *Transition Supplemental Guide* is designed to allow flexibility with regard to lesson pacing and encourages education professionals to pause and review when necessary. A number of hands-on activities and graphic organizers are included in the lessons to assist students with learning the content.

Transition Supplemental Guide Contents

The *Transition Supplemental Guide* contains tiered Vocabulary Charts, Multiple Meaning Word Activities, Syntactic Awareness Activities, and Vocabulary Instructional Activities. The Domain Assessments and Family Letters have been modified. In some instances, the activities in the Extensions as well as the activities in the Pausing Point, Domain Review, and Culminating Activities have been modified or rewritten. Please refer to the following sample At a Glance Chart to see how additional support is communicated to the teacher.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
Introductory Content	[Additional materials to help support this part of the lesson will be listed here.]	[A brief explanation about how the material can be used.]
Vocabulary Preview	[There will be one or two vocabulary preview words per lesson.]	
Purpose for Listening		
Presenting the Read-Aloud (15 minutes)		
Note: It is highly recommended that teachers preview the read-aloud, Flip Book images, and comprehension questions to determine when to pause during the read-aloud and ask guiding questions, especially before a central or difficult point is going to be presented (e.g., While we are reading this part of the read-aloud, I want to you think about . . .) and supplementary questions (e.g., Who/What/Where/When/Why literal questions) to check for understanding.		
Title of Read-Aloud	[Materials that may help scaffold the read-aloud will be listed here.]	
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work		
 **Complete Remainder of the Lesson Later in the Day**		
Extensions (20 minutes)		
Extension Activities	[Additional Extension activities may include a Multiple Meaning Word Activity, a Syntactic Awareness Activity, a Vocabulary Instructional Activity, and modified existing activities or new activities.]	

The additional materials found in the *Transition Supplemental Guide* afford students further opportunities to use domain vocabulary and demonstrate knowledge of content. The lessons of this guide contain activities that create a purposeful and systematic setting for English language learning. The read-aloud for each story or nonfiction text builds upon previously taught vocabulary and ideas and introduces language and knowledge needed for the next more complex text. The *Transition Supplemental Guide's* focus on oral language in the earlier grades addresses the language learning needs of students with limited English

language skills. These students—outside of a school setting—may not be exposed to the kind of academic language found in many written texts.

Vocabulary Charts

Vocabulary Chart for [Title of Lesson]			
Core Vocabulary words are in **bold**. Multiple Meaning Word Activity word is underlined. Vocabulary Instructional Activity words have an asterisk (*). Suggested words to pre-teach are in *italics*.			
Type of Words	**Tier 3** Domain-Specific Words	**Tier 2** General Academic Words	**Tier 1** Everyday-Speech Words
Understanding			
Multiple Meaning			
Phrases			
Cognates			

Vocabulary Charts at the beginning of each lesson categorize words into three tiers which are generally categorized as follows:

- Tier 1 words are words that are likely to appear in the basic repertoire of native English-speaking students—words such as *planet, sun,* and *moon*.
- Tier 2 words are highly functional and frequently used general academic words that appear across various texts and content areas—words such as *technology, unique,* and *categorize*.
- Tier 3 words are content-specific and difficult words that are crucial for comprehending the facts and ideas related to a particular subject—words such as *Jupiter, meteor,* and *astronomer*.

English Language Learners and students with limited oral language skills may not necessarily know the meanings of all Tier 1 words, and may find Tier 2 and Tier 3 words confusing and difficult to learn. Thus, explicit explanation of, exposure to, and practice using Tier 1, 2, and 3 words are essential to successful mastery of content for these students (National Governors Association Center for Best Practices, Council of Chief State School Officers 2010 32–35).

In addition, the Vocabulary Chart indicates whether the chosen words are vital to understanding the lesson (labeled *Understanding*); have multiple meanings or senses (labeled *Multiple Meaning*); are clusters of words that often appear together (labeled *Phrases*); or have a Spanish word that

sounds similar and has a similar meaning (labeled *Cognates*). Words in the Vocabulary Chart were selected because they appear frequently in the text of the read-aloud or because they are words and phrases that span multiple grade levels and content areas. Teachers should be aware of and model the use of these words as much as possible before, during, and after each individual lesson. The Vocabulary Chart could also be a good starting point and reference for keeping track of students' oral language development and their retention of domain-related and academic vocabulary. These lists are not meant to be exhaustive, and teachers are encouraged to include additional words they feel would best serve their students.

Multiple Meaning Word Activities

Multiple Meaning Word Activities help students determine and clarify the different meanings of individual words. This type of activity supports a deeper knowledge of content-related words and a realization that many content words have multiple meanings associated with them. Students with strong oral language skills may be able to navigate through different meanings of some words without much effort. However, students with limited English language proficiency and minimal vocabulary knowledge may be less likely to disambiguate the meanings of words. This is why it is important that teachers have a way to call students' attention to words in the lesson that have ambiguous meanings, and that students have a chance to explore the nuances of words in contexts within and outside of the lessons.

Syntactic Awareness Activities

Syntactic Awareness Activities focus on sentence structure. During the early elementary grades, students are not expected to read or write lengthy sentences, but they might be able to produce complex sentences in spoken language when given adequate prompting and support. Syntactic Awareness Activities support students' awareness of the structure of written language, interrelations between words, and grammar. Developing students' oral language through syntactic awareness provides a solid foundation for written language development in the later elementary grades and beyond.

Vocabulary Instructional Activities

Vocabulary Instructional Activities are included to build students' general

academic, or Tier 2, vocabulary. These words are salient because they appear across content areas and in complex written texts. These activities support students' learning of Tier 2 words and deepen their knowledge of academic words and the connections of these words to other words and concepts. The vocabulary knowledge students possess is intricately connected to reading comprehension, the ability to access background knowledge, express ideas, communicate effectively, and learn about new concepts.

English Language Learners and Students with Disabilities

The *Transition Supplemental Guide* assists education professionals who serve students with limited English language skills or students with limited home literacy experience, which may include English Language Learners (ELLs) and students with special needs. Although the use of this guide is not limited to teachers of ELLs and/or students with special needs, the following provides a brief explanation of these learners and the challenges they may face in the classroom, as well as teaching strategies that address those challenges.

English Language Learners

The *Transition Supplemental Guide* is designed to facilitate the academic oral language development necessary for English Language Learners (ELLs) and to strengthen ELLs' understanding of the core content presented in the domains.

When teaching ELLs, it is important to keep in mind that they are a heterogeneous group from a variety of social backgrounds and at different stages in their language development. There may be some ELLs who do not speak any English and have little experience in a formal education setting. There may be some ELLs who seem fluent in conversational English, but do not have the academic language proficiency to participate in classroom discussions about academic content. The following is a chart showing the basic stages of second language acquisition; proper expectations for student behavior and performance; and accommodations and support strategies for each stage. Please note that ELLs may have extensive language skills in their first language and that they advance to the next stage at various rates depending on their acculturation, motivation, and prior experiences in an education setting.

Language Development Stage	Comprehension and Production	Accommodations and Support Strategies
Entering	• Produces little or no English • Responds in nonverbal ways • Has a minimal receptive vocabulary in English	• Use predictable phrases for set routines • Use manipulatives, visuals, realia, props • Use gestures (e.g., point, nod) to indicate comprehension • Use lessons that build receptive and productive vocabulary, using illustrated pre-taught words • Use pre-taught words to complete sentence starters • Use simply stated questions that require simple nonverbal responses (e.g., "Show me . . . ," "Circle the . . . ") • Use normal intonation, emphasize key words, and frequent checks for understanding • Model oral language and practice formulaic expressions • Pair with another ELL who is more advanced in oral language skills for activities and discussions focused on the English language • Pair with same-language peers for activities and discussions focused on content

Emerging (Beginner)	• Responds with basic phrases
	• Includes frequent, long pauses when speaking
	• Has basic level of English vocabulary (common words and phrases)
		• Use repetition, gestures, and visual aids to facilitate comprehension and students' responses
		• Use manipulatives, visuals, realia, props
		• Use small-group activities
		• Use lessons that expand receptive and expressive vocabulary, especially Tier 2 vocabulary
		• Use illustrated core vocabulary words
		• Use pre-identified words to complete cloze sentences
		• Use increasingly more difficult question types as students' receptive and expressive language skills improve:
		  • Yes/no questions
		  • Either/or questions
		  • Questions that require short answers
		  • Open-ended questions to encourage expressive responses
		• Allow for longer processing time and for participation to be voluntary
		• Pair with another ELL who is more advanced in oral language skills for activities and discussions focused on the English language
		• Pair with same-language peers for activities and discussions focused on content

Transitioning (Intermediate)	• Speaks in simple sentences
	• Uses newly learned words appropriately
	• With appropriate scaffolding, able to understand and produce narratives
	• Has a much larger receptive than expressive vocabulary in English
		• Use more complex stories and books
		• Continue to focus on Tier 2 vocabulary
		• Introduce academic terms (e.g., making predictions and inferences, figurative language)
		• Use graphic organizers
		• Use increasingly difficult question types as students' receptive and expressive language skills improve:
		  • Questions that require short sentence answers
		  • *Why* and *how* questions
		  • Questions that check for literal and abstract comprehension
		• Provide some extra time to respond
		• Pair with high-level English speakers for activities and discussions focused on the English language

Expanding (Advanced)	• Engages in conversations • Produces connected narrative • Shows good comprehension • Has and uses expanded vocabulary in English	• Continue work with academic terms (e.g., making predictions and inferences, figurative language) • Use graphic organizers • Use questions that require opinion, judgment, and explanation • Pair with native English speakers
Commanding (Proficient)	• Uses English that nearly approximates the language of native speakers • Can maintain a two-way conversation • Uses more complex grammatical structures, such as conditionals and complex sentences. • Has and uses an enriched vocabulary in English	• Build high-level/academic language • Expand figurative language (e.g., by using metaphors and idioms) • Use questions that require inference and evaluation • Pair with students who have a variety of skills and language proficiencies

(Adapted from Hirsch and Wiggins 2009, 362–364; New York Department of Education 2013; Smyk et al. 2013)

Students with Disabilities and Students with Special Needs

Students with disabilities (SWDs) have unique learning needs that require accommodations and modifications to the general education curriculum. When using the *Transition Supplemental Guide* with SWDs and students with special needs, it is important to consider instructional accommodations, tools, strategies, and Universal Design for Learning (UDL) Principles, which promote learning for all students through the use of multiple forms of representation, expression, and engagement (Hall, Strangman, and Meyer 2003).

Pacing

Pacing is the purposeful increase or decrease in the speed of instruction. Educators can break lessons into manageable chunks depending on needs of the class and follow the section with a brief review or discussion. This format of instruction ensures that students are not inundated with information. Additionally, you may want to allow students to move around the room for brief periods during natural transition points. When waiting for students to respond, allow at least three seconds of uninterrupted wait time to increase correctness of responses, response rates, and level of thinking (Stahl 1990).

Goals and Expectations

Make sure students know the purpose and the desired outcome of each activity. Have students articulate their own learning goals for the lesson. Provide model examples of desired end-products. Use positive verbal praise, self-regulation charts, and redirection to reinforce appropriate ways for students to participate and behave.

Directions

Provide reminders about classroom rules and routines whenever appropriate. You may assign a partner to help clarify directions. When necessary, model each step of an activity's instructions. Offering explicit directions, procedures, and guidelines for completing tasks can enhance student understanding. For example, large assignments can be delivered in smaller segments to increase comprehension and completion (Franzone 2009).

Instruction Format and Grouping

Use multiple instruction formats (e.g., small-group instruction, individual work, collaborative learning, and hands-on instruction). Be sure to group students in logical and flexible ways that support learning.

Instructional Strategies

The following evidence-based strategies can assist students with disabilities in learning content (Scruggs et al. 2010):

- **Mnemonic strategies** are patterns of letters and sounds related to ideas that enhance retention and recall of information. They can be used as a tool to encode information.
- **Spatial organizers** assist student understanding and recall of information using charts, diagrams, graphs, and/or other graphic organizers.
- **Peer mediation,** such as peer tutoring and cooperative learning groups, can assist in assignment completion and enhance collaboration within the classroom.
- **Hands-on learning** offers students opportunities to gain understanding of material by completing experiments and activities that reinforce content.
- **Explicit instruction** utilizes clear and direct teaching using small steps, guided and independent practice, and explicit feedback.
- **Visual strategies** (e.g., picture/written schedules, storymaps, task analyses, etc.) represent content in a concrete manner to increase focus, communication, and expression (Rao and Gagie 2006).

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Alignment Chart for Astronomy

The following chart contains core content objectives addressed in this domain. It also demonstrates alignment between the Common Core State Standards and corresponding Core Knowledge Language Arts (CKLA) goals.

Alignment Chart for Astronomy	**Lesson**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Core Content Objectives									
Recognize the sun in the sky	✓								
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 Earth as a planet and our home		✓						✓	
Identify the earth's rotation, or spin, as the cause of day and night		✓						✓	✓
Explain 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, although they appear small in the night sky			✓						
Describe stars as hot, distant, and made of gas			✓						
Explain that astronomers study the moon and stars using telescopes			✓	✓	✓	✓	✓		
Describe how people sometimes tell stories about the moon and stars			✓	✓	✓	✓			
Explain what a constellation is				✓					
Identify the Big Dipper and the North Star				✓					
Identify the four phases of the moon—new, crescent, half, full					✓				
Explain that the moon orbits the earth					✓		✓		

Alignment Chart for Astronomy

	Lesson								
	1	2	3	4	5	6	7	8	9
Explain that astronauts travel to outer space						✓	✓		
Describe the landing on the moon by American astronauts							✓		
Explain the importance of the first trip to the moon							✓		
Explain that our solar system includes the sun and the planets that orbit around it								✓	✓
Indicate that there are eight planets in our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune)								✓	✓
Classify Pluto as a dwarf planet									✓

Note: The Language Arts Objectives in the Lessons may change depending on teacher's choice of activities.

Reading Standards for Literature: Grade 1

Craft and Structure

STD RL.1.5	Explain major differences between books that tell stories and books that give information, drawing on a wide reading of a range of text types.								
CKLA Goal(s)	Listen to, understand, and recognize a variety of texts, including fictional stories, fairy tales, fables, historical narratives, informational text, nursery rhymes, and poems, describing the differences between books that tell stories and books that give information			✓					

Reading Standards for Informational Text: Grade 1

Key Ideas and Details

STD RI.1.1	Ask and answer questions about key details in a text.								
CKLA Goal(s)	Ask and answer questions (e.g., *who, what, where, when*), orally or in writing, requiring literal recall and understanding of the details and/or facts of a nonfiction/informational read-aloud				✓				
	Answer questions that require making interpretations, judgments, or giving opinions about what is heard in a nonfiction/informational read-aloud, including answering *why* questions that require recognizing cause/effect relationships				✓				

Alignment Chart for Astronomy

		Lesson								
		1	2	3	4	5	6	7	8	9
STD RI.1.3	Describe the connection between two individuals, events, ideas, or pieces of information in a text.									
CKLA Goal(s)	Describe the connection between two individuals, events, ideas, or pieces of information in a nonfiction/informational read-aloud			✓		✓	✓	✓	✓	✓
Craft and Structure										
STD RI.1.4	Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.									
CKLA Goal(s)	Ask and answer questions about unknown words and phrases in nonfiction/informational read-alouds and discussions					✓				
Integration of Knowledge and Ideas										
STD RI.1.7	Use the illustrations and details in a text to describe its key ideas.									
CKLA Goal(s)	Use illustrations and details in a nonfiction/informational read-aloud to describe its key ideas					✓			✓	
STD RI.1.9	Identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).									
CKLA Goal(s)	Compare and contrast (orally or in writing) similarities and differences within a single nonfiction/informational read-aloud or between two or more nonfiction/informational read-alouds								✓	
Range of Reading and Level of Text Complexity										
STD RI.1.10	With prompting and support, read informational texts appropriately complex for Grade 1.									
CKLA Goal(s)	Listen to and demonstrate understanding of nonfiction/informational read-alouds of appropriate complexity for Grades 1–3					✓				
Writing Standards: Grade 1										
Research to Build and Present Knowledge										
STD W.1.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.									
CKLA Goal(s)	Make personal connections (orally or in writing) to events or experiences in a fiction or nonfiction/informational read-aloud, and/or make connections among several read-alouds							✓		
	With assistance, categorize and organize facts and information within a given domain to answer questions	✓		✓				✓	✓	✓

Alignment Chart for Astronomy

		Lesson								
		1	2	3	4	5	6	7	8	9
Speaking and Listening Standards: Grade 1										
Comprehension and Collaboration										
STD SL.1.1	Participate in collaborative conversations with diverse partners about Grade 1 topics and texts with peers and adults in small and large groups.									
STD SL.1.1a	Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).									
CKLA Goal(s)	Use agreed-upon rules for group discussion, e.g., look at and listen to the speaker, raise hand to speak, take turns, say "excuse me" or "please," etc.					✓				
STD SL.1.1b	Build on others' talk in conversations by responding to the comments of others through multiple exchanges.									
CKLA Goal(s)	Carry on and participate in a conversation over at least six turns, staying on topic, initiating comments or responding to a partner's comments, with either an adult or another child of the same age					✓				
STD SL.1.1c	Ask questions to clear up any confusion about the topics and texts under discussion.									
CKLA Goal(s)	Ask questions to clarify information about the topic in a fiction or nonfiction/ informational read-aloud					✓				
STD SL.1.2	Ask and answer questions about key details in a text read aloud or information presented orally or through other media.									
CKLA Goal(s)	Ask and answer questions (e.g., *who, what, where, when*), orally or in writing, requiring literal recall and understanding of the details, and/or facts of a fiction or nonfiction/informational read-aloud	✓	✓		✓	✓			✓	
STD SL.1.3	Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.									
CKLA Goal(s)	Ask questions to clarify directions, exercises, classroom routines, and/or what a speaker says about a topic				✓			✓		
Presentation of Knowledge and Ideas										
STD SL.1.4	Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.									
CKLA Goal(s)	Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly	✓	✓	✓			✓	✓		✓

Alignment Chart for Astronomy

		Lesson								
		1	2	3	4	5	6	7	8	9
STD SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.									
CKLA Goal(s)	Add drawings or other visual displays to oral or written descriptions when appropriate to clarify ideas, thoughts, and feelings	✓		✓	✓		✓	✓		
STD SL.1.6	Produce complete sentences when appropriate to task and situation.									
CKLA Goal(s)	Produce complete sentences when appropriate to task and situation					✓				

Language Standards: Grade 1

Vocabulary Acquisition and Use

STD L.1.5	With guidance and support from adults, demonstrate understanding of word relationships and nuances in word meanings.									
STD L.1.5a	Sort words into categories (e.g., colors, clothing) to gain a sense of the concepts the categories represent.									
CKLA Goal(s)	Sort words into categories (e.g., colors, clothing) to gain a sense of the concepts the categories represent	✓								
	Provide examples of common synonyms and antonyms			✓	✓				✓	
STD L.1.5c	Identify real-life connections between words and their use (e.g., note places at home that are *cozy*).									
CKLA Goal(s)	Identify real-life connections between words and their use (e.g., note places at home that are *cozy*)					✓				
STD L.1.5d	Distinguish shades of meaning among verbs differing in manner (e.g., *look, peek, glance, stare, glare, scowl*) and adjectives differing in intensity (e.g., *large, gigantic*) by defining or choosing them or by acting out the meanings.									
CKLA Goal(s)	Distinguish shades of meaning among verbs differing in manner (e.g., *look, peek, glance, stare, glare, scowl*) and adjectives differing in intensity (e.g., *large, gigantic*) by defining or choosing them or by acting out the meanings									
STD L.1.6	Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g., *because*).									
CKLA Goal(s)	Learn the meaning of common sayings and phrases		✓		✓					

Alignment Chart for Astronomy

	Lesson								
	1	2	3	4	5	6	7	8	9
Additional CKLA Goals									
Listen to a variety of texts, including informational text					✓				
Identify new meanings for familiar words and apply them accurately	✓							✓	
Prior to listening to an informational read-aloud, identify what they know about a given topic		✓	✓	✓	✓			✓	✓
While listening to an informational read-aloud, orally predict what will happen next in the read-aloud based on the text heard thus far, and then compare the actual outcome to the prediction						✓			
Use possessive pronouns orally							✓		

✓ These goals are addressed in all lessons in this domain. Rather than repeat these goals as lesson objectives throughout the domain, they are designated here as frequently occurring goals.

Astronomy

Transition Supplemental Guide Introduction

This introduction includes the necessary background information to be used in teaching the *Astronomy* domain. *The Transition Supplemental Guide* for *Astronomy* contains nine daily lessons, each of which is composed of two distinct parts, so that the lesson may be divided into smaller chunks of time and presented at different intervals during the day. Each entire lesson will require a total of sixty minutes.

This domain includes a Pausing Point following Lesson 5. At the end of the domain, a Domain Review, a Domain Assessment, and Culminating Activities are included to allow time to review, reinforce, assess, and remediate content knowledge. **You should spend no more than thirteen days total on this domain.**

Week One				
Day 1 #	**Day 2** #	**Day 3** #	**Day 4** #	**Day 5** # ⑩
Lesson 1A: "Introduction to the Sun and Space" (40 min.)	Lesson 2A: "The Earth and the Sun" (40 min.)	Lesson 3A: "Stars" (40 min.)	Lesson 4A: "Stargazing and Constellations" (40 min.)	Lesson 5A: "The Moon" (40 min.)
Lesson 1B: Extensions (20 min.)	Lesson 2B: Extensions (20 min.)	Lesson 3B: Extensions (20 min.)	Lesson 4B: Extensions (20 min.)	Lesson 5B: Extensions (20 min.)
60 min.	60 min.	60 min.	60 min.	60 min.

Week Two				
Day 6 ⑩	**Day 7** #	**Day 8**	**Day 9** #	**Day 10** #
Pausing Point (60 min.)	Lesson 6A: "History of Space Exploration and Astronauts" (40 min.)	Lesson 7A: "Exploration of the Moon" (40 min.)	Lesson 8A: "The Solar System, Part I" (40 min.)	Lesson 9A: "The Solar System, Part II" (40 min.)
	Lesson 6B: Extensions (20 min.)	Lesson 7B: Extensions (20 min.)	Lesson 8B: Extensions (20 min.)	Lesson 9B: Extensions (20 min.)
60 min.	60 min.	60 min.	60 min.	60 min.

Week Three		
Day 11	**Day 12** ⑩	**Day 13**
Domain Review (60 min.)	Domain Assessment (60 min.)	Culminating Activities (60 min.)
60 min.	60 min.	60 min.

⑩ Lessons include Student Performance Task Assessments

\# Lessons require advance preparation and/or additional materials; please plan ahead

Lesson Implementation

It is important to note that the interactive activities in the *Transition Supplemental Guide* count on the teacher as the "ideal reader" to lead discussions, model proper language use, and facilitate interactions among student partners.

It is highly recommended that teachers preview the read-aloud, Flip Book images, and comprehension questions to determine when to pause during the read-aloud and ask guiding questions, especially before a central or difficult point is going to be presented (e.g., While we are reading this part of the read-aloud, I want to you think about . . .) and supplementary questions (e.g., Who/What/Where/When/Why literal questions) to check for understanding.

Student Grouping

Teachers are encouraged to assign partner pairs prior to beginning a domain, and partners should remain together for the duration of the domain. If possible, English Language Learners should be paired with native English speakers, and students who have limited English oral language skills should be paired with students who have strong English language skills. Keep in mind that in some instances, a group of three would benefit beginning/entering ELLs, and an older student or adult volunteer may be a better arrangement for some students with disabilities. Partnering in this way promotes a social environment where all students engage in collaborative talk and learn from one another.

In addition, there are various opportunities where students of the same home-language work together, fostering their first-language use and existing knowledge to construct deeper meanings about new information.

Graphic Organizers and Domain-Wide Activities

Several different organizers and domain-wide activities are included to aid students in their learning of the content in the *Astronomy* domain.

- Idea Webs for outer space (Instructional Master 1A-1) and the sun (Instructional Master 1A-2)—Fill out these Idea Webs with the class to record what they know and learn about outer space and the sun.
- Planets Song—Used in Lessons 8 and 9, reviews the names and characteristics of the eight planets with a song. The song is sung to the tune of "Oh My Darling, Clementine."

- Planets Chart or Wall—For Lessons 8 and 9, you will create a Planets Chart, where students will list two facts about each planet. Alternatively, you may wish to designate part of a classroom wall to make a Planets Wall. Use Image 8A-2 as a guide. You may wish to use color yarn, metal wire, or ribbon to make the orbits. Attach the Image Card for each planet as they are mentioned in the read-aloud. After the read-aloud, write two facts about each planet onto index cards, and attach the index cards under the Image Card of the planet.
- Astronomy Journal—The writing project for this domain is a journal. Students will pretend that they are astronomers or astronauts as they sketch and write about what they have learned in the read-alouds. Individual journal pages are provided as Instructional Masters in the Appendix. Domain Assessment #3 is the cover page for their *Astronomy Journal.*

Anchor Focus in Astronomy

This chart highlights several Common Core State Standards as well as relevant academic language associated with the activities in this domain.

Anchor Focus	CCSS	Description of Focus and Relevant Academic Language
Writing	W.1.2	*Astronomy Journal:* Students will create journal pages related to read-aloud content. Relevant academic language: *journal, sketch, label, sentence, share, compare*
Language	L.1.1d	Use possessive pronouns
	L.1.1i	Use frequently occurring prepositions (e.g., *over, above, in, across, into, through,* and *beyond*)

Domain Components

Along with this *Transition Supplemental Guide,* you will need:

- *Tell It Again! Media Disk* or the *Tell It Again! Flip Book* for *Astronomy*
- *Tell It Again! Image Cards* for *Astronomy*
- *Tell It Again! Multiple Meaning Word Posters* for *Astronomy*

Recommended Resource:

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

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, the stars, the moon, and the other planets relate to the earth (given its position in space). In the early read-alouds, students will learn that the sun is a giant star as well as 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.

Part of this domain is focused on 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 in Core Knowledge Language Arts During Kindergarten

The following Kindergarten 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:

Seasons and Weather

- Identify the following units of time and their relationship to one another: day, week, month, year
- Characterize the North and South Poles as always cold in temperature, the middle section of the earth as usually warm, and the United States as having four seasons
- Describe any unique seasonal differences that are characteristic of their own locality (change of color and dropping of leaves in autumn; snow or ice in winter; increased rain and/or flooding in spring; etc.)
- Identify a thermometer as an instrument used to measure temperature, and describe how it works: i.e., as the temperature becomes warmer, the liquid in the thermometer rises; as the temperature becomes cooler, the liquid in the thermometer descends

Taking Care of the Earth

- Explain that Earth is composed of land, water, and air
- Explain that humans, plants, and animals depend on Earth's land, water, and air to live
- Explain that natural resources are things found in nature that are valuable and of great importance to people
- Explain that land, air, and water all suffer from different types of pollution, and most types of pollution are caused by human activities
- Compare and contrast freshwater, salt water, and wastewater
- Explain that many living things, including humans, need fresh water to survive, and that there is a limited supply of freshwater on Earth

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 or, in some instances, in the "Introducing the Read-Aloud" section at the beginning of the lesson. 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

atmosphere
gas
rays
shadow
surface

Lesson 2

gravity
horizon
orbit
planet
rotates

Lesson 3

dusk
meteor
stars
telescopes
universe

Lesson 4

advances
ancient
celestial bodies
constellations
myths

Lesson 5

appearance
counterclockwise
craters
crescent
reflecting

Lesson 6

astronaut
launch
rockets
spacecraft
technology

Lesson 7

determined
disaster
historic
missions
nervously

Lesson 8

abundant
accomplish
inner
solar
unique

Lesson 9

categorize
debris
outer
probes
violent

In addition to this core vocabulary list, every lesson includes its own Vocabulary Chart. Words in this chart either appear several times in the Read-Aloud or are words and phrases that support broader language growth, which is crucial to the English language development of young students. Most words on the chart are part of the General Service list of the 2000 most common English words or part of the Dale-Chall list of 3000 words commonly known by Grade 4. Moreover, a conscious effort has been made to include words from the Primary Priority Words according to Biemiller's (2010) *Words Worth Teaching*. The words on the Vocabulary Chart are not meant to be exhaustive, and teachers are encouraged to add additional words they feel would best serve their group of students.

Vocabulary Chart for Stars

Core Vocabulary words are in **bold**.
Multiple Meaning Word Activity word is underlined.
Vocabulary Instructional Activity words have an asterisk (*).
Suggested words to pre-teach are in *italics*.

Type of Words	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday-Speech Words
Understanding	astronomer dawn/**dusk*** ***meteor*** meteorite observatory stargazing ***telescopes*** **universe***	beyond incredible massive occasionally rare twinkling/glittering	big/large/small/tiny hot into nighttime/daytime sky sun through
Multiple Meaning	atmosphere country space	appear blinking wonders	building light rock ship **stars**
Phrases	in the blink of an eye outer space shooting star streak of light	_____ has faded feast your eyes on	always there from time to time larger than pretty far away
Cognates	astrónomo(a) ***meteoro*** meteorito observatorio ***telescopio*** **universo*** atmósfera espacio	increíble massivo(a) ocasionalmente raro(a)	

References

1. Beck, Isabel L., Margaret G. McKeown, and Linda Kucan. 2008. *Creating Robust Vocabulary: Frequently Asked Questions and Extended Examples*. New York: Guilford.
2. Biemiller, Andrew. 2010. *Words Worth Teaching.* Columbus, OH: SRA/McGrawHill.
3. Dale, Edgar, and Jeanne Chall. 1995. *Readability Revisited: The New Dale-Chall Readability Formula.*
4. West, Michael. 1953. *A General Service List of English Words.* London: Longman, Green and Co.

Comprehension Questions

In the *Astronomy* domain*,* there are three types of comprehension questions.

Literal questions assess students' recall of key details from the read-aloud; these questions are text dependent, requiring students to paraphrase and/or refer back to the portion of the read-aloud in which the specific answer to the question is provided. These questions generally address Reading Standards for Literature 1 (RL.1.1) and Reading Standards for Informational Text 1 (RI.1.1).

Inferential questions ask students to infer information from the text and think critically; these questions are also text dependent, but require students to paraphrase and/or refer back to the different portions of the read-aloud that provide information leading to and supporting the inference they are making. These questions generally address Reading Standards for Literature 2–4 (RL.1.2–RL.1.4) and Reading Standards for Informational Text 2–4 (RI.1.2–RI.1.4).

Evaluative questions ask students to build upon what they have learned from the text using analytical and application skills; these questions are also text dependent, but require students to paraphrase and/or refer back to the portion(s) of the read-aloud that substantiate the argument they are making or the opinion they are offering. *Evaluative* questions might ask students to describe how reasons or facts support specific points in a read-aloud, which addresses Reading Standards for Informational Text 8 (RI.1.8). *Evaluative* questions might also ask students

to compare and contrast information presented within a read-aloud or between two or more read-alouds, addressing Reading Standards for Literature 9 (RL.1.9) and Reading Standards for Informational Text 9 (RI.1.9).

The *Supplemental Guides* include complex texts, thus preparing students in these early years for the increased vocabulary and syntax demands aligned texts will present in later grades. As all of the readings incorporate a variety of illustrations, Reading Standards for Literature 7 (RL.1.7) and Reading Standards for Informational Text 7 (RI.1.7) are addressed as well.

Student Performance Task Assessments

In the *Transition Supplemental Guide* for *Astronomy,* there are numerous opportunities to assess students' learning. These assessment opportunities range from informal observations, such as *Think Pair Share* and some *Extension* activities, to more formal written assessments. These Student Performance Task Assessments (SPTAs) are identified with this icon: ⑩. There is also an end-of-domain summative assessment. Use the Tens Conversion Chart located in the Appendix to convert a raw score on each SPTA into a Tens score. On the same page, you will also find the rubric for recording observational Tens scores.

Above and Beyond

In the *Transition Supplemental Guide* for *Astronomy,* there are numerous opportunities in the lessons and Pausing Points to challenge students who are ready to attempt activities that are above grade level. These activities are labeled "Above and Beyond" and are identified with this icon: .

Supplemental Guide Activities

The *Supplemental Guide* activities that may be particularly relevant to any classroom are the Multiple Meaning Word Activities and accompanying Multiple Meaning Word Posters; Syntactic Awareness Activities; and Vocabulary Instructional Activities. Several multiple meaning words in the read-alouds are underlined to indicate that there is a Multiple Meaning

Word Activity associated with them. These activities afford all students additional opportunities to acquire a richer understanding of the English language. *Supplemental Guide* activities are identified with this icon: ⇆

Recommended Resources for Astronomy

The *Transition Supplemental Guide* includes a number of opportunities in Extensions, the Pausing Point, and the Culminating Activities for teachers to select trade books from the list below to reinforce domain concepts through the use of authentic literature. In addition, teachers should consider other times throughout the day when they might infuse authentic domain-related literature.

If you recommend that families read aloud with their child each night, you may wish to suggest that they choose titles from this trade book list to reinforce the domain concepts. You might also consider creating a classroom lending library, allowing students to borrow domain-related books to read at home with their families.

1. *Astronomy* (DK Eyewitness Books), by Kristin Lippincott (DK Children, 2008) ISBN 978-0756637675
2. *Exploring the Solar System,* by Mary Kay Carson (Chicago Review Press, 2008) ISBN 978-1556527159
3. *Find the Constellations*, by H. A. Rey (Houghton Mifflin Books for Children, 2008) ISBN 978-0547131788
4. *Find Out About Astronomy,* by Robin Kerrod (Armadillo, 2012) ISBN 978-1843228684
5. *The Magic School Bus: Lost in the Solar System*, by Joanna Cole and illustrated by Bruce Degen (Scholastic Inc., 1992) ISBN 978-0590414296
6. *Midnight on the Moon (Magic Tree House, No. 8)*, by Mary Pope Osborne and Sal Murdocca (Random House Books for Young Readers, 1996) ISBN 978-0679863748
7. *The Moon Seems to Change*, by Franklyn M. Branley and illustrated by Barbara and Ed Emberley (HarperCollins, 1987) ISBN 978-0064450652

8. *National Geographic Readers: Planets,* by Elizabeth Carney (National Geographic Children's Books, 2012) ISBN 978-1426310362
9. *National Geographic Little Kids First Big Book of Space,* by Catherine D. Hughes and illustrated by David A. Aguilar (National Geographic Children's Books, 2012) ISBN 978-1426310140
10. *Once Upon a Starry Night: A Book of Constellations*, by Jacqueline Mitton and illustrated by Christina Balit (National Geographic Children's Books, 2009) ISBN 978-1426303913 (**Note:** This book's beautiful illustrations can help students imagine what the constellations look like when they look up at the stars. The myths/text, however, are not recommended for first grade.)
11. *Our Solar System*, by Seymour Simon (Collins, 2007) ISBN 978-0061140082
12. *Planets: A Solar System Stickerbook*, by Ellen Hasbrouck and illustrated by Scott McDougall (Little Simon, 2001) ISBN 978-0689844140
13. *Stargazers*, by Gail Gibbons (Holiday House, 1999) ISBN 978-0823415076
14. *Starry Sky,* by Kate Hayden (DK Children, 2006) ISBN 978-0756619596
15. *Sun Up*, *Sun Down,* by Gail Gibbons (Voyager Books, 1987) ISBN 978-0152827823
16. *What Makes Day and Night*, by Franklyn M. Branley and illustrated by Arthur Dorros (HarperCollins, 1986) ISBN 978-0064450508
17. *Wynken, Blynken, and Nod*, by Eugene W. Field and illustrated by Giselle Potter (Schwartz & Wade, 2008) ISBN 978-0375841965

Note: Please remember to tell students that not very long ago, students in school were taught that there were nine planets in the solar system, including Pluto. However, in 2006, astronomers decided to categorize Pluto as a dwarf planet, so there are now

eight major planets. If you choose additional books to read aloud, be sure to include the phrase *dwarf planet* when referring to Pluto. Remember also that there are still many otherwise excellent older astronomy books in print that erroneously classify Pluto as a planet, but are otherwise informative trade books.

Websites and Other Resources

Student Resources

1. Interactive Earth Rotation
   http://www.bbc.co.uk/schools/scienceclips/ages/9_10/earth_sun_moon.shtml

2. NASA Kids' Club
   http://www.nasa.gov/audience/forkids/kidsclub/flash/index.html

3. National Geographic Space Activities and Photos
   http://kids.nationalgeographic.com/kids/photos/space-shuttles/#/columbia-launch-gpn-2000-000756_14481_600x450.jpg

4. PBS Game on Outer Space
   http://pbskids.org/martha/games/socksinspace/index.html

Teacher Resources

5. American Museum of Natural History Resources on Space
   http://www.amnh.org/content/search?SearchText=space&x=0&y=0

6. Photographs from the Hubble Space Telescope
   http://hubblesite.org/gallery/album/entire/npp/all/

Introduction to the Sun and Space

1

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Recognize the sun in the sky
- ✓ 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

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ With assistance, categorize and organize information about what things are located in Earth's atmosphere and what things are located in outer space (W.1.8)
- ✓ Ask and answer *what* questions orally, requiring literal recall and understanding of the details or facts from "Introduction to the Sun and Space" (SL.1.2)
- ✓ Describe the sun with relevant details, expressing ideas and feelings clearly (SL.1.4)
- ✓ Add drawings to descriptions of Earth's atmosphere and outer space to clarify the concepts (SL.1.5)
- ✓ Sort words into categories to gain of sense of the concepts of atmosphere and outer space (SL.1.6)

Core Vocabulary

atmosphere, *n.* All the air that surrounds Earth
Example: The earth's atmosphere contains air for us to breathe.
Variation(s): atmospheres

gas, *n.* Not a liquid or a solid; air or steam
Example: One cold day when I saw my breath, I realized that my breath was a gas: water vaper.
Variation(s): gases

rays, *n.* Beams of light or energy
Example: On sunny afternoons, I can see the sun's rays shining through the window.
Variation(s): ray

shadow, *n.* A shady or dark spot that is made when something blocks the light
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
Example: The surface of the moon is very bumpy.
Variation(s): surfaces

Vocabulary Chart for Introduction to the Sun and Space			
Core Vocabulary words are in **bold**. Multiple Meaning Word Activity word is underlined. Vocabulary Instructional Activity words have an asterisk (*). Suggested words to pre-teach are in *italics*.			
Type of Words	**Tier 3** Domain-Specific Words	**Tier 2** General Academic Words	**Tier 1** Everyday-Speech Words
Understanding	*astronomy* **rays** sunburns	beyond enormous flourish instantly object perhaps surrounds	across air airplane cloud Earth east/west hot marble million/billion moon morning ocean over sky sun
Multiple Meaning	***atmosphere*** **gas***	appear layer **shadow*** **surface**	blue bubble burn light skin star
Phrases	*outer space*	an array of cause serious damage shedding light on	high above burns up
Cognates	*astronomía* **rayo** atmósfera **gas*** espacio	enorme florecer instantáneamente objeto	aire aeroplano este/oeste mármol millón/billon océano

Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
Domain Introduction	T-Chart for "In Outer Space/Not in Outer Space"	Create a T-Chart to record accurate student responses of things that are found in outer space and things that are not part of outer space.
	Instructional Master 1A-1 (Idea Web for Outer Space)	You may wish to begin an Idea Web about outer space with students. Keep this Idea Web on the wall, and add to it throughout this domain.
Where Are We?	stacking cups or blocks, labels; world map and globe	Place the following labels onto the stacking cups or blocks: *you*, *city*, *state*, *United States* (country), *North America* (continent).
Essential Background Information or Terms	picutre of a telescope; a pair of binoculars	
Vocabulary Preview: Astronomy, Atmosphere/Outer Space	Image 1A-3	
Purpose for Listening		
Presenting the Read-Aloud (15 minutes)		
Introduction to the Sun and Space	Instructional Master 1A-2 (Idea Web for the sun)	You may wish to begin an Idea Web for the sun with students. [In lieu of the hexagon shape, you can draw the shape of a sun.] Keep this Idea Web on the wall, and add to it throughout this domain.
	Idea Web for Outer Space	Continue filling in the Idea Web for Outer Space.
	large, clear bowl; little marble (or one little marble per student)	Use the large bowl and marble to show students how large the sun is compared to Earth. Tell students that the bowl represents the enormous sun and the marble represents Earth. You may wish to have each student put an "Earth marble" into the bowl. Be sure that students understand that it actually takes a much, much larger bowl to fit one million marbles!

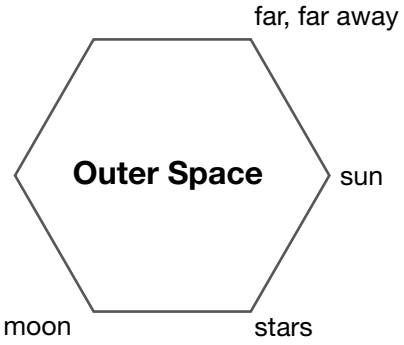
Exercise	Materials	Details
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Gas	inflated balloons	
 **Complete Remainder of the Lesson Later in the Day**		
Extensions (20 minutes)		
Multiple Meaning Word Activity: Space	Poster 1M (Space)	
Syntactic Awareness Activity: Prepositions—*in, above, over, across*	Images 1A-2, 1A-6, and 1A-9; large box or container; index cards with large words—*in*, *above*, *over*, *across*	You may wish to label parts of the classroom with these prepositions and have students identify them. Use arrows along with the labels whenever applicable.
Vocabulary Instructional Activity: Shadow	Image 1A-7; flashlight	
Astronomy Journal: Daytime	Instructional Master 1B-1, drawing tools; an example of a complete Astronomy Journal	
Take-Home Material		
Family Letter	Instructional Masters 1B-2–4	

Advance Preparation

Find an image of a telescope (e.g., Images 3A-4 and 3A-5) to show students.

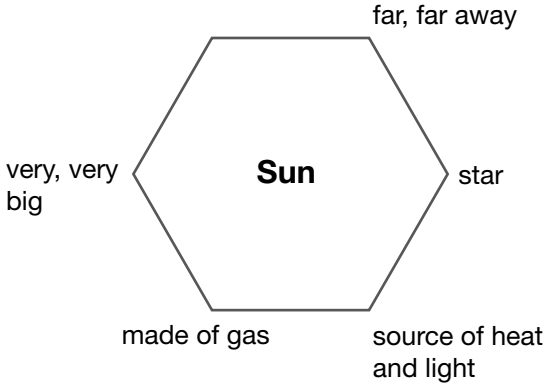
Bring in stacking cups or blocks, a pair of binoculars, a large, clear bowl, a little marble, inflated balloons, and a flashlight.

Create an Idea Web for Outer Space, using Instructional Master 1A-1 as a guide. Suggested information from today's lesson for this Idea Web includes the following:



Above and Beyond: Prepare a copy of Instructional Master 1A-1 for students who are able to fill in their own web.

Create an Idea Web for the sun, using Instructional Master 1A-2 as a guide. Suggested information from today's lesson for this Idea Web includes the following:



Above and Beyond: Prepare a copy of Instructional Master 1A-2 for students who are able to fill in their own web.

Make a copy of Instructional Master 1B-1 for each student. Students will create the first page of their Astronomy Journal. Have a completed Astronomy Journal for students to look at and refer to as they create their own journal.

Introduction to the Sun and Space

1A

Note: Introducing the Read-Aloud may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Introducing the Read-Aloud — *10 minutes*

Domain Introduction — 10 minutes

In outer space	Not in outer space
sun	airplane
moon	birds
stars	clouds

Tell students that over the next few weeks they will be learning about astronomy, the study of outer space. Ask them if they have ever heard of outer space. If so, ask them what can be found in outer space beyond the earth.

Note: 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.

State 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 small, 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.

Where Are We? 10 *minutes*

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 city).
- (Your city) 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.

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.

Essential Background Information or Terms 5 *minutes*

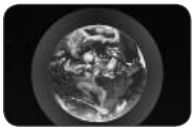
Tell students that the name for the study of objects in outer space, the area beyond the earth, is *astronomy.* Ask students to repeat the word *astronomy.* Explain that *astro–* actually means stars, and that astronomy is a science that includes the study of the stars. Direct students to say the word *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. Emphasize that over the next few weeks, students will pretend to be astronomers as they learn about outer space.

Vocabulary Preview *5 minutes*

Astronomy

1. The read-alouds in this domain are about *astronomy*.
2. Say *astronomy* with me three times.
3. Astronomy is the study of stars and other things in outer space.
4. [Show the cover of the Flip Book.] How do you think the drawing on the cover is related to the topic of this domain—astronomy? (shows stars, planets, spaceship, etc.)
5. I will name several things. If what I say is related to astronomy, raise your hand/stand up. If what I say is unrelated to astronomy, keep your hands on your lap/stay seated.
   - sun
   - automobiles
   - birds
   - moon
   - stars
   - airplanes

Atmosphere/Outer Space



Show image 1A-3: Earth's atmosphere

1. In today's read-aloud you will hear that all of the air that surrounds the Earth is called the *atmosphere*. Beyond the atmosphere is something called *outer space*.
2. [Point to the layer of air surrounding Earth.] Say the word *atmosphere* with me three times.
   [Point to beyond the layer of air.] Say the phrase *outer space* with me three times.
3. The air that surrounds the earth is the atmosphere. Part of the atmosphere is made up of oxygen for us to breathe.
   Outside of Earth's atmosphere is outer space. Outer space includes many, many stars, moons, and planets.

4. Earth's atmosphere contains air for us to breathe. Outer space is outside of Earth's atmosphere.

5. I will name several things. Tell me whether they are part of Earth's atmosphere or part of outer space. [Invite students to come up to the image and point to either Earth's atomosphere or outer space.]

   - oxygen
   - stars
   - sun
   - moon

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 actually located in outer space.

Presenting the Read-Aloud — **15** *minutes*

Introduction to the Sun and Space

Show image 1A-1: Sky

Have you looked up at the sky lately? What did you see? [1] 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.

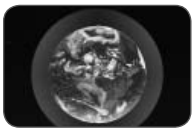
1 [Pause for responses. If there is a window in your classroom, ask one student to look out and describe the clouds.]

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. [2] Some days, it is fun to lie on your back in the grass and stare up at the interesting shapes of the 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.** [3]

2 [Point to these objects in the image.]

3 The ground that we walk on is the top layer of the earth called the earth's surface.



Show image 1A-3: Earth's atmosphere

You can think of the sky as being in two parts or two layers. The part closest to the earth is a layer of air that covers the whole earth—all the ground and oceans and everything else on the earth's surface, including you! This layer of air is called the **atmosphere.** But there is more than just the blue atmosphere. 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. [4]

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. [5]

4 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.

5 The earth is described as a speck of sand. Does this mean the earth is small or large?

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** [6] spread across the skies, which appear blue to your eyes.

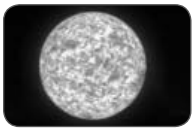
6 or beams of light

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.** [7] Everything that gets too close to it burns up instantly.

Just how enormous is the sun? Think about this: if the sun was a huge bowl and the earth was 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! [8]

7 That means that the sun is not a solid object or a liquid. It is made of gas, a thin substance that objects could pass right through—if they didn't burn up first!

8 [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. The sun is the closest star to the earth. Without the sun, Earth would be a cold, lifeless hunk of rock. All living things on Earth—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—and grow—here on Earth. [9]

9 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. [10] 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.

10 The sun warms up the land, too. It's usually colder at night than during the day.

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 [11] on the ground. Your shadow is not the only shadow in the world. [12] 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.

11 or shaded spot

12 [Point to the shadows in the image.]

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 [13] 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.

13 [Point to the sunscreen.]

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. [14]

14 [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 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.* [15] 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. [16] 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.

15 Do you remember what *astro–* means?

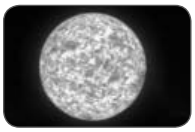
16 Do you remember what an astronomer is?

Discussing the Read-Aloud — *15 minutes*

Comprehension Questions — *10 minutes*

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* Name some objects you can see in the sky. (Answers may vary, but may include things such as airplanes, clouds, and birds.)
2. *Literal* You just heard that the sky has two parts or layers. The first layer is made up of air that surrounds the earth. What do we call this layer of air? (the atmosphere)
3. *Literal* You also heard that beyond or above the atmosphere is the part of the sky we call outer space. Name some objects that can be found in outer space. (stars, sun, moon)



Show image 1A-5: The sun

4. *Inferential* 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)
5. *Inferential* 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 shining behind that object, causing a shaded area.)

6. *Literal* After the sun sets, what other objects from outer space are visible in the night sky? (stars, moon)

7. *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)

[Please continue to model the *Question? Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

8. *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.

9. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

Word Work: Gas *5 minutes*

Note: You may wish to show students an inflated balloon and demonstrate deflating it to help them see that there is a gas (oxygen) 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, sometimes invisible, substance through which objects can pass.

4. An example of a gas you might know is steam, the cloud that rises above hot water.

5. Where do you think there 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. Directions: 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."

1. orange juice (That is not a gas.)
2. wood (That is not a gas.)
3. steam (That is a gas.)
4. air (That is a gas.)
5. brick (That is not a gas.)
6. your breath that you can see on a cold day (That is a gas.)

Complete Remainder of the Lesson Later in the Day

Introduction to the Sun and Space

1B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Multiple Meaning Word Activity — *5 minutes*

Associated Phrase: Space

Note: You may choose to have students hold up one or two fingers to indicate which image shows the meaning being described, or have a student walk up to the poster and point to the image being described.

1. [Show Poster 1M (Space).] In the read-aloud you heard, "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." Which image shows this kind of *space*?
2. *Space* also means something else. *Space* also means a blank between things or words. Which picture shows this kind of *space*?
3. [Point to the image of outer space.] With your partner, talk about what you think of when you see this kind of space. I will call on a few partners to share what they come up with. Try to answer in complete sentences. (When I see this type of space, I think of the sun, the moon, planets, etc.)
4. [Point to the image of the blank area between words.] With your partner, talk about what you think of when you see this kind of space. I will call on a few partners to share what they come up with. Try to answer in complete sentences. (When I see this type of space, I think of empty lines, no letters, lining up, moving over, etc.)

Syntactic Awareness Activity

5 *minutes*

***Prepositions:* in, above, over, across**

Note: The purpose of these syntactic 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. There may be variations in the sentences created by your class. Allow for these variations, and restate students' sentences so that they are grammatical. If necessary, have students repeat the sentence after you.

Directions: Today we are going to practice using words that show location (or where something is) and direction (or where something is going).

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

1. What do you see in this picture? (an airplane, a bird, a balloon, clouds)
   Where are they? (They are *in* the sky.)
   We use the little word *in* to show where something can be found. For example, the airplane can be found *in* the sky.
   Many times we use *in* to show that something is inside something else.
   Make up a sentence with the word *in* in it using this picture or objects in the classroom. As you say your sentence, show your partner what *in* looks like.
2. Which one of the four is the highest in the sky: the balloon, the airplane, the bird, or the clouds? (airplane)
   We can say, "The airplane is *above* the bird."
   We use the word *above* to show that something is higher than, or on top of, something else.
   What is above the balloon? (The bird is above the balloon.)
   Make up a sentence with the word *above* in it using this picture or objects in the classroom. As you say your sentence, show your partner what *above* looks like.

Show image 1A-6: Sunrise

3. What do you see in this picture? (sun, ocean, mountains, clouds)
   Where is the sun? (Answers may vary: the sun is behind the clouds; the sun is in the sky; the sun is over the ocean; the sun is over the mountains; etc.)
   We can say, "The sun is *over* the ocean."
   We use the word *over* to show that something is on top of something else.
   Make up a sentence with the word *over* in it using this picture or objects in the classroom. As you say your sentence, show your partner what *over* looks like.
4. In the read-aloud you heard, "In the morning, the sun . . . shed[s] light *across* the land." In this image, what is the sun shedding its light across? (the ocean)
   We can say, "The sun is shedding its light *across* the ocean."
   We use the word *across* to show that something goes from one side to the other side. [Point to the sun's rays shining across the ocean.]
   Make up a sentence with the word *across* in it using this picture or objects in the classroom. As you say your sentence, show your partner what *across* looks like. [Suggestions: waves moving across the ocean; clouds changing shape across the sky; swimming across the ocean; flying across the sky]
5. [Use various classroom labels and objects. Review and reinforce the concept of these prepositions: *in*, *above*, *over*, *across*.]

Vocabulary Instructional Activity — 10 *minutes*

Word Work: Shadow

Show image 1A-7: Shadows

1. In the read-aloud you heard the question, "Have you ever noticed your *shadow* on the ground?"
2. Say the word *shadow* with me three times.
3. A shadow is a shady or dark spot that is made when something blocks the light.

4. If the sun is behind you, your body blocks the sun's rays and creates a shadow.
5. Have you ever noticed your shadow on the ground? What color was it?
   What other things make shadows?

[Ask two or three students. If necessary, guide and/or rephrase the students' responses: "_____ makes shadows."]

6. What's the word we've been talking about?

Use a *Demonstration* activity for follow-up. Directions: Let's create some different shadows! [Dim the classroom lights. If available, give each partner pair or small group a flashlight.]

1. Remember, a shadow is created when something blocks the light.
2. With your partner (or in small groups), find a few classroom objects you will make a shadow with.
3. One student will hold up the object in front of a wall. Another student will shine the light on the object. Watch its shadow on the wall.
4. How are shadows created?

Extending the Activity

Have students sit facing a wall. Stand behind the students. Hold up an object and shine a light behind it so that the object casts a shadow on the wall. Have students guess what the object is by looking at its shadow.

Astronomy Journal: Daytime (Instructional Master 1B-1) 15 *minutes*

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 their astronomy journal to record both observations (what they see) and facts (what they learn) about outer space.

- First, give each student a copy of Instructional Master 1B-1. Tell them that this is the first page of their Astronomy Journal. It will be about the sky and the things they see around them during the daytime.

- Next take students outside, or if that is not possible, take them to a large window where they can see the sky. Direct students to spend at least five minutes sketching the objects they see in the sky and some things that are outside during the daytime. Tell students that a sketch is a simple drawing with few details or colors.
- Then go back to the classroom and have students spend up to five minutes finishing up their sketch, coloring in their drawing, and labeling their picture using the letter-sound correspondences learned thus far.
- Finally, have students write a sentence about the daytime on the lines below.

Remind students about the two layers 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.) Then direct students to circle any object 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)

If time allows, have students share their journal page with their partner or with home-language peers. Have them point out how their pictures are the same and different.

Take-Home Resources

Family Letter

Send home Instructional Masters 1B-2–4.

The Earth and the Sun 2

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Identify Earth as a planet and our home
- ✓ Identify the earth's rotation, or spin, as the cause of day and night
- ✓ Explain that other parts of the world experience nighttime while we have daytime
- ✓ Explain sunrise and sunset
- ✓ Explain that Earth orbits the sun

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Ask and answer *where* questions orally, requiring literal recall and understanding of the details or facts from "The Earth and the Sun" (SL.1.2)
- ✓ Describe the causes for night and day on Earth with relevant details, expressing ideas and feelings clearly (SL.1.4)
- ✓ Explain the meaning of "AM" and "PM" and use in appropriate contexts (L.1.6)

Core Vocabulary

gravity, *n.* The force which causes things to drop to the ground on Earth and keeps things from floating away into outer space
Example: Every time I throw a ball up in the air, gravity pulls it down again.
Variation(s): none

horizon, *n.* A place or line in the distance where it looks like the land or ocean meets 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.* The path around an object in space
Example: The earth travels in an orbit around the sun.
Variation(s): orbits

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

rotates, *v.* Spins around in a circle
Example: Janet rotates round and round as she pretends to be a ballerina.
Variation(s): rotate, rotated, rotating

Vocabulary Chart for The Earth and the Sun			
Core Vocabulary words are in **bold**. Multiple Meaning Word Activity word is underlined. Vocabulary Instructional Activity words have an asterisk (*). Suggested words to pre-teach are in *italics*.			
Type of Words	**Tier 3** Domain-Specific Words	**Tier 2** General Academic Words	**Tier 1** Everyday-Speech Words
Understanding	axis **horizon***	object	day/night Earth east/west large/smaller morning path **planet** sky sunrise/sunset
Multiple Meaning	dawn **gravity** ***orbit*** revolution rotation space	appear energy force revolves ***rotates*** surface	face ground light/dark moving spin
Phrases	365 days/one year orbit around the sun	based on rely on	cannot tell moves across
Cognates	**horizonte*** **gravedad** ***órbita*** rotación espacio	objeto energía fuerza	este/oeste **planeta**

Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
What Have We Already Learned?	Idea Web for Outer Space	You may wish to refer to the Idea Web for Outer Space to answer the review questions.
Essential Background Information or Terms	globe; plastic hoop; pin	You may wish to have a few students take turns demonstrating Earth's rotation and Earth's orbit.
Vocabulary Preview: Rotates, Orbit	Images 2A-3 and 2A-4; plastic hoop	
Purpose for Listening		
Presenting the Read-Aloud (15 minutes)		
The Earth and the Sun	Idea Web for the sun	You may wish to continue filling in the Idea Web for the sun with information from the read-aloud.
	globe	
	video clips of Earth's rotation to explain day and night	You may wish conclude the read-aloud with a short video clip about how the Earth's rotation causes day and night.
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Horizon	images of various things on the horizon drawing paper, drawing tools	Seeing different images of the horizon will help students draw their sketch of a horizon.
 **Complete Remainder of the Lesson Later in the Day**		
Extensions (20 minutes)		
Sayings and Phrases: AM and PM	analog or digital clock; learning clocks	
Demonstration of Earth's Rotation: Day and Night	flashlight, globe with pin on it	

Exercise	Materials	Details
Drawing the Read-Aloud	drawing paper, drawing tools	
Domain-Related Trade Book	trade book about day/night or sunrise/sunset	

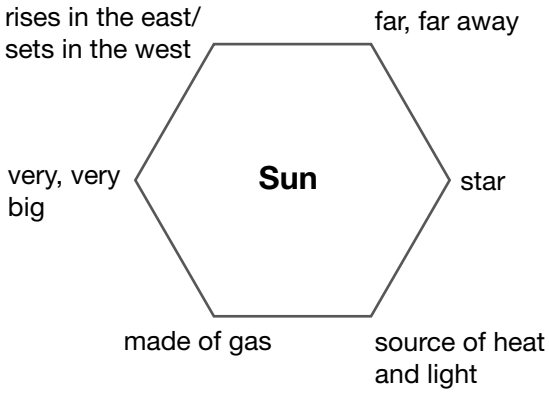
Advance Preparation

Bring in images with various things on the horizon (e.g., boat on the ocean; city in the background; mountains at a distance), a flashlight, an analog or digital clock, and if possible, several learning clocks.

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

Find a trade book about day and night or the sunrise and sunset to read aloud to the class.

Continue filling in the Idea Web for the sun. Suggested information from today's lesson for this Idea Web include the following:



Notes to Teacher

Be sure that students are clear that the terms *rotate* and *orbit* are not the same. The Earth rotates around its axis to create daytime and nighttime. (You may wish to have students stand in place and spin around.) An orbit is the path Earth takes around the sun and is the reason Earth has seasons. (You may wish to have students walk around the plastic hoop "sun.")

Students will complete page two of their Astronomy Journal in Lesson 3 (Instructional Master 3B-1). It will be a picture of the sky at night. You may wish to have students observe the night sky for homework tonight.

The Earth and the Sun

2A

Note: Introducing the Read-Aloud may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Introducing the Read-Aloud — *10 minutes*

What Have We Already Learned? — *5 minutes*

Begin with a review of the previous lesson by asking students the following questions:

- What do we call a scientist who studies astronomy or outer space? (an astronomer)
- Name some objects that are in space. (the earth, sun, moon, and stars)
- What do we call the first layer of the sky, the air that surrounds the earth? (the atmosphere)
- 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 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.

Essential Background Information or Terms — *10 minutes*

Tell students that the earth moves in two different ways and that you are going to demonstrate different ways the Earth moves. 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 around its axis. [Point out the stick representing the axis on the globe.] When the earth spins around its axis, we say it rotates. Spin the globe to demonstrate this rotation. Then ask students to rotate or spin in place. Tell students that this is one of the two ways the earth moves in space.

Explain that the earth doesn't only rotate or spin in place; it also travels around, or revolves around, the sun. Place a plastic hoop on the floor and tell students that you will now pretend that the plastic hoop is the sun. Explain that the real sun is much bigger than the earth, just like the plastic hoop is much bigger than the globe. Begin walking around the plastic hoop while holding and continuing to spin the globe. Tell students that astronomers call the path the earth follows as it revolves or travels 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.

Vocabulary Preview

5 *minutes*

Rotates

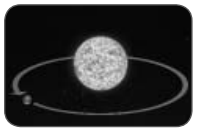
Show image 2A-3: Earth rotation

1. In today's read-aloud you will hear that Earth *rotates* round and round.
2. Say *rotates* with me three times.
3. Rotates means spins around in a circle.
4. [Point to the arrow showing the direction Earth rotates.] This image shows the direction the Earth rotates.
   [Make a circular, counterclockwise motion with your finger. Invite students to do the same as they say *rotates*.]
   Janet likes to rotate round and round as she pretends she is a ballet dancer.
   [Invite volunteers to demonstrate rotating round and round

like a ballet dancer. Have the rest of the class say, "[Name of student] rotates round and round."]

5. What is another word that is similar to *rotate*? (spin)
Have you ever experienced rotating, or spinning, round and round so much that you got dizzy? [Call on a few students to share.]

Orbit



Show image 2A-4: Orbit diagram

1. In today's read-aloud you will hear that the path that Earth follows around the sun is called the earth's *orbit*.
2. Say the word *orbit* with me three times.
3. An orbit is a path around an object in space.
4. [Point to the arrow showing Earth's orbit around the sun.] Earth travels in an orbit around the sun.
   [Raise one finger and, with the finger of your other hand, make a large circular, counterclockwise movement around that finger. Invite students to do the same as they say *orbit*.]
5. I will put the plastic hoop "sun" in front of some of you and have you make an orbit around the "sun." [Some students may enjoy rotating as they make an orbit around the "sun."]

Purpose for Listening

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

Presenting the Read-Aloud — **15** *minutes*

The Earth and the Sun

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.[1] At dawn, some people say, "Look! The sun is coming up!" This first appearance of the sun above the eastern horizon is called sunrise.

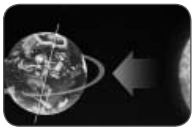
1 The horizon is the line in the distance where it appears that the land meets the sky.

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.[2] But that's not actually true. The earth, not the sun, moves! It is the daily rotation, or spin, of the earth that makes the sun *appear* to rise and set each day.

2 In fact, that's exactly what people thousands of years ago thought was happening.



Show image 2A-3: Earth rotation

Earth spins, or **rotates,** on its axis.[3] Imagine the earth's axis as an imaginary line 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.

3 [Show the globe.] Remember how we made the globe rotate earlier?

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.[4] 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.

4 [Using the globe from earlier in the lesson, point out to students the country that is on the opposite side of the world from them.]

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.[5] 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.**[6]

5 Remember that the sun is a star and provides the earth with light.

6 Remember when I carried the globe around the hula 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.

Show image 2A-5: Person jumping[7]

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.** So just as Earth's gravity causes the boy to land back to the ground instead of floating into the air, the sun's gravity holds Earth in its place. Earth orbits around the sun but does not wander off into space.[8]

7 What is this person doing? (jumping) What is going to happen to this person after he jumps? (He is going to land back to the ground.)

8 So the sun's gravity holds the earth in place. [Demonstrate the sun's gravitational pull with a hula hoop (sun) and the globe (Earth). Show how the earth orbits the sun and does not wander off into space.]

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 firmly on the ground. And if you jump up, you come straight back down. If you throw a ball in the air, it falls straight 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 revolution of the earth—create the days and years that we keep track of on the calendar.

Discussing the Read-Aloud — *15 minutes*

Comprehension Questions — 10 *minutes*

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

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. *Inferential* 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)
3. *Literal* When we are on the side of the earth facing away from the sun, is it day or night? (night) Is it day or night on the opposite side of the earth? (day)
4. *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)
5. *Literal* What causes night and day? (the earth's rotation)

6. *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 or revolution)

7. *Literal* What do we call a large object in space that revolves around a star for light? (a planet) On what planet do we live? (Earth)

8. *Inferential* The earth moves in two different ways. One way the earth moves is rotating on its axis. Show me what Earth's rotation looks like.
   Another way Earth moves is orbiting around the sun. Show me what Earth's orbit around the sun looks like.
   Which movement causes day and night? (Earth's rotation)

[Please continue to model the *Question? Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

9. *Where? Pair Share:* Asking questions after a read-aloud is one way to see how much everyone has learned. We learned about where the sun rises and sets, as well as where the earth orbits and spins. Think of a question you can ask your neighbor about the read-aloud that starts with the word *where*. For example, you could ask, "Where is the atmosphere?" Turn to your neighbor and ask your *where* question. Listen to your neighbor's response. Then your neighbor will ask a new *where* question, and you will get a chance to respond. I will call on several of you to share your questions with the class.

10. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

Word Work: Horizon *5 minutes*

1. In the read-aloud you heard, "Each morning at dawn, the sun appears on the *horizon* in the eastern sky."
2. Say the word *horizon* with me.
3. The horizon is the place or line in the distance where it appears that the land or a body of water meets the sky.
4. When we look at the horizon in the morning, it looks like the sun is rising, and when we look at the horizon in the evening, it looks like the sun is setting.
5. [Show various images with different things on the horizon.] Can you see the line of the horizon? What do you see on the horizon? [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "I can see _____ on the horizon."]
6. What's the word we've been talking about?

Use a *Drawing* activity for follow-up. Directions: When you look at the horizon, you can see a long line where the land or a body of water meets the sky. Draw a quick sketch of the horizon at sunrise or sunset, showing the top half of the sun and a line where the land would hide the rest of the sun, meeting the sky. Remember that a sketch is quickly drawn and does not include many details or colors.

Complete Remainder of the Lesson Later in the Day

The Earth and the Sun

2B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Sayings and Phrases: AM and PM — *5 minutes*

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 there are two twelve o'clocks, etc., so people need to know 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." Note 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 o'clock AM. If the time is one hour after twelve noon, we say that it is one o'clock PM." Tell students what 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. Ask students to judge whether you should add AM or PM to the time.

Find opportunities each day to talk about AM and PM.

Demonstration of Earth's Rotation: Day and Night — 10 *minutes*

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

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 on which their town has been 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 if they can guess 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. 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 happens. Ask another volunteer to point the flashlight at the globe and hold it steady, reminding students that the flashlight represents the sun. Remind them that 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.

Extending the Activity

- You may wish to extend the activity by inviting two students to represent Earth and one student to hold the flashlight. Have the two students stand back-to-back and form a circle by linking hands. Then help them to rotate counterclockwise.

- Have the student holding the flashlight shine the light at chest-level as the other two students rotate. Have the two students say whether they are in daytime or nighttime.
- In addition, as one student approaches the light, have him or her say "sunrise," and as the other student goes away from the light, have him or her say, "sunset."

Drawing the Read-Aloud *15 minutes*

- Ask students to think back to the Read-Aloud that they listened to earlier in the day: "The Earth and the Sun." You may wish to review a few Flip Book images and read-aloud concepts, (e.g., Earth rotates; from Earth it looks like the sun moves because it rises and sets but actually the sun does not move.)
- Give the following directions:
    - First, fold your paper in half.
    - Next, think about two things you learned from today's read-aloud.
    - Then, draw these two things. Your drawings should be sketches. [Allow five minutes for each sketch.]
    - Finally, label parts of your drawing using the letter-sound correspondences you have learned thus far.
- Remind students that asking questions is one way to make sure everyone knows what to do. Tell students the following, "Think of a question about the directions I just gave you. For example, you could ask, 'How many things do we draw?' Now, turn to your neighbor and ask your own question."
- Circulate around the room, asking students to identify what they have drawn. Encourage students to use read-aloud vocabulary as they describe their drawings.
- Have students share their drawings with their partner or with home-language peers. Have students compare their drawings to see if they drew the same things or different things.

Domain-Related Trade Book 20 *minutes*

- Refer to the list of recommended trade books in the Introduction at the front of this *Supplemental Guide*, and choose one trade book about day and night or sunrise and sunset to read aloud to the class.
- Explain to students that the person who wrote the book is called the author. Tell students the name of the author. Explain to students that the person who makes the pictures for the book is called an illustrator. Tell students the name of the illustrator. Show students where they can find this information on the cover of the book or on the title page.
- As you read, use the same strategies that you have been using when reading the read-aloud selections—pause and ask occasional questions; rapidly clarify critical vocabulary within the context of the read-aloud; etc.
- After you finish reading the trade book aloud, lead students in a discussion as to how the story or information in this book relates to the read-alouds in this domain.

Stars

3

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Classify the sun as a star
- ✓ Describe stars as large, although they appear small in the night sky
- ✓ Describe stars as hot, distant, and made of gas
- ✓ Explain that astronomers study the moon and stars using telescopes
- ✓ Describe how people sometimes tell stories about the moon and stars

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Listen to and understand poetry about stars, such as "Star Light, Star Bright" and "The Star" (RL.1.5)
- ✓ Describe the connection between meteors and Earth's atmosphere (RI.1.3)
- ✓ With assistance, categorize and organize information about what things can be seen at dusk (W.1.8)
- ✓ Describe what is seen in the sky at dusk (SL.1.4)
- ✓ Add drawings to descriptions of what can be seen in the sky at dusk to clarify the concepts (SL.1.5)

- ✓ Accurately apply the meanings of the antonyms *dusk* and *dawn* (L.1.5)
- ✓ Prior to listening to "Stars," identify orally what they know and have learned about Earth, planets, and stars

Core Vocabulary

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

meteor, *n.* A piece of rock or metal that is in outer space. If a meteor goes into Earth's atmosphere, it makes a streak of bright light. It is sometimes mistakenly called a "shooting star."
Example: A meteor looks like a streak of light in the night sky. Some people think it is a "shooting star," but it is a rock, not a star.
Variation(s): meteors

stars, *n.* Hot balls of gas in outer space that look like bright points of light in the sky
Example: Many stars are visible from Earth in the night sky.
Variation(s): star

telescopes, *n.* Tools that make objects that are far away seem larger and closer; used for looking at stars and planets in outer space
Example: Astronomers use telescopes to study the stars and planets.
Variation(s): telescope

universe, *n.* Everything that is on Earth and in outer space, including all the stars and planets
Example: The universe is so big that I can't even imagine it.
Variation(s): universes

Vocabulary Chart for Stars			
Core Vocabulary words are in **bold**. Multiple Meaning Word Activity word is <u>underlined</u>. Vocabulary Instructional Activity words have an asterisk (*). Suggested words to pre-teach are in *italics*.			
Type of Words	**Tier 3** Domain-Specific Words	**Tier 2** General Academic Words	**Tier 1** Everyday-Speech Words
Understanding	astronomer dawn/**dusk*** ***meteor*** meteorite observatory stargazing ***telescopes*** **universe***	beyond incredible massive occasionally rare twinkling/glittering	big/large/small/ tiny hot into nighttime/daytime sky sun through
Multiple Meaning	atmosphere country space	appear blinking wonders	building light rock <u>ship</u> **stars**
Phrases	in the blink of an eye outer space shooting star streak of light	_____ has faded feast your eyes on	always there from time to time larger than pretty far away
Cognates	astrónomo(a) ***meteoro*** meteorito observatorio ***telescopio*** **universo*** atmósfera espacio	increíble massivo(a) ocasionalmente raro(a)	

Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
What Have We Already Learned?	plastic hoop "sun"	Invite a few students to demonstrate the rotating and orbiting of Earth. Have the rest of the class say whether the student is rotating or orbiting.
Essential Background Information or Terms	Idea Web for the sun	You may wish to refer to the Idea Web to review parts of the sun.
	examples of solids and liquids	Be sure that students understand the basic differences between solid, liquid, and gas; i.e., gas is neither a liquid or a solid.
Vocabulary Preview: Telescopes, Meteor	Images 3A-4 and 3A-5; binoculars	
	Images 3A-7 and 3A-8; short video clips of a meteor shower	
Purpose for Listening		
Presenting the Read-Aloud (15 minutes)		
Stars		
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Dawn/Dusk	images of sunrise and sunset	
 **Complete Remainder of the Lesson Later in the Day**		
Extensions (20 minutes)		
Multiple Meaning Word Activity: Ship	Poster 2M (Ship)	
Syntactic Awareness Activity: Prepositions— *beyond, into, through*	Images 3A-2 and 3A-8; large cylindrical tube; index cards with large words—*beyond*, *into*, *through*	You may wish to label parts of the classroom with these prepositions and have students identify them. Use arrows with along with the labels whenever applicable.

Exercise	Materials	Details
Vocabulary Instructional Activity: Universe	Image 3A-10; drawing paper, drawing tools	
Astronomy Journal: Nighttime	Instructional Master 3B-1, drawing tools	
Poetry Read-Aloud	chart paper with "Star Light, Star Bright" written on it; instrumental music for "Twinkle, Twinkle, Little Star"	

Advance Preparation

Bring in plastic hoop "sun," images of sunrise and sunset, binoculars, and instrumental music for "Twinkle, Twinkle, Little Star."

Find age-appropriate video clips showing a meteor shower.

Make a copy of Instructional Master 3B-1 for each student. Students will create the second page of their Astronomy Journal.

Write the nursery rhyme "Star Light, Star Bright" on a large piece of chart paper.

Notes to Teacher

If you did not have students observe the night sky for homework yet, you may wish to assign the Astronomy Journal (Instructional Master 3B-1) for homework tonight.

Stars

3A

Note: Introducing the Read-Aloud may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Introducing the Read-Aloud — *10 minutes*

What Have We Already Learned? — *5 minutes*

Review the previous read-aloud, highlighting two ways the earth moves: rotating and orbiting, or revolving, around the sun. Remind students that the earth rotates when it spins on its own axis, and that this spin creates day and night. Remind students that the earth is a planet because it orbits the sun for light and heat. Ask students if the sun is a planet or a star. (a star)

Essential Background Information or Terms — *10 minutes*

Tell students that today's read-aloud is about stars. Remind students that they already learned about Earth's most important star, and ask them to identify it. (the sun) Show image 1A-5, and 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.)

Explain the three states of matter: solid, liquid, and gas. Things that are solid have a shape that remains the same, such as a book or a pencil. Things that are liquid can be poured, such as water or juice. Things that are gas are often hard to see; an example of a gas is the air around us. We know the air is not solid because it does not have or hold a shape, and it is not liquid because it cannot be poured. Air is a gas that cannot be seen.

Stars are made up of gases even though they appear to be in shapes 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. Ask students to give other examples of how things that are far away look smaller than they actually are. (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.

Vocabulary Preview

5 *minutes*

Telescopes

Show image 3A-5: Conventional telescope

1. In today's read-aloud you will hear that we can use telescopes to get a better look at the stars in the sky.
2. Say *telescopes* with me three times.
3. Telescopes are tools that make objects that are far away seem larger and closer.

Show image 3A-4: Inside observatory

4. Telescopes, like the one in this picture, are important tools to astronomers.
5. Why do you think telescopes are important tools to astronomers? What do telescopes do? (make objects that are far away seem larger and closer)
   [If available, have students look through binoculars at people or objects that are far away. Explain that telescopes do the same thing but are much more powerful and can see things that are very, very far away.]

Meteor

Show image 3A-7: Meteor

1. In today's read-aloud you will hear that if you look at the night sky long enough, you may see a *meteor*.
2. [Point to the streak of light.] Say the word *meteor* with me three times.
3. A meteor is a rock or piece of metal that floats around in outer space.

Show image 3A-8: Close-up of meteor hitting earth's atmosphere

4. When a meteor flies from outer space into Earth's atmosphere, it looks like a streak of light in the night sky.

5. Have you seen a meteor before? What did it look like? [Call on a few volunteers to share.]
   Are a meteor and a star the same thing? (no)
   How are a meteor and a star different? (meteor is a solid rock, not gas; a meteor moves around in space; it does not have an orbit or stay still.)

Purpose for Listening

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

Note: Extensions may have activity options which exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Presenting the Read-Aloud — *15 minutes*

Stars

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.[1] 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.

1 Stars are hot balls of gas that give off light and heat.

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] 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.

2 It is dusk in this image.

Show image 3A-2: Starry night

They may look small, but many of those stars that you see[3] 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.[4] 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.

3 [Point to a few stars.]

4 Everything looks smaller when it is far away. Think of how small an airplane looks when it is high up in the sky.

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 into space, it would take you thousands of years—about seventy-three thousand to be exact—to reach the nearest star beyond our sun![5] That's very 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.

5 Here the word *ship* means a large spacecraft. The word *ship* can also 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.[6] Observatories are built high up on hills or mountaintops, where there are no buildings or trees blocking the telescope.[7] 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.

6 Telescopes are tube-like tools with lenses and mirrors used for magnifying objects in space in order to observe them.

7 What smaller word do you hear in the word *observatories*? *Observe* means to look.

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.[8] That's a big telescope!

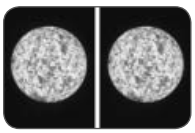
8 [Point to the large telescope.]

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.[9] Or you can use a telescope like this one.[10] You'd be surprised by all the different things you can see through a telescope!

9 [Hold your hands to your eyes like you are holding binoculars.]

10 [Point to the telescope in the image.]



Show image 3A-6: Magnified stars[11]

Through careful study, astronomers have figured out many interesting facts about stars, even though no one is able to travel and study a star up close.[12] Astronomers have learned that some stars are older than other stars. Some stars are hotter than others. Some appear red through the telescope[13] and others appear

11 These are pictures of stars that have been made larger, or magnified.

12 Remember, it would take thousands of years to get close to one.

13 [Point to the red star on the left.]

blue.[14] Stars change color depending on how hot they are, and how hot a star is depends on its age, size, and other factors.

14 [Point to the blue star on the right.]

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 may see a **meteor.**

A meteor is simply a rock or piece of metal that flies through space. It appears as a streak of light in the sky before it disappears in the blink of an eye. At first glance, a meteor may look like a star that is literally falling through the sky. However, stars do not move like that. Meteors—although they are sometimes called "shooting stars"—are not stars at all.[15]

15 So if you see a shooting star, what are you really seeing?

Show image 3A-8: Close-up of meteor hitting earth's atmosphere

There are billions of meteors out there. Some meteors are quite large, but most are tiny, between the size of a grain of sand and a baseball.[16]

16 When rocks break in space, all the broken pieces just move around together because there isn't enough gravity for them to fall anywhere.

Meteors are whizzing around all over the place in outer space. Occasionally, a meteor travels toward Earth. Before it can hit Earth's surface, however, the meteor 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 the meteor. The meteor hits the atmosphere at an incredible speed and keeps moving through the atmosphere. As it does so, it generates intense heat. The meteor burns up as it enters the uppermost parts of earth's atmosphere, creating a streak of light, or a "shooting star" as some people call it.[17]

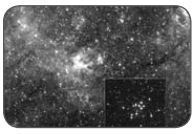
17 If meteors hit Earth's atmosphere and burn up all the time, why do we only see them at night?

Show image 3A-9: Recovered meteorite

Occasionally, bits and pieces of meteors 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 meteor survives the trip through the atmosphere and lands on Earth, we call the meteor a meteorite, or space rock.[18]

18 [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!



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 place called the **universe,** of which we and our planet Earth are but a teeny, tiny part.[19] Feast your eyes on this massive star cluster[20] 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![21] That's so huge, it's hard to think about, and that's just fourteen stars out of all the stars in this photo!

19 The universe is everything in space taken together, including planets, stars, and space itself.

20 or group

21 And remember, our sun is a million times bigger than the whole planet Earth.

Discussing the Read-Aloud ***15** minutes*

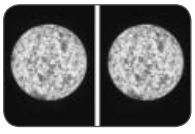
Comprehension Questions **10** *minutes*

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* Describe what you might see in the sky at dusk. (sun setting, colors of sunset, stars coming out, darkening sky, moon coming up)

2. *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.)

3. *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

4. *Inferential* We learned that not all stars are the same. Why are some stars blue and some stars red? (Some are hotter than others.) [Note: Blue stars are much hotter than red stars.]

5. *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)

6. *Inferential* What is a meteor? (a rock or piece of metal that flies through space) What happens to meteors when they enter the earth's atmosphere? (They usually burn up completely.)

[Please continue to model the *Think Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

7. *Evaluative* *Think Pair Share:* After listening to today's read-aloud, do you think stars are small or large? How could you explain to a friend that stars may appear to look small in the night sky, but they are actually very big? (Answers may vary.)

8. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

Word Work: Dawn/Dusk *5 minutes*

1. In yesterday's lesson you learned that at *dawn*, the sun rises in the east.
   In today's 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 *dawn* with me.
   Say the word *dusk* with me.
3. *Dawn* and *dusk* are opposites.
   Dawn is the time of day when the sun begins to rise, when the sky is not fully light yet.
   Dusk is the time of day just after sunset, when the sky is not fully dark yet.
4. [Show an image of sunrise.] The sky brightens with the colors of sunrise at dawn, when night ends and day begins.
   [Show an image of sunset.] The sky glows with the colors of sunset at dusk, when the day ends and the night begins.
5. What do you do at dawn? What do you do at dusk? Try to use the words *dawn* and *dusk* when you tell about it.
   [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "At dawn I . . . At dusk I . . . "]
6. What are the words we've been talking about?

Use an *Making Choices* activity for follow-up. Directions: We know that dawn is when the sun is coming up and night turns into day. We also know that dusk is the time when the sun is going down and day turns into night. Listen to the following examples. If I describe something that happens at dusk, say, "That happens at dusk." If I am describe something that happens at dawn, say, "That happens at dawn."

1. The sun sets. (That happens at dusk.)
2. The sun rises. (That happens at dawn.)
3. The stars fade. (That happens at dawn.)
4. The stars get brighter. (That happens at dusk.)
5. The moon shines. (That happens at dusk.)

Complete Remainder of the Lesson Later in the Day

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Multiple Meaning Word Activity — *5 minutes*

Definition Detective: Ship

Note: You may choose to have students hold up one, two, or three fingers to indicate which image shows the meaning being described, or have a student walk up to the poster and point to the image being described.

1. In the read-aloud you heard the word *ship* in this sentence: "If someone put you on the fastest rocket *ship* it would take you thousands of years . . . to reach the nearest star beyond our sun!"
2. With your partner, think of as many meanings for *ship* as you can, or discuss ways you can use the word *ship*.
3. [Show Poster 2M (Ship).] Point to the picture on the poster that shows how the word *ship* is used in the read-aloud.
4. *Ship* can also mean other things. *Ship* can mean to send a package or box through the mail. Which picture shows this?
5. A ship is also a large boat used for traveling on the sea. Which picture shows this?
6. Did you or your partner think of any of these definitions or uses of *ship*?
7. Now with your partner, make a sentence for each meaning of *ship*. [Call a few partner pairs to share their sentences. Have them point to the images of *ship* used in their sentences.]

Syntactic Awareness Activity

5 *minutes*

Prepositions: **beyond, into, through**

Note: The purpose of these syntactic 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. There may be variations in the sentences created by your class. Allow for these variations, and restate students' sentences so that they are grammatical. If necessary, have students repeat the sentence after you.

Directions: Today we are going to practice using words that show location (or where something is) and direction (or where something is going).

Show image 3A-2: Starry night

1. What do you see in this picture? (many, many stars)
   These stars are *beyond* the sun.
   We use the word *beyond* to show that something is on the other side of and past something else, just like all of these stars that are beyond the sun. Many times we use *beyond* to show that something is farther away.
   Make up a sentence with the word *beyond* in it using this picture or objects in the classroom. As you say your sentence, show your partner what *beyond* looks like.

Show image 3A-8: Close-up of meteor hitting earth's atmosphere

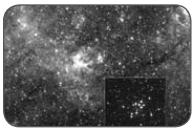
2. What do you see in this picture? (a meteor)
   In today's read-aloud we heard that meteors can crash into Earth's atmosphere. We use the word *into* to show that something moved from the outside to the inside of something else, just like this meteor crashed into Earth's atmosphere.
   Make up a sentence with the word *into* in it. As you say your sentence, show your partner what *into* looks like.

3. In the read-aloud we also heard that as the meteor keeps moving *through* the atmosphere, it gets really, really hot and burns up. This is what makes a streak of light or "shooting star."
   [Remind students that a meteor is not a star but a space rock.]

We use the word *through* to show that something moves from one side straight to the other side. [Demonstrate this by moving a small object through a large tube.]
Make up a sentence with the word *through* in it using this picture or objects in the classroom. As you say your sentence, show your partner what *through* looks like. (e.g., meteor going through the atmosphere; meteor flying through the sky.)

4. [Use various classroom labels and objects. Review and reinforce the concept of these prepositions: *beyond*, *into*, *through*.]

Vocabulary Instructional Activity — 5 minutes



Word Work: Universe

Show image 3A-10: Star cluster

1. In the read-aloud you heard, "By studying the stars, planets, and other objects in space, astronomers have learned many things about this incredible place called the *universe*."
2. Say the word *universe* with me three times.
3. The universe is everything that is on Earth and in space, including all the stars and planets.
4. A long, long time ago, people thought that Earth was in the middle of the universe; now we know that is not true.
   The universe is so great, it is hard for anybody to know how big it is.
5. After listening to the last two read-alouds, do you feel the universe is big or small? When you hear the word *universe*, what comes to mind?

[Ask two or three students. If necessary, guide and/or rephrase the students' responses: "When I hear the word *universe*, I think of . . ."]

6. What's the word we've been talking about?

Use a *Sharing and Drawing* activity for follow-up. Directions: Remember, *universe* means everything that is on Earth and in space. We also use the word *universe* to show that something is important and meaningful to a person. For example, to someone

who really loves cars, cars could be that person's universe; and to someone who is really interested in math, numbers could be that person's universe. Tell your partner about something important in your universe.

[If time permits have students draw a picture of their universe and label or write a sentence about their picture.]

Astronomy Journal: Nighttime (Instructional Master 3B-1) 15 *minutes*

Note: If you have not yet asked students to observe the night sky for homework, you may wish to assign the Astronomy Journal (Instructional Master 3B-1) for homework tonight.

Tell students that they will continue to write in their Astronomy Journal. Tell them they will use their Astronomy Journal to record both observations (what they see) and facts (what they learn) about outer space.

- First, give each student a copy of Instructional Master 3B-1. Tell them that this is the second page of their Astronomy Journal. It will be about the sky and the things they see around them during the nighttime.
- Next, ask students to think about what they see in the night sky.
- Then, have students spend at least five minutes sketching the objects they see in the night sky and some things that are outside at night. Tell students that a sketch is a simple drawing with few details or colors.
- Finally, have students label and/or write a sentence about their sketches.

Remind students about the two layers of the sky: the atmosphere and outer space. Look at students' sketches, helping them recognize which objects in their drawings are located inside Earth's atmosphere. (birds, airplanes, clouds, etc.) Then direct students to circle any object that is found in outer space, outside or beyond the layer of air we call the atmosphere. (stars, moon, meteors)

If time allows, have students share their journal page with their partner or with home-language peers. Have them point out how their pictures are the same and different.

Poetry Read-Aloud 15 *minutes*

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 chart paper with the "Star Light, Star Bright" nursery rhyme. Explain that they will learn a nursery rhyme about wishing on a star, using the echo technique.

Directions: First I will read the whole nursery rhyme while you listen. Watch as I point to each word. Then I am going to repeat the first line and point to each word as I read it. Then I will stop and give you a chance to echo the words while I point to the words again. When you echo the words, it means you will say the exact words that I said. We will continue doing this for each line of the rhyme.

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 at this point. 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 for the verses that follow the famous first verse.

The Star

by Jane Taylor

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.

Discuss the poem, highlighting 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. Encourage students to look out their windows at night, or if their parents allow them, to go outside and look at the stars and let the view of outer space inspire their imaginations.

Stargazing and Constellations

4

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Explain that Earth orbits the sun
- ✓ Explain that astronomers study the moon and stars using telescopes
- ✓ Describe how people sometimes tell stories about the moon and stars
- ✓ Explain what a constellation is
- ✓ Identify the Big Dipper and the North Star

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Ask and answer *who* questions orally, requiring literal recall and understanding of the details or facts from "Stargazing and Constellations" (SL.1.2)
- ✓ Ask questions to clarify directions for an activity in which students are creating a model of the Big Dipper (SL.1.3)
- ✓ Add drawings to descriptions the Big Dipper to clarify the concept (SL.1.5)
- ✓ Accurately apply the meanings of the antonyms *ancient* and *modern,* and the antonyms *major* and *minor* (L.1.5a)
- ✓ Explain the meaning of "hit the nail on the head" and use in appropriate contexts (L.1.6)

✓ Prior to listening to "Stargazing and Constellations," identify orally what they know and have learned about stars

Core Vocabulary

advances, *n.* Improvements and progress
Example: With advances in astronomy, people know more and more about the universe.
Variation(s): advance

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

celestial bodies, *n.* Any objects, including planets, stars, comets, moons, or meteors, that can be found in space
Example: The earth, moon, sun, 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 shapes or outlines of "pictures"
Example: I was so excited when I found different constellations in the night sky.
Variation(s): constellation

myths, *n.* Stories that people tell to explain things in nature, or to teach a lesson
Example: In ancient times, some people believed in myths about a sun god who ruled over the world.
Variation(s): myth

Vocabulary Chart for Stargazing and Constellations			
Core Vocabulary words are in **bold**. Multiple Meaning Word Activity word is underlined. Vocabulary Instructional Activity words have an asterisk (*). Suggested words to pre-teach are in *italics*.			
Type of Words	**Tier 3** Domain-Specific Words	**Tier 2** General Academic Words	**Tier 1** Everyday-Speech Words
Understanding	astronomer ***constellations*** Copernicus Galileo hypotheses **myths** Orion Scorpio/scorpion stargazers Taurus/bull telescope	**ancient*** believed bragged curious explanation imagined knowledge	look named sky sun
Multiple Meaning	space	**advances** handle major/minor* shapes	list star stories
Phrases	Big/Little Dipper Canis Major/Minor **celestial bodies** Polaris/North Star	figured out has a tough time much more than meets the eye relied on remained the same	as if by magic thousands of years ago
Cognates	astrónomo(a) ***constelaciones*** hipótesis **mito** telescopio espacio	anciano* **avances** curioso(a) explicación imaginarse mayor/menor*	lista

Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
What Have We Already Learned?	chart paper, writing tools	Consider creating an Idea Web for stars to list surprising facts about stars that students have learned. Discuss why they are surprising.
Essential Background Information or Terms		
Vocabulary Preview: Constellations	Image 4A-10; additional images of constellations	
Purpose for Listening	Instructional Masters 4A-1 (Big Dipper) and 4A-2 (Orion); star stickers or drawing tools	You may wish to introduce the group of stars known as the Big Dipper and the constellation Orion before the read-aloud. At a later time, students may be interested in adding stickers or color dots to the Big Dipper and Orion.
	Images 4A-11 and 4A-12	You may wish to show students images of Copernicus and Galileo and introduce students to these two famous astronomers. Ask students to listen carefully to find out how they helped us to know more about our universe.
Presenting the Read-Aloud (15 minutes)		
Stargazing and Constellations		
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Ancient		
 **Complete Remainder of the Lesson Later in the Day**		

Exercise	Materials	Details
Extensions (20 minutes)		
Sayings and Phrases: Hit the Nail on the Head	chart paper, chalkboard, or whiteboard; drawing tools	
Vocabulary Instructional Activity: Major/Minor	chart paper; index cards	
Astronomy Journal: Constellations	Instructional Master 4B-1, images of constellations; star stickers, drawing tools	
The Really Big Dipper	chart paper; drawing tools	
Domain-Related Trade Book	trade book about stars or constellations	

Advance Preparation

Bring in images of constellations, and star stickers.

Make copies of Instructional Master 4A-1 and 4A-2 for each student. These are worksheets with the outline of the Big Dipper and Orion on them.

Make a copy of Instructional Master 4B-1 for each student. Students will create the third page of their Astronomy Journal.

For Vocabulary Instructional Activity, create a Horizontal Word Wall and write the following words on index cards: *major*, *minor*, *big*, *important*, *giant*, *small*, *unimportant*, *tiny*.

Find a trade book about stars or constellations to read aloud to your class.

Stargazing and Constellations

4A

Introducing the Read-Aloud — *10 minutes*

What Have We Already Learned? — *5 minutes*

Review the previous read-aloud during which students heard a variety of facts about stars. Ask students to describe surprising facts they learned about stars. (stars are really far away, really big, really hot, and don't twinkle or fall through the sky) Explain that all of these facts are known only because of the work of astronomers. Remind students that if you believe what you see in the night sky, you might think that stars are tiny and that they twinkle. You also might believe that they only come out at night. Explain that the scientists who study the stars (astronomers), with the help of observatories and telescopes, have learned that many of the things we might believe when we look at the stars are not actually true.

Essential Background Information or Terms — *5 minutes*

Reference Note:

In the Early World Civilizations domain, students learned that the ancient Egyptians believed that the sun god, Amon-Ra moved the sun across the sky.

In the Early American Civilizations domain, students learned that the Maya believed the stars and planets were gods. The Inca believed that the world was created by Viracocha.

Explain that in today's read-aloud, students will take a step back in time thousands of years to ancient times, before astronomy had begun. Remind students that they have already learned about some people in ancient times, such as the Mesopotamians, ancient Egyptians, and the Maya, Aztec, and Inca people. Remind students that many ancient people often told stories, or myths, to explain how events in nature occurred. Emphasize that several ancient cultures believed in many gods and goddesses who were responsible for controlling the events in nature.

Ask students, "Were there telescopes in ancient times?" Explain that in ancient times, the people's knowledge of outer space was based solely on what they could see with their own eyes when they looked up at the sky. Point out that since ancient times, tools have been invented to study space in a scientific way. Remind students that the scientific study of outer space is called astronomy.

Vocabulary Preview

5 *minutes*

Constellations

Show image 4A-10: Constellation chart

1. In today's read-aloud you will hear about many different groups of stars in the sky that are called *constellations*.
2. Say *constellations* with me three times.
3. Constellations are groups of stars in the night sky that seem to form shapes or pictures.
4. The constellations that ancient people saw in the night sky thousands of years ago are the same constellations we see in the night sky today.
5. Do you see any constellations in this image? [Call on a few volunteers to come up to the image and point to the constellations they think they see.]

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 things that ancient peoples may never have known. 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.

Presenting the Read-Aloud — *15 minutes*

Stargazing and Constellations

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.** [1] The **ancient** Greeks, Arabs, Romans, Chinese, Egyptians, Turks, Mayans, Babylonians, and countless others [2] all studied the stars and tried to figure out what they were and why they were there.

1 or objects found in space

2 who lived long, long ago

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. [3] 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 the very same stars the ancient Greeks, Arabs, and countless others saw, as well! [4]

3 We still use these names today.

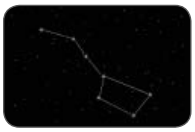
4 It's hard to believe outer space has changed so little in all those years!

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

The ancient Greeks believed that the stars had been placed in the sky by gods—as if by magic—in order to tell stories and teach lessons. [5] The Greeks identified certain groups of stars in the night sky that seem to form specific shapes. These shapes are called **constellations.** [6] 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.

5 These stories are called myths.

6 That's the name for the pictures they saw in the stars.



Show image 4A-4: Big Dipper[7]

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.[8] The Big Dipper is made up of seven stars. The Big Dipper looks different in the sky depending on the time of year.[9] 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 revolving around the sun.

7 [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" below.]

8 You might also think it looks like a pot with a handle.

9 [Rotate the Flip Book as you read the following sentence.]

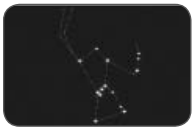
Show image 4A-5: Little Dipper

Next to the Big Dipper is another group of stars 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: Columbus navigating sailing ship

Since ancient times, people have relied on the North 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. Christopher Columbus and other sailors used to look for the North Star on starry nights out on the wide ocean.[10]

10 Because Polaris is always in the north sky, Columbus could use it like a compass to navigate his 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.[11] 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.[12]

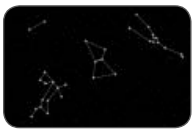
11 Myths are stories that people tell to explain things in nature, or to teach others how to behave.

12 [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. [13]

13 [Point to the tail.] A scorpion is a poisonous, spider-like insect with a curved tail.



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 in outer space: he is being chased by a giant scorpion at the same time he is fighting a giant bull!

Fortunately, Orion has a couple of friends: his two loyal hunting dogs, Canis Major and Canis Minor. [14] These dogs follow Orion through the sky, helping him fight Taurus the Bull.

14 These are Latin words. *Canis* means dog, *major* means big, and *minor* means small.

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.[15] In fact, sometimes when we look into outer space, our eyes can play tricks on us.

15 This means there is more to know about space than what we can see with our eyes.

The first astronomers began using math and science to learn about the universe. Rather than make up myths and stories, astronomers made scientific guesses about space.

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 actually true, that the earth in fact revolved around the sun. [16] This discovery was made by an early astronomer named Nicolaus Copernicus.

16 Do you remember how we orbited the hula hoop sun?

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. Galileo invented telescopes that helped astronomers prove that Copernicus's theory was true. [17] 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.

17 What is a telescope?

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** [18] 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. [19] Astronomers today use telescopes like this one to study the stars and other distant parts of outer space that Galileo may have never imagined.

18 or progress

19 [Point to the telescope, and flip back to the previous page to point to Galileo's telescope.]

Show image 4A-14: Constellation chart

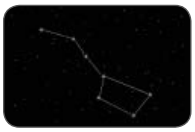
Yet even as we have gained new knowledge about outer space, our understanding of the stars is still built upon the stories and knowledge passed on by people for thousands of years. Next time you find a constellation in the sky, you will know that other stargazers have been studying and telling stories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

Discussing the Read-Aloud **15** *minutes*

Comprehension Questions **10** *minutes*

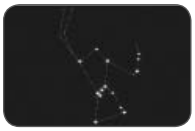
If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* Were the stars that ancient civilizations observed at night different or the same as the ones we see? (same)
2. *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 image 4A-4: Big Dipper

3. *Inferential* Why is this group of stars called the Big Dipper? (group of stars that looks like a ladle or pot)



Show image 4A-7: Orion

4. *Literal* This constellation is called Orion. [Trace a line with your finger connecting the three stars in his belt as you ask the following question.] These three stars form a famous piece of Orion's clothing. What do they form? (his belt)
5. *Literal* Remember that when you look at the sky during the day, the sun looks like it is moving. The ancient people believed that the sun revolved around the earth. An astronomer named Copernicus believed something different. What did Copernicus believe? (Copernicus believed that the earth revolved around the sun.)
6. *Literal* We also learned about another important astronomer, Galileo. What invention did he improve upon that helped astronomers make new discoveries? (telescopes)

[Please continue to model the *Question? Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

7. *Who? Pair Share:* Asking questions after a read-aloud is one way to see how much everyone has learned. A lot of people and animals were mentioned in today's read-aloud, from the ancient stargazers and Orion, Scorpio, and Taurus, to Copernicus and Galileo. Think of a question you can ask your neighbor about someone in the read-aloud that starts with the word *who*. For example, you could ask, "Who was found out that the earth revolves around the sun?" Turn to your neighbor and ask your *who* question. Listen to your neighbor's response. Then your neighbor will ask a new *who* question, and you will get a chance to respond. I will call on several of you to share your questions with the class.
8. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

Word Work: Ancient

5 *minutes*

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. Directions: 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."

1. 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.)
2. Barley was used for trade in Mesopotamia. (That is ancient.)
3. People built pyramids in which to bury their kings. (That is ancient.)
4. People wrote hieroglyphics on clay tablets. (That is ancient.)
5. People bring jars and cans to a recycling bin. (That is modern.)
6. People believed that the sun orbits around the Earth. (That is ancient.)

Complete Remainder of the Lesson Later in the Day

Stargazing and Constellations

4B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Sayings and Phrases: Hit the Nail on the Head — *5 minutes*

Proverbs are short, traditional sayings that have been passed along orally from generation to generation. These sayings usually express general truths based on experiences and observations of everyday life. Although some proverbs do have literal meanings—that is, they mean exactly what they say—many proverbs have a richer meaning beyond the literal level. It is important to help students understand the difference between the literal meanings of the words and their implied or figurative meanings.

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. Explain that you are writing down the saying, but that they are not expected to be able to read what you write because they are still learning all the rules for decoding. Emphasize that you are writing the saying so that you don't forget, and tell them that you will read the words to them.

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 to the head. Explain that the words of the saying mean, literally, 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 exactly right, or who have made exactly 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 exactly 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 exactly 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 exactly right. Tell students that you want to see if they can apply this saying correctly to the following situation. Directions: Listen as I tell you a short story about two people. When I am done, tell me which person gets it exactly 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 exactly right when describing the stars. Who hit the nail on the head: Joe or Mary?

Explain that a teacher might "hit the nail on the head" when she explains something in just the right way so you can understand it. Your dad might "hit the nail on the head" when he guesses exactly why you're sad or upset. Remind students that the next time a friend, a parent, or a teacher gets something exactly right, instead of saying "exactly," "that's it," or "you got it," you can say, "you hit the nail on the head!"

Vocabulary Instructional Activity — 5 *minutes*

Horizontal Word Wall: Major/Minor

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

1. In the read-aloud you heard, "Fortunately, Orion has a couple of friends: his two loyal hunting dogs, Canis *Major* and Canis *Minor.*"
2. Say the word *major* with me. Say the word *minor* with me.
3. *Major* refers to something that is large or that is important. *Minor* refers to something that is little or something people don't really care about as much.
4. We 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.]
5. [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 each 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."]
6. Talk with your partner using the different words on the Horizontal Word Wall. Remember to use complete sentences.

Astronomy Journal: Constellations (Instructional Master 4B-1) 15 *minutes*

Tell students that they will continue to write in their Astronomy Journal. Today they will draw their own real constellation or made-up constellation. [You may wish to have images of real constellations available for students to reference.]

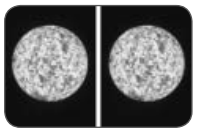
- First, give each student a copy of Instructional Master 4B-1. Tell them that this is the third page of their Astronomy Journal. It will be about constellations.
- Next, ask students to think about what kind of constellation they would like to draw. [Note: If they want to draw the Big or Little Dipper, mention that it is part of a larger constellation, so it is called a group of stars.]
- Then, have students shade in the background black for the night sky and spend at least five minutes making the shape or outline of a picture for their constellation.
- Finally have students label and/or write a sentence about their constellation.

Remind students that long ago there were no telescopes or rocket ships to explore space. Ask students: "How did people from ancient times explain what they saw in the night sky?" (They told stories and myths about the constellations they saw in the night sky.)

If time allows, have students share their journal page in small groups or with home-language peers, having others guess what "picture" their constellation is supposed to make.

The Really Big Dipper 15 *minutes*

Show Flip Book images 4A-3 through 4A-9 to review the constellations and groups of stars that students learned about in today's read-aloud. (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)



Show Flip Book image 3A-6 of magnified stars.

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. Make seven groups of students, and give each group a large piece of chart paper. (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.) 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, check their understanding of the task to be done.

Say, "Asking questions is one way to make sure that everyone knows what to do. Think of a question you can ask your neighbor about the directions I have just given you. For example, you could ask, 'What should we do first?' Turn to your neighbor, and ask your own question now. I will call on several of you to share your 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 seven (or fourteen) stars have been cut out, tell students that you will use the image of the Big Dipper (and possibly the Little 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. To conclude this activity, 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.

Domain-Related Trade Book 20 *minutes*

- Refer to the list of recommended trade books in the Introduction at the front of this Supplemental Guide, and choose one trade book about stars or constellations to read aloud to the class.
- Explain to students that the person who wrote the book is called the author. Tell students the name of the author. Explain to students that the person who makes the pictures for the book is called an illustrator. Tell students the name of the illustrator. Show students where they can find this information on the cover of the book or on the title page.
- As you read, use the same strategies that you have been using when reading the read-aloud selections—pause and ask occasional questions; rapidly clarify critical vocabulary within the context of the read-aloud; etc.
- After you finish reading the trade book aloud, lead students in a discussion as to how the story or information in this book relates to the read-alouds in this domain.

The Moon 5

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Explain that astronomers study the moon and stars using telescopes
- ✓ Describe how people sometimes tell stories about the moon and stars
- ✓ Identify the four phases of the moon—new, crescent, half, full
- ✓ Explain that the moon orbits the earth

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the connection between the orbit of the moon around the earth and its appearance at various phases of the orbit (RI.1.3)
- ✓ Describe an illustration of the moon and the source of its illumination and use pictures and detail in "The Moon" to describe the read-aloud's key ideas (RI.1.7)
- ✓ Ask and answer *when* questions orally, requiring literal recall and understanding of the details or facts from "Introduction to the Sun and Space" (SL.1.2)
- ✓ Prior to listening to "The Moon," identify orally what they know and have learned about the earth, sun, and moon

Core Vocabulary

appearance, *n.* The way something or someone looks
Example: The appearance of the moon looks like it changes.
Variation(s): appearances

counterclockwise, *adv.* Moving in a circle toward the left, which is the opposite direction in which the hands on a clock move
Example: Earth rotates counterclockwise on its axis.
Variation(s): none

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

crescent, *n.* Thin, curved shape
Example: My banana was shaped like a crescent.
Variation(s): crescents

reflecting, *v.* Bouncing light off one surface onto another
Example: I can see the light from the night-light reflecting off the walls when the room is dark.
Variation(s): reflect, reflects, reflected

Vocabulary Chart for The Moon			
Core Vocabulary words are in **bold**. Multiple Meaning Word Activity word is underlined. Vocabulary Instructional Activity words have an asterisk (*). Suggested words to pre-teach are in *italics*.			
Type of Words	**Tier 3** Domain-Specific Words	**Tier 2** General Academic Words	**Tier 1** Everyday-Speech Words
Understanding	celestial **counterclockwise*** **craters** lava meteoroids	exactly feature *phases* sliver visible	days/month/year look moon night sky sun
Multiple Meaning	atmosphere orbit waxing/waning	**appearance** change course cycle ***reflecting*** shape surface	dark hit light rock
Phrases	**crescent** moon new/waxing/full/waning moon "once in a blue moon"	a better idea of . . . depending on	same side facing the _____
Cognates	celeste **cráter** lava meteoroid atmósfera órbita	exactamente *fases* visible **apariencia** curso ciclo ***reflejando***	noche

Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
What Have We Already Learned?	Images 3A-5: Conventional telescope; 3A-6: Magnified stars; and 3A-7: Meteor	You may wish to show these images from Lesson 3 as you review content.
Vocabulary Preview: Phases, Reflecting	Image 5A-3	
	items that reflect light: mirrors, plastic wrap, sequins, glitter, metal spoons, CDs, water, clothing with reflective strips items that absorb light: unpolished wood, black cloth, opaque materials	You may wish to do a quick demonstration showing how different items reflect and absorb light.
Purpose for Listening		
Presenting the Read-Aloud (15 minutes)		
The Moon	draw diagram of new moon and full moon showing the positions of the sun, Earth, and moon	(See sidebar in the read-aloud.)
	video clips of the phases of the moon	You may wish to conclude the read-aloud with a short video clip about the phases of the moon. Focus on naming *new moon*, *crescent moon*, *half-moon*, and *full moon*.
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Counterclockwise	Image 5A-3; learning clocks	
Complete Remainder of the Lesson Later in the Day		
Extensions (20 minutes)		
Four Phases of the Moon	Image Cards 3–6; Instructional Master 5B-1	
Moon Dial	Instructional Master 5B-2; drawing tools; card stock or construction paper; brads (one per student)	Note: This can also be a Pausing Point activity.

Exercise	Materials	Details
On Stage: Earth-Moon Relay	globe, plastic hoop; five 8 ½ x 11" signs, one with the word *sun*, and four blank ones	
Domain-Related Trade Book	trade book about the moon or the phases of the moon	

Advance Preparation

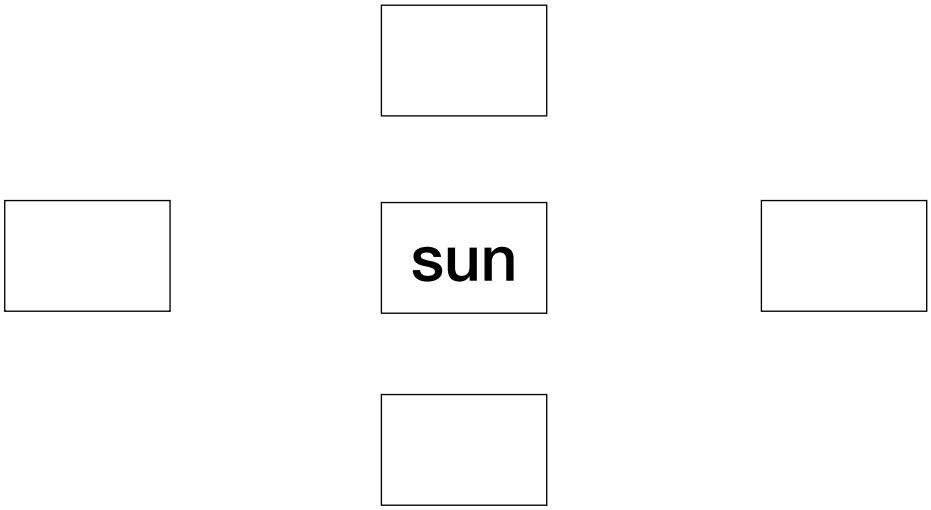
Bring in items that reflect light (e.g., mirrors, shiny metal, water, paper with sequins and glitter glued on, clothing with reflective strips, etc.), items that absorb light (e.g., dark clothing, unfinished wood, opaque things, etc.), several learning clocks, and a plastic hoop.

Find age-appropriate video clips showing the phases of the moon.

Make a copy of Instructional Master 5B-1 for each student. Students will order the four phases of the moon.

Prepare the materials to make a moon dial. Copy both pages of Instructional Master 5B-2 on card stock or construction paper. Alternatively, you can copy them onto regular paper and help students cut and paste them on card stock. Help students make a hole for the brad to go through.

Set up for the Earth-Moon Relay. **Note**: This activity is best completed outdoors or in a large indoor space. Make five signs that will be taped to the floor; one sign should say *sun,* and the other four should blank. Put the sign for *sun* in the center, and put the four blank cards around the sun card in a circle, or ellipse. The floor should look like this:



Find a trade book about the moon or the phases of the moon to read aloud to the class.

Notes to Teacher

While demonstrating which items reflect or absorb light, be sure that students are clear that *reflection* is when light bounces off something (The opposite of *reflection* is *absorption,* when light is "soaked up" and does not go through or bounce off something). Relate this to how the moon reflects light from the sun.

You may need to read through the On Stage: Earth-Moon Relay a few times to become familiar with the directions for this activity. You may wish to practice this activity with six volunteers before presenting it to the rest of the class.

The Moon

5A

Introducing the Read-Aloud — *10 minutes*

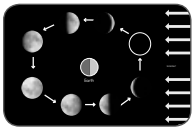
What Have We Already Learned? — *5 minutes*

Tell students that today they will listen to a nonfiction, or true, read-aloud about the moon and will learn many interesting facts. Ask students what tool astronomers use to study objects in outer space. (telescopes) Remind students that they already learned that long ago, before astronomers had powerful telescopes, ancient people often believed many things about the earth, the sun, and the stars that were not true. Explain to students that the ancient people also believed many things about the moon that were also 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. Ask students what ancient people believed about the movement of the earth and sun. (They believed the sun revolved around the earth.) Ask students if the ancient people were correct about this. (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.)

When people observe the stars from Earth, they may think that stars are small and twinkle, 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 objects are called. (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.

Vocabulary Preview *5 minutes*



Phases

Show image 5A-3: Lunar phases

1. In today's read-aloud you will learn about the *phases* of the moon.
2. Say *phases* with me three times.
3. Phases are stages or steps in a process.
4. [Point to the phases of the moon.] This image shows the phases of the moon.
   [Point to each phase of the moon as you name it.] You will hear about the *new moon*, *crescent moon*, *half-moon*, and *full moon*.
   The moon goes through the same phases over and over again.

5. How many phases does this image show? (eight)

[**Note**: The focus of the read-aloud is on these four phases of the moon: the *new moon*, *crescent moon*, *half-moon*, and *full moon*. Point to these phases and repeat these four phases again.]

Reflecting

1. In today's read-aloud you will hear that the moon does not have its own light; the light you see when you look at the moon is actually light from the sun *reflecting* off the moon.
2. Say the word *reflecting* with me three times.
3. Reflecting means bouncing off something. Light is reflecting off [point to an item in the room that reflects light].
4. At night we can see the light of the sun reflecting off the moon.
5. [Dim the lights in the room, and shine a flashlight on the different materials.] Light reflects off something when it bounces off that thing. I will show you several things. Tell me whether light is reflecting off it or not reflecting off it.
   [If appropriate, you may wish to mention the antonym *absorbing*.]

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 and what were misunderstandings or old stories that people made up about the moon.

Presenting the Read-Aloud — *15 minutes*

The Moon

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? [1] It's the moon.

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 claimed that the moon was the sun's sister. Others said the moon was a giant face looking down on Earth. Some children's stories even said that the moon was made of cheese! [2]

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. [3] The light you see when you look at the moon is actually light from the sun **reflecting** [4] off the moon. [5]

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? [6] It takes about 365 days, or one year. Can you guess how long it takes for the moon to orbit Earth? [7]

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. [8] 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 [9] changes depending on where it is in its orbit. Follow the arrows in this diagram and you can see

1 [Pause for responses.] Describe what you see in the picture. How does the moon look?

2 Why do you think people had these ideas about the moon?

3 So even though it looks like light is shining brightly from the moon, it is not; our eyes are playing tricks on us!

4 or bouncing

5 [Point to the moon in the illustration.] So where is this light coming from?

6 [Pause for responses.]

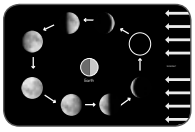
7 [Pause for responses.]

8 So the moon rotates on its axis and orbits the earth just like the earth rotates on its axis and orbits the sun.

9 or the way it looks

that the moon orbits Earth in a **counterclockwise** motion.[10] The sun is over on the right-hand side of this diagram.

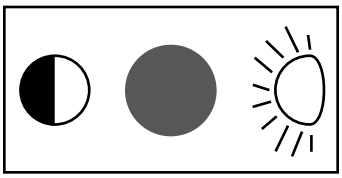
10 Counterclockwise is this direction. [Trace your finger along the orbit.]



Show image 5A-3: Lunar phases

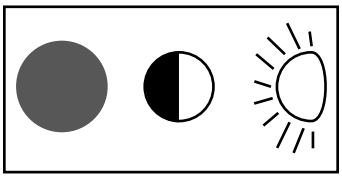
This image gives you a better idea of what the moon really looks like during each of its phases.

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 monthly 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.[11] 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.

11 So when there's a new moon, we can't actually see it, because no light is reflecting off the moon toward us.

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.[12]

12 [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. [13] This is called a half moon. [14] Remember, the moon only looks like it is changing shape. The moon is always a big, round rock, but it can look different during its orbit depending on how the light reflects off it.

13 [Drag your finger down the center line.]

14 Does the moon really change shape in the night sky or does it just look like it changes shape?

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 seems to be 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. [15] When this happens, it is called a "blue moon." But this is rare, meaning it only happens every few years. So, if you hear someone say that something only happens "once in a blue moon," they simply mean that it does not happen very often.

15 The few extra days each month add up over time.

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. [16]

16 What do we call the moon when it looks like a big circle?

Show image 5A-8: Moon close-up [17]

People sometimes see what looks like a man's face in the moon because of dark areas on the moon's surface. [18] These dark areas are places where, a long time ago, lava from inside of the moon poured out onto the moon's surface creating lava lakes. 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 are actually seeing deep and dark holes—or lava lakes—across the moon's surface.

17 Let's take a closer look at the moon.

18 [Point to the dark areas of the moon.]

When you take a close-up look, you can see that the moon's surface is also covered with hundreds and thousands of **craters.** [19] 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 no layer of air around the moon, nor does the moon have any water, soil, plants, or any other signs of life whatsoever.

19 or big, dipped holes

Show image 5A-9: Close-up of large craters

Without an atmosphere, the moon has nothing to protect it from all the meteoroids that zoom through outer space. As you learned, meteoroids 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. [20] Meteoroids, 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. [21]

20 What do some people call a meteor? (a shooting star)

21 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. [22] How do you think they got there? [23] Keep listening over the next couple of days, and you will learn the answers.

22 Do you know what we call these people who travel in space?

23 [Pause for responses.]

Discussing the Read-Aloud *15 minutes*

Comprehension Questions *10 minutes*

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Inferential* When we look at the moon at night, it looks like it is shining or 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)

3. *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)

4. 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.

   - *Literal* Which phase is the moon in when it looks like a big circle? (full moon)
   - *Literal* Which phase is it in when it looks as if it has been cut right down the middle? (half moon)
   - *Literal* Which phase is it in when it is a thin, curved sliver? (crescent moon)
   - *Literal* Which phase is it in when we can't see it at all? (new moon)

5. *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)

6. *Inferential* You heard about some ways that the moon is not like the earth. The air in the earth's atmosphere makes it possible for the plants and animals to live on Earth. Do you think that there is life (any plants or animals) on the moon? (no) Why not? (The moon doesn't have an atmosphere.)

7. *Inferential* 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.)

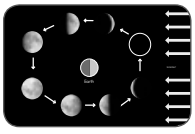
[Please continue to model the *Question? Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

8. *When? Pair Share:* Asking questions after a read-aloud is one way to see how much everyone has learned. We learned a lot in today's read-aloud about how the moon changes: reflecting the sunlight, going through an orbit, and going through different phases. Think of a question you can ask your neighbor about something that happens to the moon that starts with the word *when*. For example, you could ask, "When

does the moon look like a circle?" Turn to your neighbor and ask your *when* question. Listen to your neighbor's response. Then your neighbor will ask a new *when* question, and you will get a chance to respond. I will call on several of you to share your questions with the class.

9. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

Word Work: Counterclockwise



Show image 5A-3: Lunar phases

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 in which 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 have been talking about?

Use a *Movement* activity for follow-up. Directions: I will place you in small groups. With backs facing each other, link hands with your group members to make a circle. When I say "clockwise," move in a circle to your right. Remember, clockwise is the direction the hands on a clock move. When I say "counterclockwise," move in a circle to your left. Remember, counterclockwise is the opposite direction the hands on a clock move.

Complete Remainder of the Lesson Later in the Day

The Moon

5B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

⑩ Four Phases of the Moon (Instructional Master 5B-1) — 10 *minutes*

Note: You may wish to first review the four phases of the moon using Image Cards 3–6 before giving students Instructional Master 5B-1.

Give each student a copy of Instructional Master 5B-1. Explain that this sheet addresses the phases of the moon. Ask students to listen to the directions and write the appropriate number in the blank. Directions: The pictures show four different phases of the moon. Write the number "1" on the line below the new moon. Write the number "2" below the crescent moon. Write the number "3" below the half moon. Write the number "4" below the full moon.

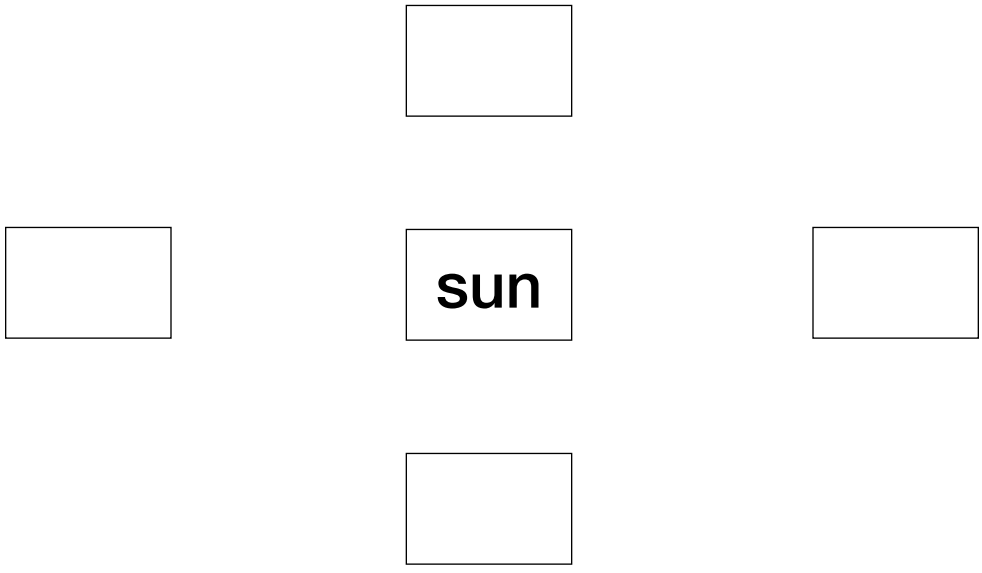
Moon Dial (Instructional Master 5B-2) — 15 *minutes*

- Discuss what students know about the shapes of the moon during its phases. (sliver/crescent moon, half circle/half moon, circle/full moon)
- Review the following phases of the moon with students: new moon (no moon showing), crescent moon (on the right), half moon (on the right), full moon (whole moon showing), half moon (on the left), crescent moon (on the left), new moon (no moon showing).
- Tell students that 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.

- First, have students cut out the two circles for their dial. If necessary, help them paste the circles on card stock. [Be sure that a triangular shape is cut out from the top circle.] Students should write their name on the dial and may wish to decorate the top circle.
- Next, have students cut out the six images showing the phases of the moon and place them in order. [Be sure that the first half has the right side of the moon showing and the second half has the left side of the moon showing.]
- Then, 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.

On Stage: Earth-Moon Relay — 15 *minutes*



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 plastic 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 plastic 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 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.

Ask students: "How long does it take for Earth to orbit the sun one time?" (about one year, 365 days)

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. Tell all students to slowly spin around in place once.

[Monitor students to make sure that they spin only once and slowly to avoid dizziness.]

Ask students: "How much time has passed when the earth spins around one time?" (one day, 24 hours)

Then say, "Does anyone want to try orbiting the sun again, spinning the globe at the same time?" Take four new volunteers.

Have each volunteer stand on one of the blank cards. [You may also want to choose new volunteers for the sun.] 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.

Ask: "Does anyone know 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. [Hint: How many days are in a year?]" (The earth spins 365 times.)

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.

Ask: "How long does it take the moon to orbit the earth one time?" (about one month)

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 all of the movements they've practiced together. 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, you can have four student volunteers play the role of the moon, orbiting the person who is holding the globe in relay style as well, from one blank card to the next.

Domain-Related Trade Book 20 *minutes*

- Refer to the list of recommended trade books in the Introduction at the front of this *Supplemental Guide*, and choose one trade book about the moon or the phases of the moon to read aloud to the class.
- Explain to students that the person who wrote the book is called the author. Tell students the name of the author. Explain to students that the person who makes the pictures for the book is called an illustrator. Tell students the name of the illustrator. Show students where they can find this information on the cover of the book or on the title page.
- As you read, use the same strategies that you have been using when reading the read-aloud selections—pause and ask occasional questions; rapidly clarify critical vocabulary within the context of the read-aloud; etc.
- After you finish reading the trade book aloud, lead students in a discussion as to how the story or information in this book relates to the read-alouds in this domain.

Pausing Point

PP

Note to Teacher

You should pause here and spend one day reviewing, reinforcing, or extending the material taught thus far.

You may have students do any combination of the activities listed below, but it is highly recommended you use the Mid-Domain Student Performance Task Assessment to assess students' knowledge of astronomy. The other activities may be done in any order. You may also choose to do an activity with the whole class or with a small group of students who would benefit from the particular activity.

Core Content Objectives Up to This Pausing Point

Students will:

- ✓ Recognize the sun in the sky
- ✓ 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 Earth as a planet and our home
- ✓ Identify the earth's rotation, or spin, as the cause of day and night
- ✓ Explain 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, although they appear small in the night sky
- ✓ Describe stars as hot, distant, and made of gas

- ✓ Explain that astronomers study the moon and stars using telescopes
- ✓ Describe how people sometimes tell stories about the moon and stars
- ✓ Explain what a constellation is
- ✓ Identify the Big Dipper and the North Star
- ✓ Identify the four phases of the moon—new, crescent, half, full
- ✓ Explain that the moon orbits the earth

Student Performance Task Assessment

⑩ The Earth, Sun, Moon, and Meteor (Instructional Master PP-1)

Directions: [Name each image at the top: Earth, the sun, the moon, and a meteor. Be sure students are able to identify each image.] I am going to read sentences that refer to one of these celestial bodies. Remember, celestial bodies are any objects found in space, such as Earth, the sun, the moon, and a meteor. Circle the picture of the celestial body my sentence is about.

1. This celestial body is your home—the planet on which you live. (Earth)
2. This celestial body is actually a star. (sun)
3. This celestial body might look like a shooting star in the sky, but it is a rock, not a star. (meteor)
4. This celestial body orbits the sun. (Earth)
5. This celestial body orbits the earth. (moon)
6. This celestial body of rock or metal flies or floats around outer space. (meteor)
7. This celestial body is made of gas. (sun)
8. This celestial body does not have its own light but reflects the light from the sun. (moon)

Activities

Image Review

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

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.

Other possible topics you may wish to suggest for students to draw and write about include the following:

- 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 Introduction. You may also choose to have students select a read-aloud to be heard again.

Exploring Student Resources

Materials: Domain-related student websites

Pick appropriate websites from the Internet for further exploration of the sun, moon, meteors, and constellations. See suggested resources listed in the Introduction.

Videos related to Astronomy

Materials: Videos related to the sun, moon, meteors, and constellations

Carefully peruse the Internet for short (5-minute), age-appropriate videos related to the sun, moon, meteors, and constellations.

Prepare some questions related to the content presented in the videos.

Discuss how watching a video is the same as and different from listening to a storybook or read-aloud.

Have students ask and answer questions using question words *who, what, when, where,* and *why* regarding what they see in the videos.

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) That's right, the earth is our home.
- I am the closest star to the earth. (sun) That's right, the sun is the nearest star to the earth.
- I orbit, or revolve around, the sun. (Earth) That's right, the earth orbits the sun.
- I orbit, or revolve around, the earth. (moon) That's right, the moon orbits the earth.
- 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 complete circle, and other times I look like half a circle or even just a sliver in the sky. (moon) That's right, the moon appears to have different shapes during different parts of its orbit.

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 shout the word "day," they are to slowly spin around in place, counterclockwise, pretending to rotate like Earth does every twenty-four hours. When you shout out "year," they are to walk around you, the sun, counterclockwise, in an orbit.

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 of the sun, or the 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.

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. See if students can order themselves from left to right as follows: new, crescent, half, and full.

Note: This activity can also be done using chocolate cookies with white cream filling. Carve out the phases of the moon with popsicle sticks. Each student should have six cookies; each cookie will represent one phase of the moon (new, crescent, half, full, half, crescent). Be sure to check with your school's policy regarding food distribution and allergies.

History of Space Exploration and Astronauts 6

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Explain that astronomers study the moon and stars using telescopes
- ✓ Describe how people sometimes tell stories about the moon and stars
- ✓ Explain that astronauts travel to outer space

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the connection between the United States and the Soviet Union with respect to the Space Race (RI.1.3)
- ✓ Describe the way in which the Chinese launched early rockets (SL.1.4)
- ✓ Add drawings to descriptions of various types of rockets (SL.1.5)
- ✓ Prior to listening to "History of Space Exploration and Astronauts," orally predict what the read-aloud is about, and then compare the actual outcomes to predictions

Core Vocabulary

astronaut, *n.* A person who travels into outer 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 with force
Example: The seventh-grade class planned to launch their homemade rocket into the air.
Variation(s): launches, launched, launching

rockets, *n.* Engines that help the spacecraft go up into space
Example: The rockets shot the spacecraft straight up into the air and through Earth's atmosphere into outer space.
Variation(s): rocket

spacecraft, *n.* A vehicle for traveling beyond Earth's atmosphere
Example: It took many years for engineers to design a spacecraft that could travel safely in outer space.
Variation(s): none [Note: *Spacecraft* is a non-count noun. It has no plural form.]

technology, *n.* The use of science to invent useful things or to help solve problems
Example: Computers are an important kind of technology.
Variation(s): technologies

Vocabulary Chart for History of Space Exploration and Astronauts			
Core Vocabulary words are in **bold**. Multiple Meaning Word Activity word is underlined. Vocabulary Instructional Activity words have an asterisk (*). Suggested words to pre-teach are in *italics*.			
Type of Words	**Tier 3** Domain-Specific Words	**Tier 2** General Academic Words	**Tier 1** Everyday-Speech Words
Understanding	***astronaut*** *exploration* satellite **spacecraft**	equipment impossible incredibly journey powerful **technology*** training wondered	flight
Multiple Meaning	capsule mission orbit **rockets** space	**launch*** pride program tough	race stars
Phrases	Cape Canaveral NASA (National Aeronautics and Space Administration) Soviet Union/ Russia Space Race Sputnik 1 Yuri Gagarin	by no means creative ideas out of reach wanted to prove	gazed up at using their imaginations
Cognates	***astronauta*** *exploración* satélite cápsula misión órbita espacio	equipo imposible increíblemente **tecnología*** programa	

Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
What Have We Already Learned?	Image Cards 3–6; Four Phases of the Moon worksheet or Moon Dial	You may wish to have partner pairs review the phases of the moon using their worksheet or moon dial.
Making Predictions About the Read-Aloud	chart paper, writing tools	After telling students the title, ask students what they think they will hear about in today's read-aloud. Record student responses. Check off topics that are covered in the read-aloud.
Vocabulary Preview: Exploration, Astronauts	Images 6A-7 and 6A-8	
Purpose for Listening		
Presenting the Read-Aloud (15 minutes)		
History of Space Exploration and Astronauts		You may wish to show a short video clip of a rocket launch at the end of the read-aloud.
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Launch	Image 6A-6	
 **Complete Remainder of the Lesson Later in the Day**		
Extensions (20 minutes)		
Multiple Meaning Word Activity: Pride	Poster 3M (Pride)	
Syntactic Awareness Activity: Possessive Pronouns—*my, your, his, her*	image of astronaut Sally Ride	
Vocabulary Instructional Activity: Technology	drawing paper, drawing tools	
Astronomy Journal: Spacecraft	Instructional Master 6B-1, drawing tools	

Exercise	Materials	Details
Take-Home Material		
Family Letter	Instructional Masters 6B-2 and 6B-3	

History of Space Exploration and Astronauts 6A

Note: Introducing the Read-Aloud may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Introducing the Read-Aloud — *10 minutes*

What Have We Already Learned? — *5 minutes*

Review the previous read-aloud about the moon by asking students to tell you the facts they 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. Then tell students that you will review the phases of the moon by showing them Image Cards and asking them to identify which phase of the moon is represented 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), pausing after each to allow students to identify the phase.

Making Predictions About the Read-Aloud — *5 minutes*

Then read the title of today's read-aloud to students: "History of Space Exploration and Astronauts." Ask students to predict what the read-aloud will be about. Have them 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 outer space. Then ask students to predict how and when space travel might have begun, and what it was like for the first astronauts.

Vocabulary Preview *5 minutes*

Exploration

1. The title of today's read-aloud is "History of Space *Exploration* and Astronauts." [You may wish to check that students know the meaning of *history* (the past) and *space* (the place beyond Earth, where the stars and planets are) before defining *exploration.*]
2. Say *exploration* with me three times.
3. An exploration is a deep and serious study of something that is not very well known.
4. The United States began its space exploration over fifty years ago.
   The doctor needed to do further exploration to find out the cause of his sickness.
5. Would you rather go on an exploration into space or go on an exploration into the deepest parts of the ocean? Where else would you like to have an exploration?

Astronauts

Show image 6A-7: Yuri Gagarin

1. Today's read-aloud is also about *astronauts*.
2. Say the word *astronauts* with me three times.
3. Astronauts are people whose job is to travel into space. In the Greek language, *astro* means "star" and *naut* means "sail" or to travel on a boat in the sea. Astronauts are "star sailors"!
4. This is Yuri Gagarin from Russia (former Soviet Union); he is the first person and astronaut to travel into space.

Show image 6A-8: Alan Shepard

This is Alan Shepherd; he is the first American astronaut to travel into space.

5. Why do you think astronauts are called "star sailors"? Do you think being an astronaut is hard work, fun work, or both? [Tell students to listen carefully to the end of today's read-aloud to find out.]

Purpose for Listening

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

Presenting the Read-Aloud — *15 minutes*

History of Space Exploration and Astronauts

Show image 6A-1: Ladder to the moon

Ever since they first gazed up at the stars, people have always 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.

Show image 6A-2: Rockets

The Chinese invented the first **rockets**[1] hundreds of years ago using gunpowder—the same type of explosive used to fire guns and cannons. Lighting the gunpowder would **launch** the rocket[2] into the air. It was not until about one hundred years ago that scientists started to make serious advances in rocket **technology.**[3]

1 engines that power spacecraft, driving them through the air

2 lifting or pushing it forcefully

3 or started to apply the discoveries they made in rocket science.

Show image 6A-3: Newspaper about early space travel

By the 1950s,[4] rocket technology had improved to the point that people began to think seriously about space travel and exploration. 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.[5] At the time, the United States was the only other nation in the world as large or as strong as the Soviet Union.[6] The leaders of the Soviet Union and the United States each wanted to show the world that their country was the more powerful country by being the first to launch a rocket into outer space.

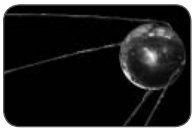
4 probably around the time your grandparents were born or just a little bit before then

5 [Point to Russia on a world map or globe.]

6 [Point to the United States on the world map or globe.]

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.[7]

Sputnik 1 was carried into space aboard a rocket and then released.[8] It orbited Earth for several months before reentering the atmosphere and burning up.[9]

After the success of Sputnik 1, the "Space Race" between the United States and the Soviet Union had begun.[10] 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.[11]

7 Some satellites teach us about space by taking photographs.

8 It didn't have an engine like a rocket, so it couldn't get into space by itself.

9 That's what happens to meteors that hit the earth's atmosphere, too.

10 It wasn't a real race with a start and finish line, but both countries wanted to be the first to go to space.

11 *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 good. The word *pride* can also refer to a group of lions.

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.[12]

12 [Point to satellite in image.]

Show image 6A-7: Yuri Gagarin

The Space Race continued at a heated pace into 1961, [13] when Soviet Yuri Gagarin 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. [14]

13 So both countries were trying hard to win for eleven years.

14 Why might he be nervous?

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.** [15] 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. [16]

15 A spacecraft is a vehicle used for traveling beyond Earth's atmosphere.

16 There's 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. [17] This photo shows the Freedom 7, Alan Shepard's ship, after his flight. Shepard is inside that little capsule! [18] 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 pick him up.

17 because you crash into the atmosphere on the way back, like meteors do

18 a small, closed space that keeps a pilot or astronaut safe when traveling or landing

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." [19] 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

19 or a person who is trained to travel into space

and launched into space in a rocket powered by thousands of gallons of powerful fuel. It can be scary and it is uncomfortable.

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.

Discussing the Read-Aloud — *15 minutes*

Comprehension Questions — 10 *minutes*

1. *Literal* When rockets launch, we usually say, "Blast off!" In the read-aloud today, you heard that the Chinese invented rockets. How did the Chinese launch these first rockets? (by lighting gunpowder; by making an explosion) Why does saying "blast off" make sense? (*blast* means explode)
2. *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 contest or competition? (The Space Race)
3. *Inferential* The Soviet Union was the first country to send an object into space: the satellite, Sputnik 1. How did they get it into space? (They launched a rocket carrying it.)
4. *Inferential* 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)
5. *Literal* What is an astronaut? (a person who travels in space)
6. *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.)

[Please continue to model the *Think Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

7. *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.)

8. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these remaining questions.]

Word Work: Launch

***5** minutes*

Show image 6A-6: Explorer launch

1. In the read-aloud you heard, "[The United States and the Soviet Union] wanted to [be] the first to *launch* a rocket into outer space."

2. Say the word *launch* with me.

3. *Launch* means to lift or push an object with force.

4. I will pretend my table is a runway when I launch my paper airplane into the air.

5. Tell me what you think of when you hear the word *launch*. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "When I hear the word *launch*, I think of . . ."]

6. What's the word we've been talking about?

Use a *Dramatization* activity for follow-up. Directions: 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!

Complete Remainder of the Lesson Later in the Day

History of Space Exploration and Astronauts 6B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Multiple Meaning Word Activity — *5 minutes*

Sentence in Context: Pride

Note: You may choose to have students hold up one or two fingers to indicate which image shows the meaning being described, or have a student walk up to the poster and point to the image being described.

1. [Show Poster 3M (Pride).] In today's read-aloud you heard, "[The U.S. and the Soviet Union] took the Space Race very seriously; it was . . . a true matter of national *pride*." Here *pride* means good feelings about yourself or others when you or they do something good. Which picture shows this?
2. A pride is also a group of lions. Which picture shows this?
3. Now with your partner, make a sentence for each meaning of *pride*. [Call on a few partner pairs to share their sentences. Have them point to the images of *pride* used in their sentences.]

Syntactic Awareness Activity — *5 minutes*

Possessive Pronouns: my, your, his, her

Note: The purpose of these syntactic 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.

There may be variations in the sentences created by your class. Allow for these variations, and restate students' sentences so that they are grammatical. If necessary, have students repeat the sentence after you.

Directions: Today we are going to learn about possessive pronouns. We use possessive pronouns to replace words that identify to whom things belong.

1. I will read a pair—or two—sentences to you. Listen carefully as I replace the name of somebody with a possessive pronoun. Tell me which words have changed. I will say each pair of sentences twice. [Whenever you see a person's name in brackets, please replace that name with the name of a student or co-teacher in your class. You may wish to place stress on the words that are being replaced.]

Possessive Pronoun	**Sentence 1**	**Sentence 2**	**Replacement**
My	[Point to yourself, and use your name as you say the sentence.] *[Ms. Gilbert's] shirt is _____.*	***My** shirt is _____.*	The pronoun ***my*** replaces [Ms. Gilbert's].
Now, you try: Work with your partner to create a sentence to describe something that belongs to you, using the pronoun ***my.*** Use this sentence starter to help you begin: *"**My** _____ is _____."*			
Your	[Address a nearby student.] *[Aida's] shirt is _____.*	***Your** shirt is _____.*	The pronoun ***your*** replaces [Aida's].
Now, you try: Work with your partner to create a sentence to describe something that belongs to your partner, using the pronoun ***your.*** Use this sentence starter to help you begin*: "**Your** _____ is _____."*			
His	[Talk about a male student.] *[Ryan's] shirt is _____.*	***His** shirt is _____.*	The pronoun ***his*** replaces [Ryan's].
Now, you try: Work with your partner to create a sentence to describe something that belongs to a boy student, using the pronoun ***his.*** Use this sentence starter to help you begin: *"**His** _____ is _____."*			
Her	[Talk about a female student.] *[Ginny's] shirt is _____.*	***Her** shirt is _____.*	The pronoun ***her*** replaces [Ginny's].
Now, you try: Work with your partner to create a sentence to describe something that belongs to a girl student, using the pronoun ***her.*** Use this sentence starter to help you begin: *"**Her** _____ is _____."*			

2. I am going to read a letter from an imaginary fifth-grader who is also learning about Astronomy. This letter contains many of the possessive pronouns we just practiced. Please stand up or raise your hand when you hear me say one of those pronouns. Remember, the possessive pronouns we just practiced are *my*, *your*, *his*, and *her*. [Acknowledge students for correctly identifying the possessive pronouns in the read-aloud.]

Dear First Graders,

Hello, my name is Josefa, and I am in fifth grade. ***My*** *fifth-grade class is studying astronomy, too, just like* ***your*** *first-grade class.* ***My*** *favorite part of learning about astronomy has been learning about astronauts. Did you know that astronaut means "star sailor"?*

[If available, show an image of Sally Ride.]

My favorite astronaut is Sally Ride; she was the first woman to travel in space. Thanks to ***her*** *hard work, she fixed 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*** *books about space, kids all over America want to be astronauts one day, too!*

What's ***your*** *favorite part of learning about astronomy?*

Happy learning,

Josefa

Vocabulary Instructional Activity — 5 *minutes*

Word Work: Technology

1. In the read-aloud you heard that about one hundred years ago, scientists started to make progress in rocket *technology*.
2. Say the word *technology* with me three times.
3. Technology is the use of science to invent useful things or to help solve problems.
4. Computers are an important kind of technology. Astronauts need to learn to use all the technology inside of the spacecraft.
5. How are computers an important kind of technology? What can we do with computers?

[Ask two or three students. If necessary, guide and/or rephrase the students' responses: "Computers are an important technology because I can _____ using a computer."]

6. What's the word we've been talking about?

Use a *Word to World* activity for follow-up. Directions: Technology is all around us. We have already talked about the computer as an important kind of technology. What are some other kinds of technology? [cell phones, airplanes, batteries, cars, DVD players, MP3 players, vacuum cleaners, etc. If time allows, have students draw a picture of a useful technology and write a sentence about it.]

Astronomy Journal: Spacecraft (Instructional Master 6B-1) 15 *minutes*

- Tell students that they will continue to write in their Astronomy Journal. Today they will design a spacecraft for astronauts to explore space. Explain that there are many different kinds of scientists involved in learning about space. Astronauts—one kind of scientist—are trained to travel in outer space. Engineers are scientists who design and build spacecraft.

Show image 6A-6: Explorer launch

- First, give each student a copy of Instructional Master 6B-1. Tell them that this is the fourth page of their Astronomy Journal. They will draw their design of a spacecraft on it.
- Next, ask students to think about what kind of features or things their spacecraft should have. Remind students that a spacecraft needs rockets to launch it into space and that it needs to be strong to endure incredible cold and heat.
- Then, have students draw their spacecraft for at least five minutes.
- Finally, have students label and/or write a sentence about their spacecraft.

- Ask students: "Which type of scientist designs spacecraft—an astronaut or an engineer?"
- If time allows, have students share their journal page in small groups or with home-language peers, sharing about the features of their spacecraft.

Take-Home Material

Family Letter

Send home Instructional Masters 6B-2 and 6B-3.

Exploration of the Moon 7

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Explain that astronomers study the moon and stars using telescopes
- ✓ Explain that the moon orbits the earth
- ✓ Explain that astronauts travel to outer space
- ✓ Describe the landing on the moon by American astronauts
- ✓ Explain the importance of the first trip to the moon

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the connection between unmanned and manned missions to the moon (RI.1.3)
- ✓ Make personal connections to the concerns the first astronauts may have felt before heading in to space, and about what they would see, do, or feel if they went to the moon as an astronaut (W.1.8)
- ✓ With assistance, categorize and organize information about what would be seen and experienced on the surface of the moon (W.1.8)
- ✓ Ask questions to clarify directions for an activity in which students are creating a sketch and written statement about what they might do, see, or feel if they went to the moon (SL.1.3)

- ✓ Describe the moon with relevant details, expressing ideas and feelings clearly (SL.1.4)
- ✓ Add drawings to descriptions of the moon to clarify the concepts (SL.1.5)
- ✓ Use possessive pronouns orally

Core Vocabulary

determined, *adj.* Having a strong feeling that you need to do something and that no one can stop you
Example: I walked fast because I was determined to get to school on time.
Variation(s): none

disaster, *n.* An accident or something that has a bad result and can cause a lot of damage
Example: The strong storm winds that blew down trees and damaged buildings was a disaster.
Variation(s): disasters

historic, *adj.* Famous or important in history
Example: The day the first man walked on the moon was a historic day.
Variation(s): none

missions, *n.* Important jobs
Example: My dad gave us all a job to do to clean up the house and said we needed to complete our missions before we could play; my mission was to collect the dirty laundry.
Variation(s): mission

nervously, *adv.* Showing feelings of being worried or afraid
Example: Marta nervously walked to the front of the classroom to give her speech.
Variation(s): none

Vocabulary Chart for Exploration of the Moon

Core Vocabulary words are in **bold**.
Multiple Meaning Word Activity word is underlined.
Vocabulary Instructional Activity words have an asterisk (*).
Suggested words to pre-teach are in *italics*.

Type of Words	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday-Speech Words
Understanding	astronaut scientist spacecraft spacesuit	**disaster** equipment ***historic*** monitored **nervously**	ladder moon television
Multiple Meaning	engine gravity ***missions*** module rocket space survey	**determined*** launched prepared surface	flag land rock step
Phrases	Apollo Program Apollo 1/4/7/11 Buzz Aldrin John F. Kennedy manned/unmanned missions Michael Collins mission control NASA Neil Armstrong rocket/command module/lunar module "That's one small step for man, one giant leap for mankind." "The Eagle has landed."	determined to succeed little room for error were glued to their	
Cognates	astronauta científico(a) gravedad ***misión*** módulo espacio	desastre equipo ***histórico(a)*** **nerviosamente** **determinado(a)*** preparado(a)	televisión

Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
Essential Background Information or Terms	chart paper, writing tools	
Vocabulary Preview: Historic, Missions	Image 7A-12; images of King Tut's tomb, Machu Picchu, early automobile (Ford Model T), early airplane (Wright flyer), early telephone (Bell's telephone and rotary phones)	You may wish to use these images to show students historic creations and findings.
	Images 7A-2, 7A-3, 7A-5	You may wish to preview the different missions with students.
Purpose for Listening		
Presenting the Read-Aloud (15 minutes)		
Exploration of the Moon		You may wish to show students additional images and videos related to Apollo 11. (See *Notes to Teacher* for a link to NASA's Apollo 11 page.)
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Determined		
 **Complete Remainder of the Lesson Later in the Day**		
Extensions (20 minutes)		
Astronomy Journal: On the Moon	Image 7A-12; Instructional Master 7B-1; drawing tools	
Domain-Related Trade Book	trade book about astronauts and space exploration	

Advance Preparation

Bring in images of historic events, creations, and findings (e.g., King Tut's tomb, Machu Picchu, Ford Model T, Wright flyer, Bell's telephone, etc.).

Make a copy of Instructional Master 7B-1 for each student. Students will create the fifth page of their Astronomy Journal.

Find a trade book about astronauts and space exploration to read aloud to the class.

Notes to Teacher

For additional information, images, and video related to the Apollo 11 mission, you may wish to refer to the following website:

http://spaceflight.nasa.gov/history/apollo/apollo11/index.html

Exploration of the Moon 7A

Introducing the Read-Aloud *10 minutes*

Essential Background Information or Terms *5 minutes*

Review the previous read-aloud about space exploration and the first astronauts. Emphasize that the first astronauts didn't land anywhere in space. They were launched into space, orbited the earth, and landed back on Earth. 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, "What is the one celestial body that is close enough to Earth to visit, and made of rock instead of gas?" (the moon) Tell students that today's read-aloud will teach them about the first astronauts ever to visit the moon.

Emphasize that traveling to the moon for the first time required astronauts to be brave. No one had ever traveled to the moon before, so nobody knew how long it would take, what the conditions would be like, or what might happen on the 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. Record student concerns. 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.

Vocabulary Preview

5 minutes

Historic

Show image 7A-12: The flag

1. In today's read-aloud we will hear about a *historic* moment in world history.
2. Say *historic* with me three times.
3. *Historic* means famous or important in history.
4. Launching the first rocket into space was a historic event in space exploration.
   What historic event do you see in this picture? (man on the moon)
5. [Show various images of historic events, findings, or creations. Ask why they are considered historic.]

Missions

1. In today's read-aloud we will hear about several space *missions*.
2. Say the word *missions* with me three times.
3. Missions are important jobs.

Show image 7A-2: Surveyor 1

4. NASA had several missions to the moon. NASA sent Surveyor 1 to the moon to find out more about the moon. No astronauts were on this spacecraft, so it was an unmanned mission. [*Unmanned* means that no man or person was on it.]

Show image 7A-3: Apollo 4 launch

Then NASA sent Apollo 4, another unmanned spacecraft, to make sure that the rockets were powerful enough to launch the spacecraft into space.

Show image 7A-5: Apollo 11 crew

Finally, NASA launched Apollo 11; three astronauts were on board, so it was a manned mission.

5. If you could be sent on any space mission, where would you like to go? What would you like to discover on your mission?

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. Additionally, tell students to listen and find out who won the Space Race to the moon.

Presenting the Read-Aloud — *15 minutes*

Exploration of the Moon

Show image 7A-1: JFK [1]

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. [2] So, 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. [3]

1 This was the president of the United States many years ago. His name is John F. Kennedy. Who is the current president of the United States?

2 They were committed to making it happen.

3 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 [4] 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. [5]

4 or study

5 This would help them answer questions about what they would discover when they landed.

Show image 7A-3: Apollo 4 launch

The Apollo Program involved many **missions.** [6] The first mission, Apollo 1, was a **disaster.** [7] The spacecraft caught on fire before they had a chance to launch it. After that, however, the Apollo scientists had better success. First, there were unmanned missions to test various rockets and systems. [8] This beautiful 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.

6 or jobs that needed to be done to accomplish what they wanted to do

7 A disaster is a sudden event that is unpleasant.

8 These missions would help answer questions about whether their spacecraft could handle the trip.

Show image 7A-4: Apollo 7 crew

Next came manned missions, [9] 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 in outer space. This photo shows the crew of the Apollo 7 mission.

9 or missions with people

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:[10] Neil Armstrong, Michael Collins, and Buzz Aldrin. This picture was taken shortly before they went on their **historic** mission.[11]

It took four days for Apollo 11 to travel the 239,000 miles from Earth to the moon.[12] During the launch, the astronauts were sitting in the very top of the rocket. Once it reached outer space, the part they were in—called the command module—broke off from the rocket and continued on toward the moon. The rocket was not needed once the ship reached outer space.[13]

10 [Point to the three astronauts in the center of this image.]

11 It was historic because it was important and many people would remember it for many years.

12 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.

13 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 on the moon. The lunar module, called the Eagle, was attached to the command module during the journey from Earth to the moon.[14]

Once they got close enough to the moon, the Eagle—the lunar module—broke off from the command module and began to descend, or go down, to the surface of the moon.[15] Two astronauts were inside the Eagle: Buzz Aldrin and Neil Armstrong.

14 In fact, the word *lunar* is used to describe anything that is related to the moon.

15 So the spacecraft had three parts: there was the rocket, the command module, and the lunar module. But only the lunar module [point to the picture] actually landed on the moon.

Show image 7A-7: Mission control[16]

Meanwhile, as the Eagle approached the surface of the moon, hundreds of scientists back at mission control were watching their computers **nervously**[17] to make sure everything went as planned. There is little room for error[18] in space travel. The NASA scientists monitored every single part of the ship, making sure every fuse and wire were working properly.

16 This is mission control, where NASA scientists on the ground talk to and help astronauts in space.

17 or worried about what might happen

18 or mistakes

Show image 7A-8: TV news broadcast

At the same time, people all over America were glued to their television sets, [19] 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. [20]

19 watching the news

20 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 man, one giant leap for mankind." What did Neil Armstrong mean? [21] 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.

21 [Pause for responses.]

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 easy it was 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.[22]

22 Can you imagine hopping up in the air and staying up there for a bit? Imagine how far you could jump!

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.[23] They had prepared the flag beforehand by inserting wires in it so that it would be firm and appear to be waving, even though there is no wind on the moon.

23 Explorers often planted flags to claim the new land for their home countries.

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.

Discussing the Read-Aloud — *15 minutes*

Comprehension Questions — 10 *minutes*

1. *Literal* You heard in today's read-aloud that President Kennedy, the president of the United States, was determined to do something within just ten years. What was he determined to do? (to send people to the moon)

2. *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)

3. You learned that the Apollo 11 spacecraft had three parts: the rocket, the command module, and the lunar module (or Eagle).
    a. *Literal* Which part launched it into space? (rocket)
    b. *Literal* Which part held the pilot who orbited the moon without landing? (command module)
    c. *Literal* Which part landed on the moon? (the lunar module, also called the Eagle)
4. *Evaluative* 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.)
5. *Inferential* In another read-aloud, you learned that gravity is a force that pulls one object to another. The moon has very little gravity. What did the low gravity mean for the astronauts when they walked on the moon? (They hopped and stayed up in the air for a few seconds.)
6. *Evaluative* 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)

[Please continue to model the *Think Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

7. *Evaluative* ***Think Pair Share:*** Neil Armstrong stepped off the ladder and said, "That's one small step for 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 minutes*

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 have a strong feeling that you need to do something and that no one can stop you.
4. I am determined to do well in school.
5. Tell about something you are determined to do before you finish first grade. 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: "Before I finish first grade, I am determined to . . . "]
6. What's the word we've been talking about?

Use a *Making Choices* activity for follow-up. Directions: Listen to the following sentences that Jason says. If you think he is determined to succeed, say, "He is determined." If you think he is not determined, say, "He is not determined."

1. Jason says, "I will keep on trying until I get it." (He is determined.)
2. Jason says, "It's too hard; forget it." (He is not determined.)
3. Jason says, "I will never give up." (He is determined.)
4. Jason says, "It doesn't matter that much to me." (He is not determined.)
5. Jason says, "I will achieve my goal." (He is determined.)

Complete Remainder of the Lesson Later in the Day

Exploration of the Moon 7B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Astronomy Journal: On the Moon (Instructional Master 7B-1) — 15 *minutes*

Show image 7A-12: The flag

- Tell students that they will continue to write in their Astronomy Journal. Today they will draw themselves pretending to be astronauts on the moon.
  - First, give each student a copy of Instructional Master 7B-1. Tell them that this is the fifth page of their Astronomy Journal. They will pretend to be astronauts on the moon.
  - Next, ask students to think about what it might be like on the moon and what kind of gear or clothing they would wear. Remind students that astronauts wear spacesuits designed to endure harsh hot and cold temperatures. Also remind students that there is very little gravity on the moon compared to Earth, so if they jump up they will not come straight down, but stay up longer and come down more slowly!
  - Then, have students draw a sketch of themselves on the moon for at least five minutes. [Remind students that a sketch is quickly drawn and does not include many colors or details.]
  - Finally, have students label and/or write a sentence about what it is like on the moon.

- Ask students: “What would happen if you jumped on the moon?”
- If time allows, have students share their journal page in small groups or with home-language peers, sharing about the sketch of themselves on the moon and comparing their drawings to see how they are the same and different.

Domain-Related Trade Book — 20 *minutes*

- Refer to the list of recommended trade books in the Introduction at the front of this Supplemental Guide, and choose one trade book about astronauts and space exploration to read aloud to the class.
- Explain to students that the person who wrote the book is called the author. Tell students the name of the author. Explain to students that the person who makes the pictures for the book is called an illustrator. Tell students the name of the illustrator. Show students where they can find this information on the cover of the book or on the title page.
- As you read, use the same strategies that you have been using when reading the read-aloud selections—pause and ask occasional questions; rapidly clarify critical vocabulary within the context of the read-aloud; etc.
- After you finish reading the trade book aloud, lead students in a discussion as to how the story or information in this book relates to the read-alouds in this domain.

The Solar System, Part I

8

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Explain that the sun is a source of energy, light, and heat
- ✓ Classify the sun as a star
- ✓ Identify Earth as a planet and our home
- ✓ Identify the earth's rotation or spin as the cause of day and night
- ✓ Explain that Earth orbits the sun
- ✓ Explain that our solar system includes the sun and the planets that orbit around it
- ✓ Indicate that there are eight planets in our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune)

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the connection between the sun and the first inner planets (RI.1.3)
- ✓ Describe an illustration of the moon and use pictures and detail in "The Solar System, Part I" to describe the read-aloud's key ideas (RI.1.7)
- ✓ Compare and contrast Mercury, Venus, Earth, and Mars (RI.1.9)
- ✓ With assistance, categorize and organize information about Mercury, Venus, Earth, and Mars (W.1.8)

- ✓ Ask and answer *what* questions orally, requiring literal recall and understanding of the details or facts from "The Solar System, Part I" (SL.1.2)
- ✓ Accurately apply the meanings of the antonyms *abundant* and *scarce* (L.1.5a)
- ✓ Prior to listening to "The Solar System, Part I," identify orally what they know and have learned about the difference between planets and stars

Core Vocabulary

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

accomplish, *v.* To get something done successfully
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; the inside of something
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 calculator that works by soaking up the rays of the sun.
Variation(s): none

unique, *adj.* One of a kind
Example: Each planet is unique.
Variation(s): none

Vocabulary Chart for The Solar System, Part I			
Core Vocabulary words are in **bold**. Multiple Meaning Word Activity word is underlined. Vocabulary Instructional Activity words have an asterisk (*). Suggested words to pre-teach are in *italics*.			
Type of Words	**Tier 3** Domain-Specific Words	**Tier 2** General Academic Words	**Tier 1** Everyday-Speech Words
Understanding	astronomer axis crater Mars Mercury rovers telescope Venus	**abundant*** **accomplish** essential **inner** **unique***	closest Earth eight first/second/third/fourth moon mostly planet sky smallest
Multiple Meaning	atmosphere orbit revolution tint	brightest major revolve rotate surface	color water
Phrases	celestial body dwarf planets NASA Roman god/goddess ***solar*** *system*	hard to spot have in common	
Cognates	astrónomo(a) cráter Marte Mercurio Telescopio Venus *sistema* ***solar***	**abundante*** esencial **único(a)*** mayor	planeta color

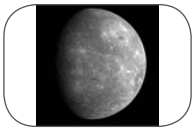
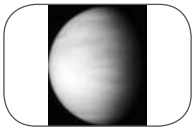
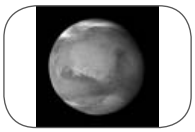
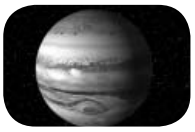
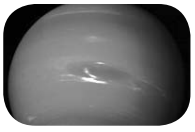
Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
What Have We Already Learned?	Image 2A-4	Refer to Lesson 2 image and content during the review.
Vocabulary Preview: Solar System	Image 8A-2	You may wish to begin the Planets Chart or Wall. (Refer to the *Extensions* activity.)
Purpose for Listening		
Presenting the Read-Aloud (15 minutes)		
The Solar System, Part I		Before introducing a planet, show its Flip Book image and pause to let students describe the planet first.
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Abundant	Image 8A-8	
 **Complete Remainder of the Lesson Later in the Day**		
Extensions (20 minutes)		
Multiple Meaning Word Activity: Color	Poster 4M (Color)	
Syntactic Awareness Activity: Possessive Pronouns—*our, their*		
Vocabulary Instructional Activity: Unique		
Planets Song	instrumental music for the song, "Oh My Darling, Clementine"	
Planets Chart	Image Cards 1 (Earth), 7 (Mercury), 8 (Venus), and 9 (Mars); chart paper, chalkboard, or whiteboard	Alternatively, you may wish to create a Planets Wall.

Advance Preparation

Bring in instrumental music for the song, "Oh My Darling, Clementine," with which students can sing the Planets Song.

Create a Planets Chart. Draw the following chart, completing the first column and adding Image Cards to the second column. After the read-aloud, you will elicit two facts from students about each planet mentioned in today's read-aloud. The chart should look like the one below.

Position and Name	*Image Card Number*		*Fact 1*	*Fact 2*
1) Mercury		*7*		
2) Venus		*8*		
3) Earth		*1*		
4) Mars		*9*		
5) Jupiter		10		
6) Saturn		*11*		
7) Uranus		*12*		
8) Neptune		*13*		

Alternatively, you may wish to designate part of a classroom wall to make a Planets Wall. Use Image 8A-2 as a guide. You may wish to use color yarn, metal wire, or ribbon to make the orbits. Attach the Image Card for each planet as they are mentioned in the read-aloud. After the read-aloud, write two facts about each planet onto index cards and attach the index cards under the Image Card of the planet.

Notes to Teacher

For additional information, images, and video related to the solar system, you may wish to refer to the following website:

http://solarsystem.nasa.gov/kids/# (click on K–4 at the top)

The Solar System, Part I

8A

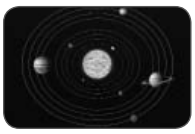
Introducing the Read-Aloud — *10 minutes*

What Have We Already Learned? — *5 minutes*

Tell students that for the next two days they will learn about several planets. Remind students that they learned that a planet is different from a star. Ask students if they remember how a planet differs from a star. (Unlike a star, a planet does not provide its own light, but revolves around a star which generates light and heat.)

Tell students that they have already learned about one planet and the star it revolves around. Ask, "Which planet and star have we already learned about?" (the earth and the sun) Then ask students if they have ever heard the names of any other planets. Tell students to turn to a neighbor and talk for thirty seconds, telling everything he or she knows about planets. Then have the partner talk for half a minute as well. Encourage pairs to share some of the ideas they discussed about planets.

Vocabulary Preview — *5 minutes*



Solar System

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

1. The next two read-alouds will be about the *solar system*.
2. Say the phrase *solar system* with me three times.
3. *Solar* means related to the sun. *System* means parts that work together to do something. The solar system is the sun and all the planets that revolve around it.
   [Note: In *The Human Body*, students learned about several body systems like their skeletal, muscular, and digestive systems.]
4. The sun is at the center of the solar system.
   Which planets do you know are part of the solar system?
   [Point out the planets on the image.]

5. Why do you think it is important that the sun is at the center of the solar system? [Suggestions: it gives off heat and light; it pulls other planets towards it so they do not drift away]

Purpose for Listening

Tell students that after the read-aloud, you will be completing 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. In this read-aloud students will hear about the inner planets closest to the sun: Mercury, Venus, Earth, and Mars.

Presenting the Read-Aloud — **15** *minutes*

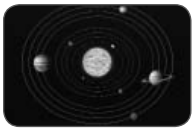
The Solar System, Part I

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.[1] 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.[2] In addition, there are a number of dwarf planets—or little planets.

1 Remember that a planet is a large celestial body that revolves around a star for light and heat.

2 The other day, you heard the word *major* and its antonym, or opposite, *minor*. What does the word *major* mean? (big or important)



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.[3]

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**.[4] The first four planets you will learn about are called the **inner** planets:[5] Mercury, Venus, Earth, and Mars. These planets are called the inner planets because they are closest to the sun.

3 So what do we call the sun and the planets that orbit it? What does the word *lunar* refer to? (the moon)

4 one of a kind and different from any other

5 or the ones near the center of the solar system

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.[6] Mercury can be seen from Earth, but it is hard to spot. You can only see it in the early morning or early evening.

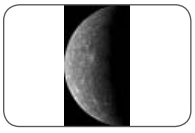
Most of the planets in the solar system are named after Roman gods and goddesses.[7] The planet Mercury is named after the Roman god Mercury. In mythology, the god Mercury was very

6 Being the smallest and closest to the sun makes Mercury unique.

7 Remember when you learned about constellations? Their names also came from Greek and Roman myths.

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.[8] Unlike Earth, Mercury does not rotate much. It spins on its axis just one and a half times during its revolution around the sun.

8 Remember that Earth takes 365 days to orbit the sun. So if Mercury only takes eighty-eight days, which planet is faster?



Show image 8A-4: Close-up of Mercury[9]

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 gotten hit by some very large meteors. In fact, some craters are about fifty miles wide.

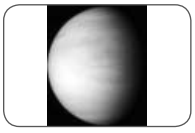
9 Describe what you see in this close-up picture of Mercury.

Mercury has no atmosphere to protect it like Earth does.[10] 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 1400 degrees Fahrenheit[11] while the surface facing away from the sun can be as low as 350 degrees below zero.[12]

10 Like they do to our moon, meteors just crash right into Mercury's surface, making the craters.

11 On Earth, we consider ninety degrees Fahrenheit to be hot.

12 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.[13]

13 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.[14]

14 Remember, Earth rotates counterclockwise. [Circle your finger in a counterclockwise direction.] So Venus rotates _____. [Circle your finger in a clockwise direction.]

Show image 8A-6: Venus viewed from Earth[15]

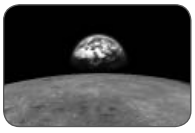
Venus is sometimes referred to as the "morning star" or the "evening star" because it often appears as a bright object in the evening sky or as a bright object in the morning sky. Venus is also known as Earth's sister planet because it is the closest planet to Earth, and the two planets are roughly the same size.[16]

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

16 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![17]

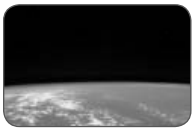
17 That's really hot! You also learned the word *atmosphere* when we first started studying astronomy. What does *atmosphere* mean? (the bubble of gas that surrounds a planet)



Show image 8A-7: Earth from moon[18]

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.

18 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).

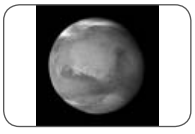


Show image 8A-8: Earth's surface

One of the most important factors that sets Earth apart from other planets is the **abundant** supply of water.[19] 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.[20]

19 That means there is more than enough or plenty of water.

20 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

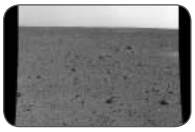
Mars is the fourth planet from the sun. Mars is named after the Roman god of war. Mars is often referred to as the Red Planet because of its color.[21] You can see Mars from Earth, and even without a telescope you can identify it by its reddish tint.

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.

21 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. The word *color* can also mean to draw or fill in a picture with crayons, markers, or pencils.

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.[22] 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.[23]

22 or achieve this goal

23 Mars is also unique because it is a celestial body we might be able to visit one day.

Discussing the Read-Aloud — **15** *minutes*

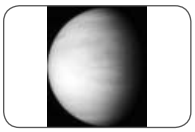
Comprehension Questions — **10** *minutes*

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? What do all the planets do that is the same? (They orbit the sun.)

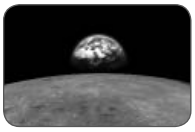
Show image 8A-3: Mercury

3. *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)



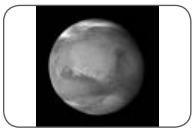
Show image 8A-5: Venus

5. *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)



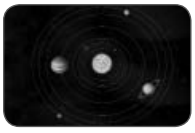
Show image 8A-7: Earth from moon

6. *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

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



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

8. Ask the following questions:

   - *Inferential* 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.)

   - *Inferential* 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.)

- *Inferential* Which planet takes the shortest time to go around the sun? (Mercury)
- *Inferential* Which planet do you think takes the longest time to go around the sun? [Point to the outer planets in succession until students identify the outermost one.]

[Please continue to model the *Question? Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

9. *What? Pair Share:* Asking questions after a read-aloud is one way to see how much everyone has learned. We learned about four planets today: Mercury, Venus, Earth, and Mars. 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 is the name of the planet with a lot of water?" 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: Abundant *5 minutes*

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 lot of it; more than enough.
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. Directions: You know that *abundant* means having more than enough of something, or having a lot 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 a lot, say, "That is abundant." If I describe an amount that is very little, say, "That is scarce."

1. the amount of stars in the sky (That is abundant.)
2. the amount of rain in the desert (That is scarce.)
3. the amount of light from the sun (That is abundant.)
4. the amount of grains of sand on the beach (That is abundant.)
5. the amount of the moon you can see when it is a crescent moon (That is scarce.)

Complete Remainder of the Lesson Later in the Day

The Solar System, Part I

8B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Multiple Meaning Word Activity — *5 minutes*

Definition Detective: Color

Note: You may choose to have students hold up one or two fingers to indicate which image shows the meaning being described, or have a student walk up to the poster and point to the image being described.

1. In the read-aloud you heard the word *color* in this sentence: "Mars is often [called] the Red Planet because of its *color*."
2. With your partner, think of as many meanings for *color* as you can, or discuss ways you can use the word *color*.
3. [Show Poster 4M (Color).] Point to the picture on the poster that shows how the word *color* is used to mean separate colors like red, orange, yellow and blue.
4. *Color* can also mean to draw or fill in a picture using crayons, markers, or color pencils. Which picture shows this?
5. Did you or your partner think of either of these definitions or uses of *color*?
6. Now with your partner, make a sentence for each meaning of *color*. [Call on a few partner pairs to share their sentences. Have them point to the images of *color* used in their sentences.]

Syntactic Awareness Activity

5 minutes

Possessive Pronouns: our, their

Note: The purpose of these syntactic 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. There may be variations in the sentences created by your class. Allow for these variations, and restate students' sentences so that they are grammatical. If necessary, have students repeat the sentence after you.

Directions: Today we are going to learn about more possessive pronouns. We use possessive pronouns to replace words that identify to whom things belong.

1. I will read a pair—or two—sentences to you. Listen carefully as I replace the name of a person with a possessive pronoun. Tell me which words have changed. I will say each pair of sentences twice. [Whenever you see a person's name in brackets, please replace that name with the name of a student or co-teacher in your class. You may wish to place stress on the words that are being replaced.]

Possessive Pronoun	**Sentence 1**	**Sentence 2**	**Replacement**
Our	[Gesture to yourself and to the rest of the class.] *[Ms. Gilbert's, Aida's, and Ryan's] class is learning about _____.*	***Our** class is learning about _____.*	The pronoun ***our*** replaces [Ms. Gilbert's, Aida's, and Ryan's].
Now, you try: Work with your partner to create a sentence to describe something that belongs to both you and your partner, using the pronoun ***our.*** Use this sentence starter to help you begin: *"**Our** _____ is/are _____."*			
Their	[Talk about a partner pair in the classroom.] *[Aida's and Ryan's] books are _____.*	***Their** books are _____.*	The pronoun ***their*** replaces [Aida's and Ryan's].
Now, you try: Work with your partner to create a sentence to describe something that belongs to another partner pair, using the pronoun ***their.*** Use this sentence starter to help you begin: ***"Their** _____ are _____."*			

2. I am going to read a letter that I have written back to the imaginary fifth grader, Josefa. Do you remember what her class is also learning about? Her class is also learning about astronomy. Our letter will have many of the possessive pronouns we just practiced. Please stand up or raise your hand when you hear me say one of those pronouns. Remember, we have learned *my*, *your*, *his*, *her*, *our*, and *their*. [Acknowledge students for correctly identifying the possessive pronouns in the read-aloud. To make this activity more challenging, you may wish to pause and have students supply the correct pronoun.]

Dear Josefa,

***Our** class is learning about astronomy, too, just like **your** class! Thank you for sharing about **your** favorite astronaut, Sally Ride. We hope that **our** teacher will read one of **her** books to us.*

*We also learned about astronauts like Neil Armstrong, Michael Collins, and Buzz Aldrin. **Their** spacecraft was called Apollo 11. **Their** mission was to go to the moon. Did you know that Neil Armstrong was the first man to walk on the moon? **His** famous quote is, "That's one small step for man, one giant leap for mankind."*

*Now **our** class is learning about the solar system. What is **your** class learning about?*

Happy learning,

[Ms. Gilbert's] class

Vocabulary Instructional Activity — 5 minutes

Word Work: Unique

1. In the read-aloud you heard that each planet is *unique*.
2. Say the word *unique* with me three times.
3. *Unique* means one of a kind. Something that is unique is unusual and special; there is nothing else like it.
4. Earth is unique because it is mostly covered with water.
5. How else do you think our Earth is unique?

[Ask two or three students. If necessary, guide and/or rephrase the students' responses: "Our Earth is unique because . . ."]

6. What's the word we've been talking about?

Use a *Synonyms and Antonyms* activity for follow-up. Directions: What are other words that have a similar meaning to unique? (special, rare, uncommon, extraordinary, weird, strange)

What words have an opposite meaning of *unique*? (common, normal, ordinary, usual, regular)

Planets Song — 10 *minutes*

Teach students the following solar system song to help them remember the planets learned thus far, 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.

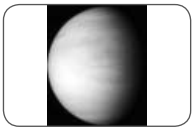
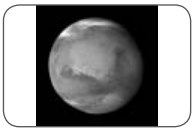
Fourth is Mars, a rusty sight.

Planets Chart — 10 *minutes*

Tell students that together you will be making 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.

On chart paper, a chalkboard, or a whiteboard, draw the following chart, completing the first column and adding Image Cards to

the second column. Elicit two facts from students about each planet, and add them 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.

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

The Solar System, Part II 9

☑ *Lesson Objectives*

Core Content Objectives

Students will:

- ✓ Identify the earth's rotation or spin as the cause of day and night
- ✓ Explain that Earth orbits the sun
- ✓ Explain that our solar system includes the sun and the planets that orbit around it
- ✓ Indicate that there are eight planets in our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune)
- ✓ Classify Pluto as a dwarf planet

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the connection between the sun and the reason the last four planets are referred to as the outer planets (RI.1.3)
- ✓ With assistance, categorize and organize information about the eight planets (W.1.8)
- ✓ Describe what is unique about each of the eight planets with relevant details, expressing ideas and feelings clearly (SL.1.4)
- ✓ Prior to listening to "The Solar System, Part II," identify orally what they know about the four inner planets

Core Vocabulary

categorize, *v.* Sort or 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

debris, *n.* The pieces left over when something is destroyed or broken; trash
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

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

probes, *n.* Tools designed to collect information in outer space and send it back to Earth
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

Core Vocabulary words are in **bold**.
Multiple Meaning Word Activity word is underlined.
Vocabulary Instructional Activity words have an asterisk (*).
Suggested words to pre-teach are in *italics*.

Type of Words	Tier 3 Domain-Specific Words	Tier 2 General Academic Words	Tier 1 Everyday-Speech Words
Understanding	astronomer axis **debris** Europa Jupiter mythology Neptune Pluto Saturn telescope Uranus	**categorize*** explore inner/**outer** substances **violent** visible	billion coldest fifth/sixth/seventh/ eighth ice mile moon planet
Multiple Meaning	atmosphere gas orbit **probes** storm	complete major	rings spot
Phrases	dwarf planet solar system	the naked eye outer reaches	
Cognates	astrónomo(a) Júpiter Mitología Neptuno Saturno telescopio Urano atmósfera órbita	**categorizer*** explorar sustancia violento(a) visible completer mayor	billón milla planeta

Note: Introducing the Read-Aloud and Extensions may have activity options that exceed the time allocated for that part of the lesson. To remain within the time periods allocated for each portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Exercise	Materials	Details
Introducing the Read-Aloud (10 minutes)		
What Have We Already Learned?	Image 9A-1; Planets Chart	Use image 9A-1 to review inner planets.
Purpose for Listening	Image 9A-1	Use image 9A-1 to preview outer planets.
Presenting the Read-Aloud (15 minutes)		
The Solar System, Part II		Before introducing a planet, show its Flip Book image and pause to let students describe the planet first.
Discussing the Read-Aloud (15 minutes)		
Comprehension Questions		
Word Work: Categorize	buttons, marbles, or counters that are different sizes and colors	Have students put items into categories.
 **Complete Remainder of the Lesson Later in the Day**		
Extensions (20 minutes)		
Planets Song	instrumental music for the song, "Oh My Darling, Clementine"	
Planets Chart	Image Cards 10 (Jupiter), 11 (Saturn), 12 (Uranus), and 13 (Neptune)	Alternatively, you may wish to add these Image Cards onto the Planets Wall.
The Solar System	Instructional Master 9B-1	
Domain-Related Trade Book	trade book about the solar system and planets	

Advance Preparation

Make a copy of Instructional Master 9B-1 for each student. Students will answer a few questions about the solar system.

Bring in instrumental music for the song, "Oh My Darling, Clementine," with which students can sing the Planets Song.

Bring in a trade book about the solar system and planets to read aloud to the class.

The Solar System, Part II

9A

Introducing the Read-Aloud — *10 minutes*

What Have We Already Learned? — 10 *minutes*

Ask students, "What are the names of the four planets you learned about in the last read-aloud?" (Mercury, Venus, Earth, and Mars)

Sing with students the following solar system song to help them review the first four major planets discussed in yesterday's read-aloud, and one fact about each planet. 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.

Continue the review by rereading the Planets Chart that was developed in the previous lesson. Ask, "Why are these planets called the inner planets?" (they are closest to the sun) 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.

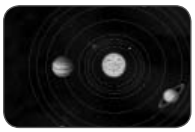
Ask students if they have heard of any additional planets besides the ones they learned about in the previous read-aloud. Then ask students to predict where the outer planets might be located

and what they might be like. Ask students how they might be different from the inner planets they learned about in the previous read-aloud.

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. In this read-aloud, students will hear about the outer planets that are farthest away from the sun: Jupiter, Saturn, Uranus, and Neptune.

Presenting the Read-Aloud — **15** *minutes*



The Solar System, Part II

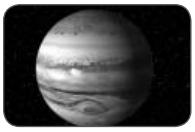
Show image 9A-1: Solar system diagram

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, and Neptune, as well as the famous dwarf planet, Pluto. [1]

1 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. [2]

2 You learned about gases when we began our study of astronomy. What are gases?



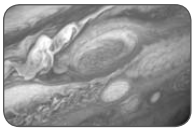
Show image 9A-2: Jupiter

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. [3] Jupiter is so big that you could stuff about 1300 planet Earths inside of it.

3 Being the largest planet makes Jupiter unique.

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,** [4] stormy place.

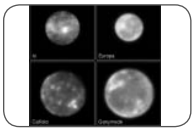
4 a dangerously rough



Show image 9A-3: Red spot

The best-known feature on Jupiter is its large, red spot. This spot is actually a massive storm. [5] 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.

5 This stormy, red spot makes Jupiter unique, and it helps us remember what the planet looks like.



Show image 9A-4: Jupiter's moons

There are at least sixty-three moons in orbit around Jupiter.[6] 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.[7]

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.[8]

6 How many moons do you see from Earth? Jupiter has sixty-three moons going around it!

7 [Point to Europa.]

8 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.[9] 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.[10] 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.

9 Its rings make Saturn unique and easy to recognize.

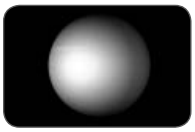
10 These layers and clouds are part of the planet. Remember, outer planets are made of gases. What are inner planets made of?

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**[11] 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 the year, and with an ordinary telescope you can see the rings.

11 or broken pieces



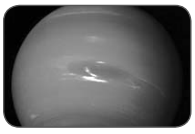
Show image 9A-7: Uranus

The seventh planet, Uranus, has the coldest atmosphere of any planet in the solar system.[12] Because it is so far from the sun, it takes Uranus eighty-four Earth years to make one complete orbit. Uranus is made of hydrogen, but its atmosphere also contains a lot of ice and other substances not found 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.

12 Its cold atmosphere makes Uranus unique.

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.[13]

13 Lying on its side makes Uranus unique.



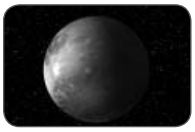
Show image 9A-8: Neptune

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.[14] 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.[15]

14 Its blue color and its distance from the sun make Neptune unique. What was the red planet you heard about yesterday? (Mars)

15 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. [16]

16 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. Nitrogen is a type of gas. 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. [17]

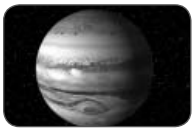
17 What do probes do?

Discussing the Read-Aloud — *15 minutes*

Comprehension Questions — 10 *minutes*

1. *Inferential* In the previous read-aloud, you learned that there are four inner planets, closest to the sun: Mercury, Venus, Earth, and Mars. In this read-aloud, we learned that Jupiter, Saturn, Uranus, and Neptune are outer planets. What makes them outer planets? (They are farthest away from the sun, on the outside borders of the solar system.)

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

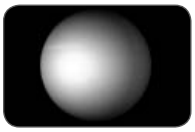


Show image 9A-2: Jupiter

3. *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)

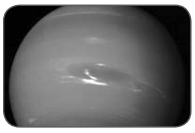
Show image 9A-5: Saturn

4. *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

5. *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

6. *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)

[Please continue to model the *Think Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

7. *Evaluative* ***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 minutes*

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?

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." Directions: 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 yesterday 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."]

Complete Remainder of the Lesson Later in the Day

The Solar System, Part II

9B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Planets Song — 10 *minutes*

Sing with students the first two verses, and teach them the last two verses of the solar system song about all the planets, 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.

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.

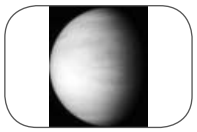
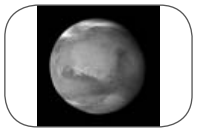
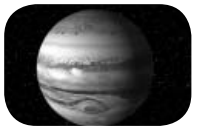
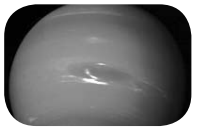
I know all about the planets

But the _____'s my favorite one.

Planets Chart — 10 *minutes*

Tell students that today you will be completing the chart of the planets in our solar system. Remind students that you have already written down facts for the first four planets: Mercury, Venus, Earth, and Mars. Today you will write facts for the rest of the planets in the solar system.

On the chart from yesterday, add rows for the final four planets in the solar system. Point out that these four are known as the outer planets. Complete the first column, and add Image Cards to the second column. Elicit two facts from students about each planet, and add them 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 as follows:

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

The Solar System (Instructional Master 9B-1) **10** *minutes*

Give each student a copy of Instructional Master 9B-1. Explain that this is a worksheet 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.

Domain-Related Trade Book 20 *minutes*

- Refer to the list of recommended trade books in the Introduction at the front of this *Supplemental Guide*, and choose one trade book about the solar system and planets to read aloud to the class.
- Explain to students that the person who wrote the book is called the author. Tell students the name of the author. Explain to students that the person who makes the pictures for the book is called an illustrator. Tell students the name of the illustrator. Show students where they can find this information on the cover of the book or on the title page.
- As you read, use the same strategies that you have been using when reading the read-aloud selections—pause and ask occasional questions; rapidly clarify critical vocabulary within the context of the read-aloud; etc.
- After you finish reading the trade book aloud, lead students in a discussion as to how the story or information in this book relates to the read-alouds in this domain.

Domain Review

DR

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 Addressed in This Domain

Students will:

- ✓ Recognize the sun in the sky
- ✓ 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 Earth as a planet and our home
- ✓ Identify the earth's rotation, or spin, as the cause of day and night
- ✓ Explain that other parts of the world experience nighttime while we have daytime
- ✓ Explain sunrise and sunset
- ✓ Describe stars as large, although they appear small in the night sky
- ✓ Describe stars as hot, distant, and made of gas
- ✓ Explain that astronomers study the moon and stars using telescopes
- ✓ Describe how people sometimes tell stories about the moon and stars
- ✓ Explain what a constellation is
- ✓ Identify the Big Dipper and the North Star
- ✓ Identify the four phases of the moon—new, crescent, half, full
- ✓ Explain that the moon orbits the earth

- ✓ Explain that astronauts travel to outer space
- ✓ Describe the landing on the moon by American astronauts
- ✓ Explain the importance of the first trip to the moon
- ✓ Explain that our solar system includes the sun and the planets that orbit around it
- ✓ Indicate that there are eight planets in our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune)
- ✓ Classify Pluto as a dwarf planet

Review Activities

Image Review

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

Image Card Review

Materials: Planet 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 what 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: [Create more of your own riddles. Use Image Cards whenever applicable.]

- 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)

Domain Assessment

DA

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 (Instructional Master DA-1)

Directions: I am going to say a sentence using a word you have heard in the read-alouds. First I will say the word, and then I will use it in a sentence. If I use the word correctly in my sentence, circle the smiling face. If I do not use the word correctly in my sentence, circle the frowning face. I will say each sentence two times. Let's do number one together.

1. **Atmosphere:** The earth's atmosphere is where the moon and stars are located. (frowning face)
2. **Gravity:** When you throw a ball into the air, the earth's gravity brings it back to the ground. (smiling face)
3. **Orbit:** The earth travels in an orbit around the sun. (smiling face)
4. **Planet:** A planet is a large object that makes its own light and heat. (frowning face)
5. **Telescopes:** Scientists use telescopes to look at stars and planets in outer space. (smiling face)
6. **Meteor:** A meteor is a star in outer space. (frowning face)

7. **Constellations:** If you look up in the night sky, you might see constellations, or groups of stars, that look like pictures. (smiling face)
8. **Astronaut:** An astronaut is someone who travels in outer space. (smiling face)
9. **Astronomer:** An astronomer is a scientist who studies stars and other things in outer space. (smiling face)
10. **Solar:** Things associated with the moon are called solar. (frowning face)

Directions: I am going to read more sentences using other words you have heard in the read-alouds. If I use the word correctly in my sentence, circle the smiling face. If I do not use the word correctly in my sentence, circle the frowning face. I will say each sentence two times.

11. **Ancient:** Ancient means new. (frowning face)
12. **Technology:** Computers, robots, and rocketship are examples of technology. (smiling face)
13. **Determined:** Someone who is determined will try very hard to reach his or her goal. (smiling face)
14. **Categorize:** To categorize things means to put them into groups according to their size, shape, or color. (smiling face)
15. **Major:** *Major* means small or unimportant. (frowning face)

Part II (Instructional Master DA-2)

Directions: Listen to the following sentences about celestial bodies. Next to the number of the sentence I read, you will notice four names. You will notice that the first three names are always the same. Let's read them together: "sun, moon, Earth." You will also notice that the last name is usually different. I will read the four choices to you after I read each sentence. Circle the name of the appropriate object my sentence is about:

1. I am the source of light and heat for the whole solar system. (sun)
2. I am the planet on which you live. (Earth)

3. I revolve around the earth. (moon)
4. I am known as the "Red Planet," and am the fourth planet from the sun. (Mars)
5. I am the largest planet and have a big red spot, which is actually a storm. (Jupiter)
6. I am a star. (sun)
7. I was visited by astronauts from Earth. (moon)
8. I am the smallest planet and closest to the sun. (Mercury)
9. I am the planet with big, beautiful rings. (Saturn)
10. I am a planet with enough water and oxygen to support life. (Earth)
11. I am the star that allows life to survive on Earth. (sun)
12. People call me Earth's sister planet and the brightest planet; people call me the "morning" or "evening star." (Venus)
13. My axis is sideways, and I rotate on my side. (Uranus)
14. I am a blue planet and the farthest from the sun. (Neptune)
15. I have phases: new, crescent, half, and full. (moon)

Part III (Instructional Master DA-3)

Directions: Make the cover page for your Astronomy Journal. Draw a picture of your favorite topic from the *Astronomy* domain. Write one sentence about your favorite topic.

Culminating Activities

CA

Please use this final day to address class results of the Domain Assessment. Based on the results of the Domain Assessment and students' Tens scores, 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 below in order to provide students with opportunities to enliven their experiences with domain concepts.

Remediation

You may choose to regroup students according to particular areas of weakness, as indicated from Domain Assessment results and students' Tens scores.

Remediation opportunities include the following:

- targeting Review Activities
- revisiting lesson Extensions
- rereading and discussing select read-alouds

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 Introduction. You may also choose to have students select a read-aloud to be heard again.

Exploring Student Resources

Materials: Domain-related student websites

Pick appropriate websites from the Internet for further exploration of the solar system.

Videos related to Astronomy

Materials: Videos related to space exploration and the solar system

Carefully peruse the Internet for short (5-minute), age-appropriate videos related to space exploration and the solar system.

Prepare some questions related to the content presented in the videos.

Discuss how watching a video is the same as and different from listening to a storybook or read-aloud.

Have students ask and answer questions using question words *who, what, when, where,* and *why* regarding what they see in the videos.

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

New 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. Explain, however, that many popular mnemonics were written when Pluto was still considered a planet. One example is, "My Very Educated Mother Just Served Us Nine Pizzas." 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

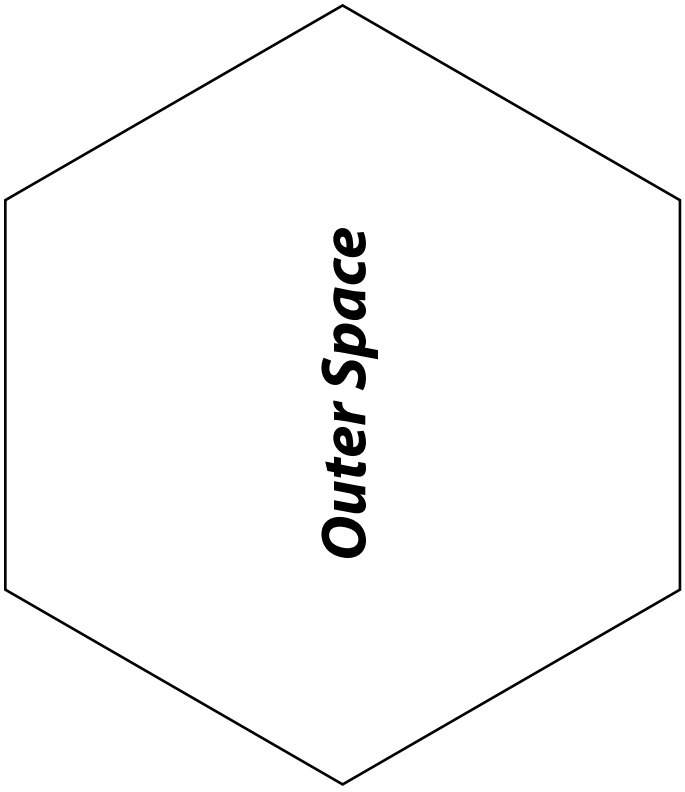
Have students pretend that they were one of the first astronauts who traveled to space or to the moon, or that they were one of the hundreds of scientists at mission control. Ask students to describe what they saw and heard. For example, for the first walk on the moon, students may talk about the four 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.

For Teacher Reference Only:

Instructional Masters for
Astronomy

1A-1

Name _____



1A-2

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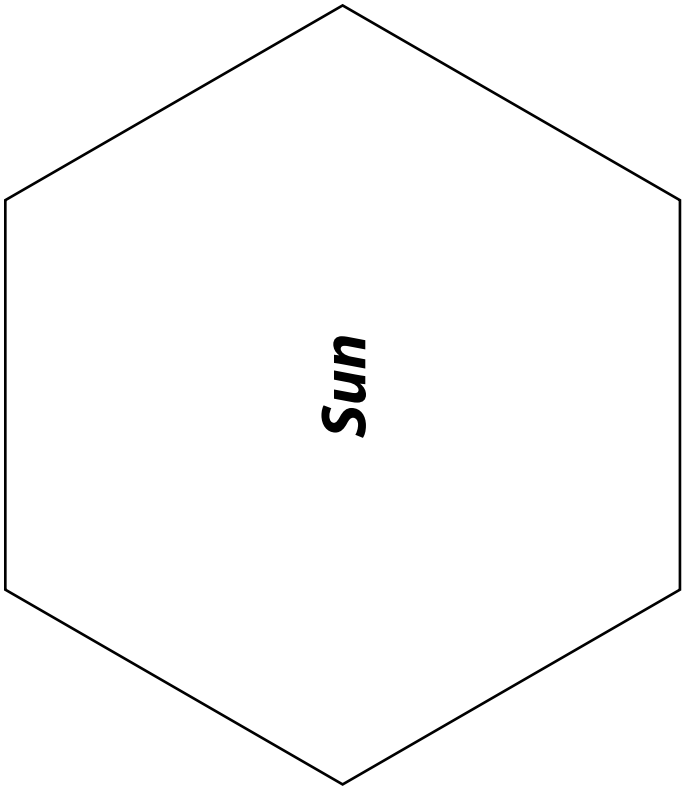

1B-1

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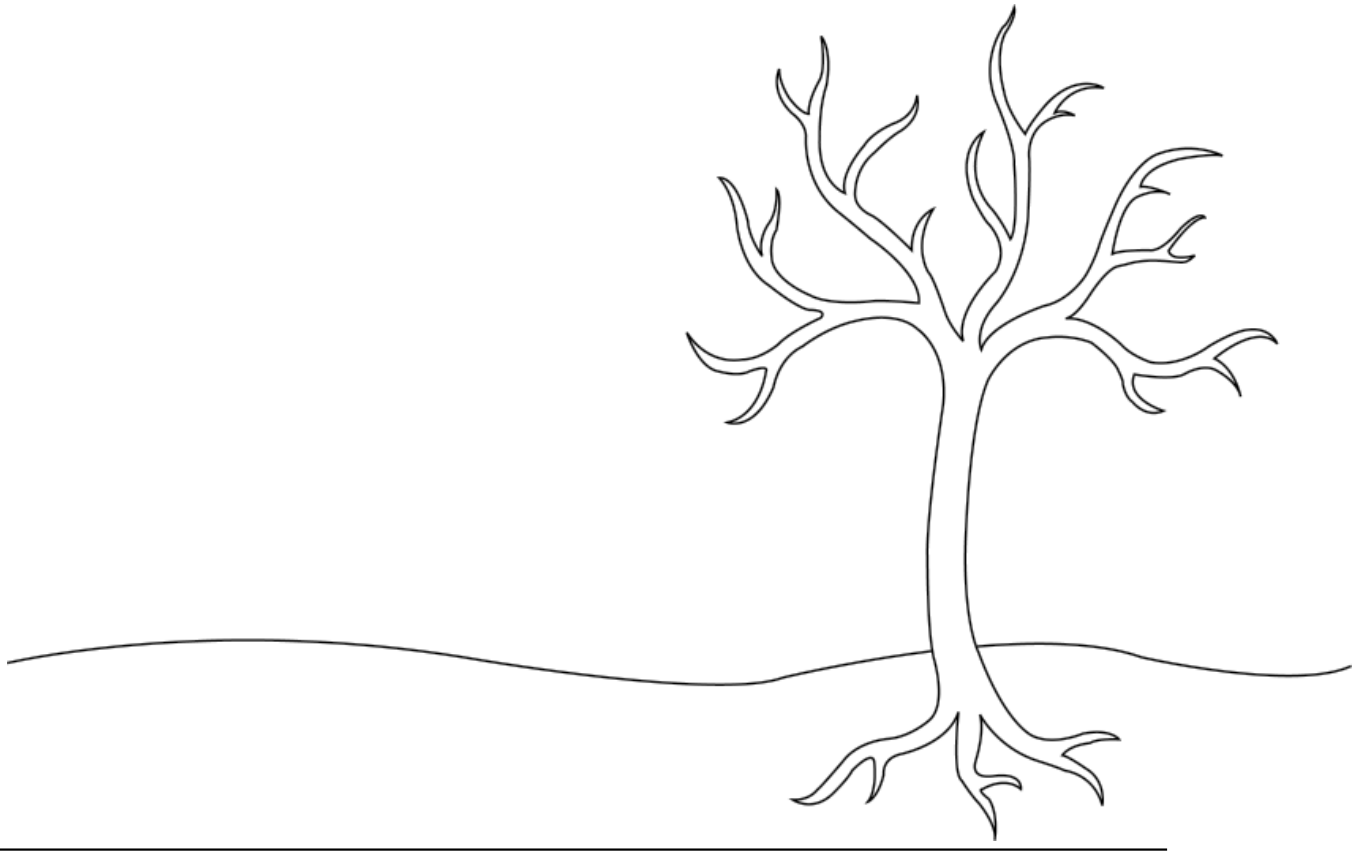


1

1B-2

Dear Family Member,

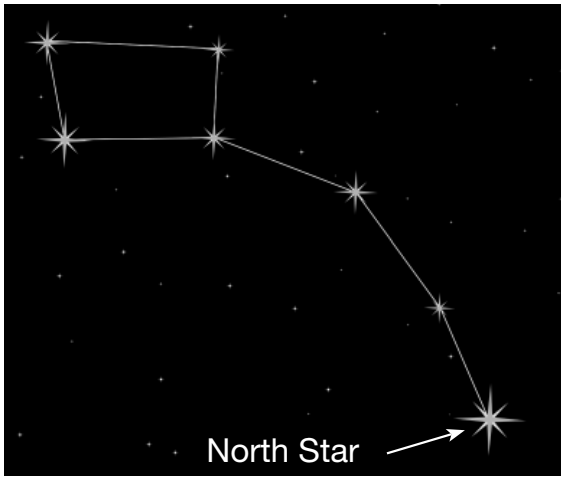
Over the next few weeks, your child will be learning about astronomy. Your child will learn about the sun, the moon, the stars, and the eight planets in our solar system. The most powerful way you can help support your child's learning about astronomy is to take him or her outside to observe the sky. Below are some suggestions for ways you can make his/her study of astronomy even more meaningful and fun.

1. Earth's Star: The Sun

Your child will learn that the sun is actually a star in outer space that supports life on Earth. S/he will learn that even though it looks like the sun moves across the sky each day, it is actually the earth spinning on its axis that causes day and night. Invite your child to write a short rhyming poem about the sun. Encourage the use of words that rhyme with *sun, hot, star, bright*.

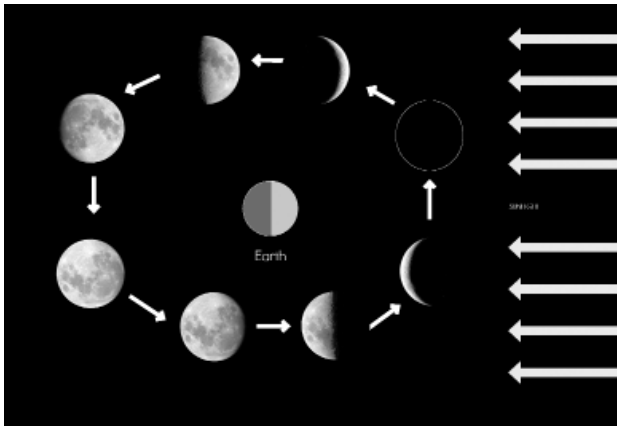
2. Stargazing

In a few days your child will learn about the stars and the constellations. Constellations are groups of stars that look like they form a picture. If possible, take your child out in the evening to observe the stars. The Big and Little Dipper are part of the Big Bear constellation. S/he will learn to recognize the dippers and Polaris (the North Star).



3. Phases of the Moon

Your child will learn about the moon and how it orbits the earth, reflecting the sun's light. S/he will also learn to recognize its four phases: the new moon, the crescent moon, the half moon, and the full moon. Look for the moon every few days, and talk with your child about how much of it is visible in the sky.



4. Read Aloud Each Day

It is very important that you read to your child each day. I have attached a list of books relevant to astronomy to this letter.

Be sure to let your child know how much you enjoy hearing about what s/he has been learning at school.

Recommended Trade Books for Astronomy

1. *Astronomy* (DK Eyewitness Books), by Kristin Lippincott (DK Children, 2008) ISBN 978-0756637675
2. *Exploring the Solar System,* by Mary Kay Carson (Chicago Review Press, 2008) ISBN 978-1556527159
3. *Find the Constellations*, by H. A. Rey (Houghton Mifflin Books for Children, 2008) ISBN 978-0547131788
4. *Find Out About Astronomy,* by Robin Kerrod (Armadillo, 2012) ISBN 978-1843228684
5. *The Magic School Bus: Lost in the Solar System*, by Joanna Cole and illustrated by Bruce Degen (Scholastic Inc., 1992) ISBN 978-0590414296
6. *Midnight on the Moon (Magic Tree House, No. 8)*, by Mary Pope Osborne and Sal Murdocca (Random House Books for Young Readers, 1996) ISBN 978-0679863748
7. *The Moon Seems to Change*, by Franklyn M. Branley and illustrated by Barbara and Ed Emberley (HarperCollins, 1987) ISBN 978-0064450652
8. *National Geographic Readers: Planets,* by Elizabeth Carney (National Geographic Children's Books, 2012) ISBN 978-1426310362
9. *National Geographic Little Kids First Big Book of Space,* by Catherine D. Hughes and illustrated by David A. Aguilar (National Geographic Children's Books, 2012) ISBN 978-1426310140
10. *Once Upon a Starry Night: A Book of Constellations*, by Jacqueline Mitton and illustrated by Christina Balit (National

Geographic Children's Books, 2009) ISBN 978-1426303913 (**Note:** This book's beautiful illustrations can help students imagine what the constellations look like when they look up at the stars. The myths/text, however, is not recommended for first grade.)

11. *Our Solar System*, by Seymour Simon (Collins, 2007) ISBN 978-0061140082
12. *Planets: A Solar System Stickerbook*, by Ellen Hasbrouck and illustrated by Scott McDougall (Little Simon, 2001) ISBN 978-0689844140
13. *Stargazers*, by Gail Gibbons (Holiday House, 1999) ISBN 978-0823415076
14. *Starry Sky,* by Kate Hayden (DK Children, 2006) ISBN 978-0756619596
15. *Sun Up, Sun Down,* by Gail Gibbons (Voyager Books, 1987) ISBN 978-0152827823
16. *What Makes Day and Night*, by Franklyn M. Branley and illustrated by Arthur Dorros (HarperCollins, 1986) ISBN 978-0064450508
17. *Wynken, Blynken, and Nod*, by Eugene W. Field and illustrated by Giselle Potter (Schwartz & Wade, 2008) ISBN 978-0375841965

Note: Please remember to tell your child that not very long ago, students in school were taught that there were nine planets in the solar system, including Pluto. However, in 2006, astronomers decided to categorize Pluto as a dwarf planet, so there are now eight major planets. If you choose additional books to read aloud, be sure to include the phrase *dwarf planet* when referring to Pluto. Remember also that there are still many excellent astronomy books in print that erroneously classify Pluto as a planet, but are otherwise informative trade books.

1B-3

Name _____

Vocabulary List for Astronomy (Part 1)

This list includes many important words your child will learn about in *Astronomy*. Try to use these words with your child in English and in your native language. Next to this list are suggestions of fun ways your child can practice and use these words at home.

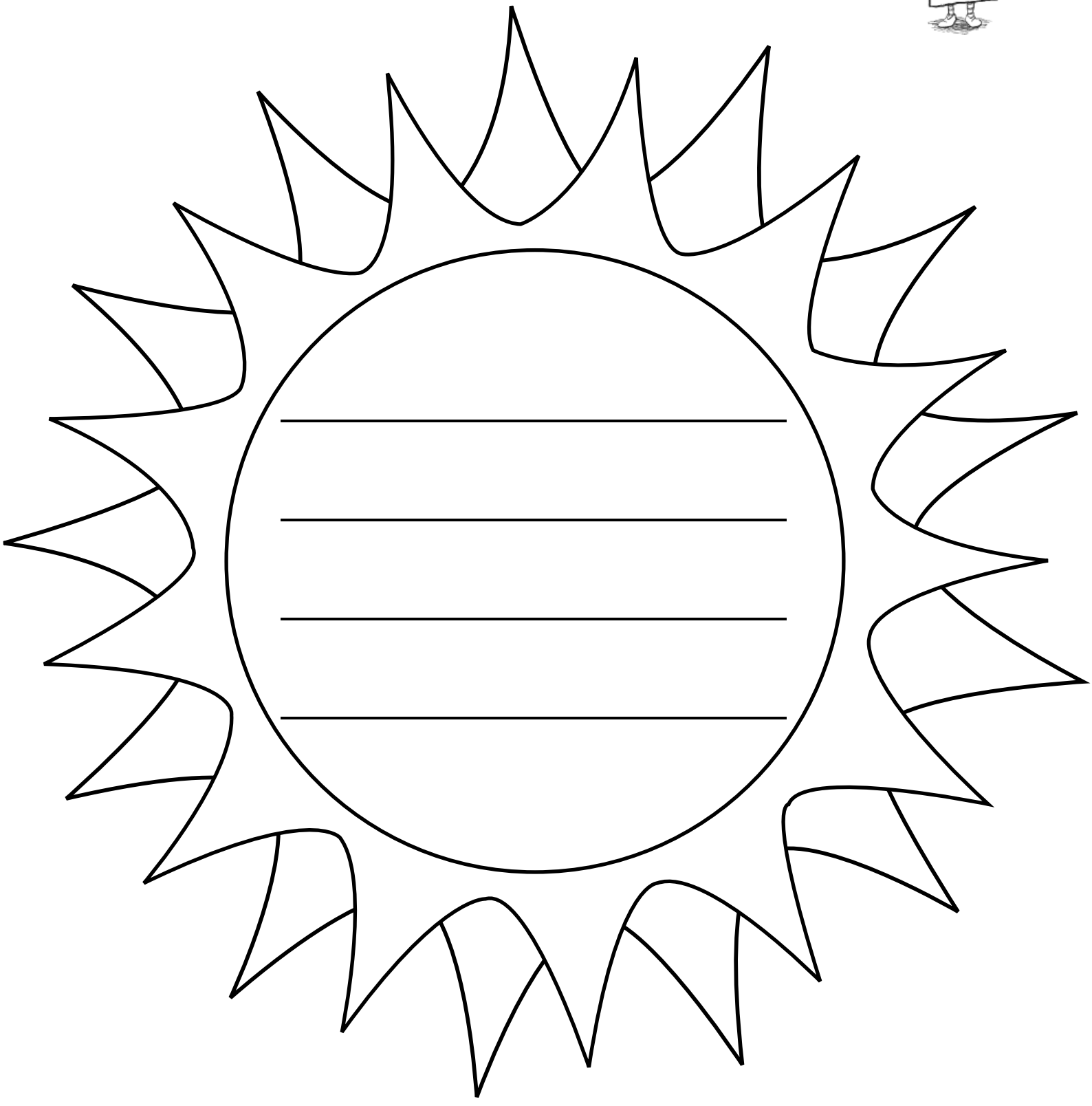
- ❑ atmosphere
- ❑ gas
- ❑ shadow
- ❑ gravity
- ❑ horizon
- ❑ orbit
- ❑ rotates
- ❑ dusk
- ❑ meteor
- ❑ telescope
- ❑ universe
- ❑ celestial bodies
- ❑ constellations
- ❑ counterclockwise
- ❑ craters

Directions: Help your child pick a word from the vocabulary list. Then help your child choose an activity and do the activity with the word. Check off the box for the word. Try to practice a word a day in English and in your native language.

	**Draw it**
	**Use it in a sentence**
	**Find one or two examples**
	**Tell a friend about it**
	**Act it out**
	**Make up a song using it**

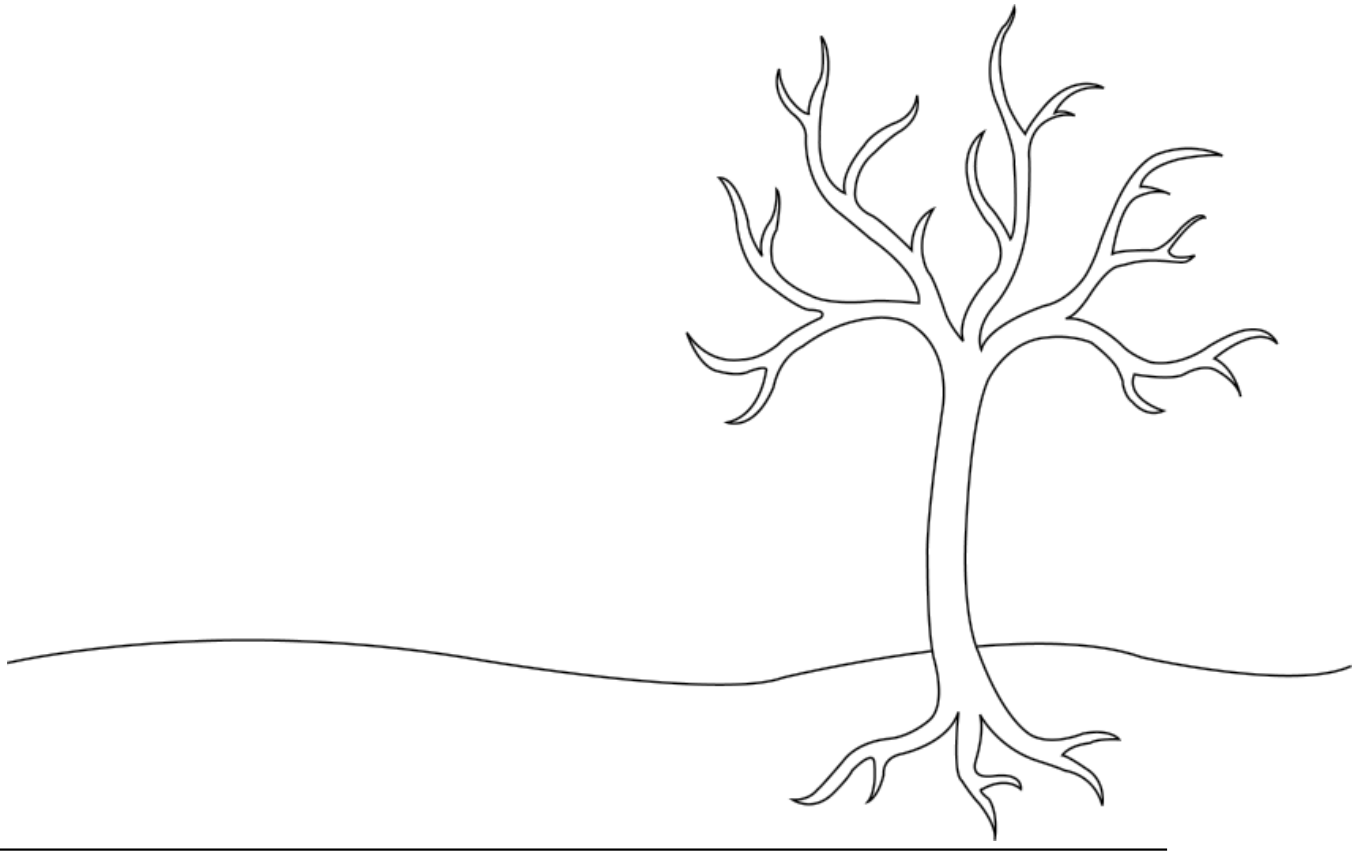
1B-4

Name _____



3B-1

Name _____

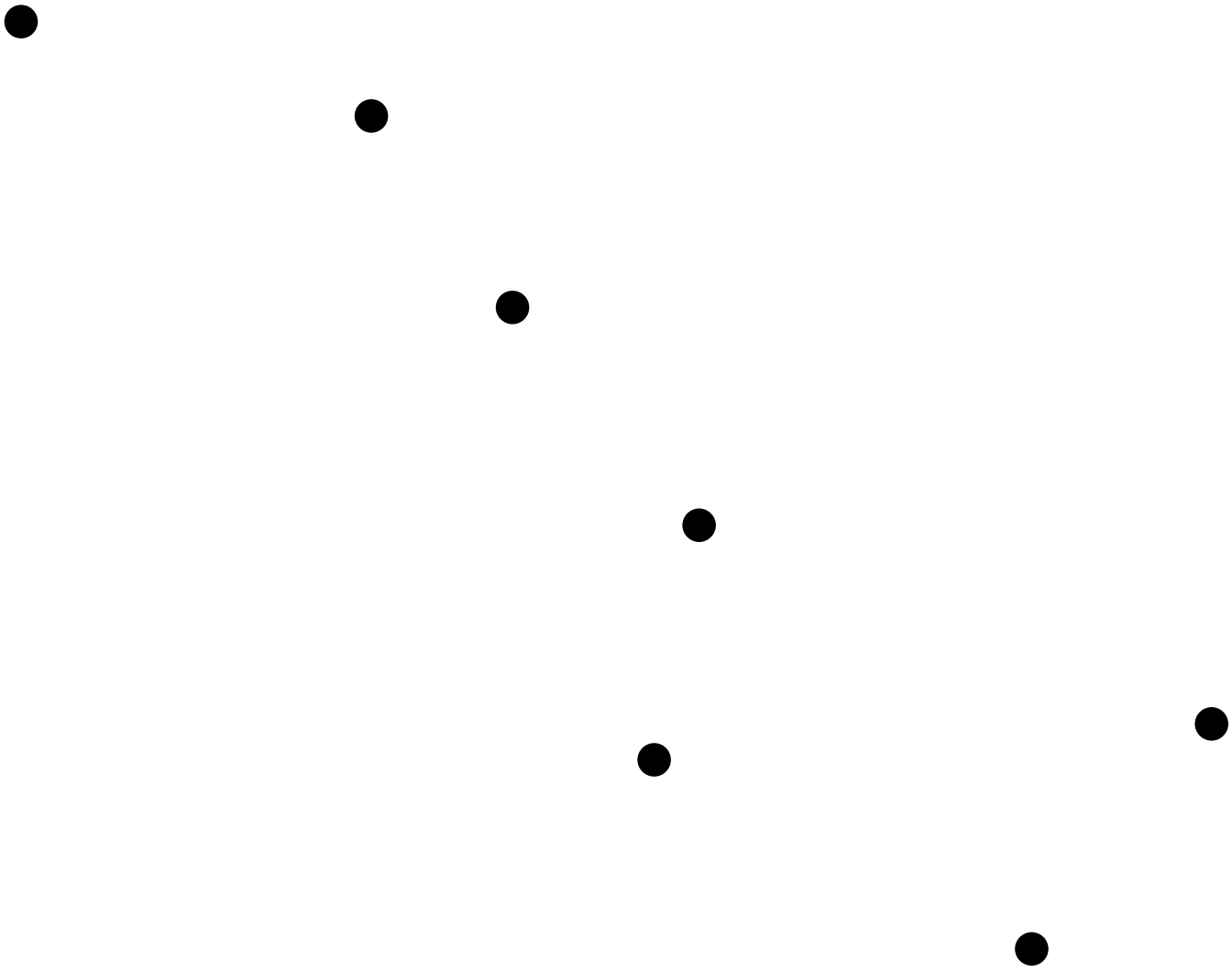


2

4A-1

Name _____

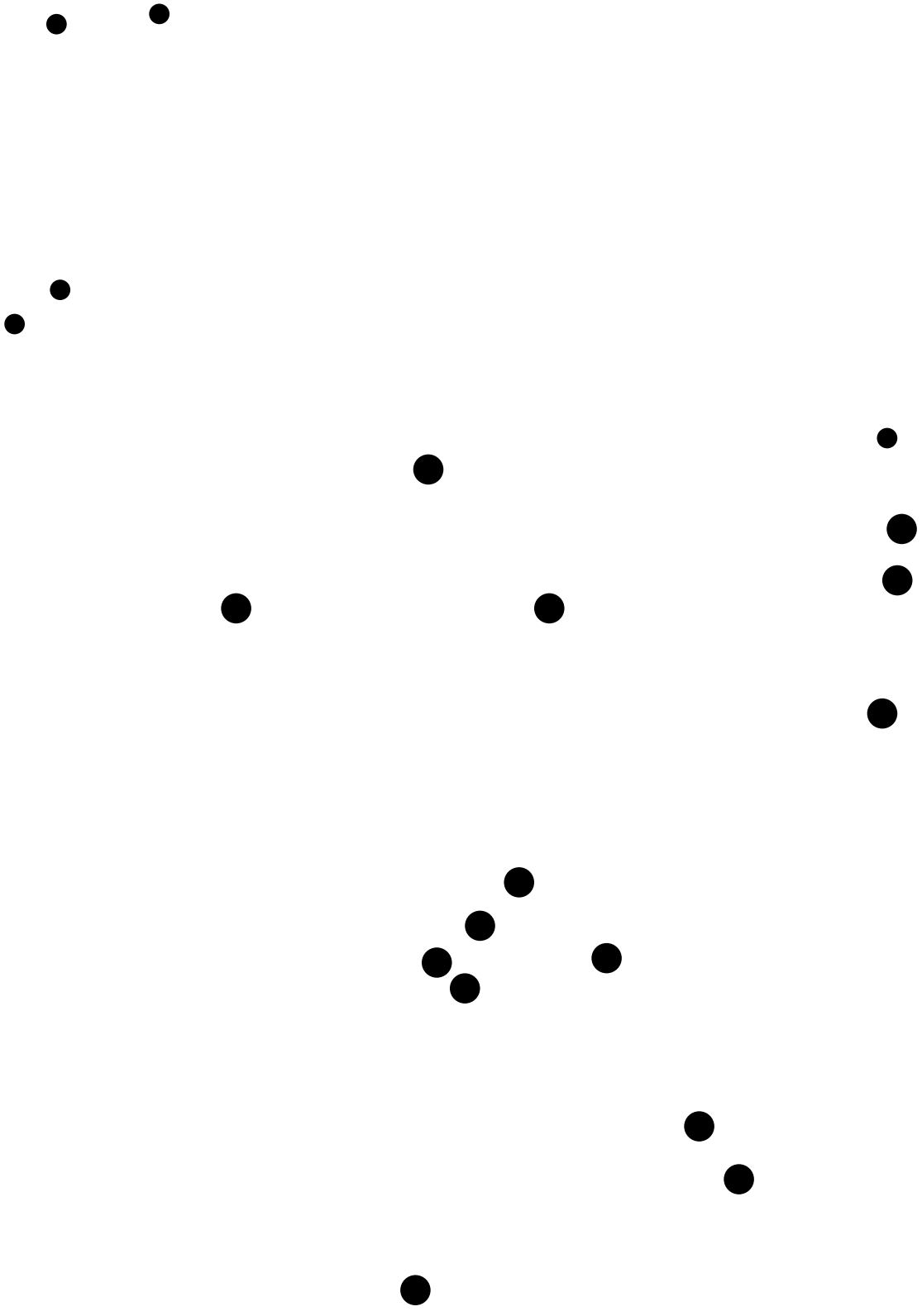
Big Dipper



4A-2

Name _____

Orion



4B-1

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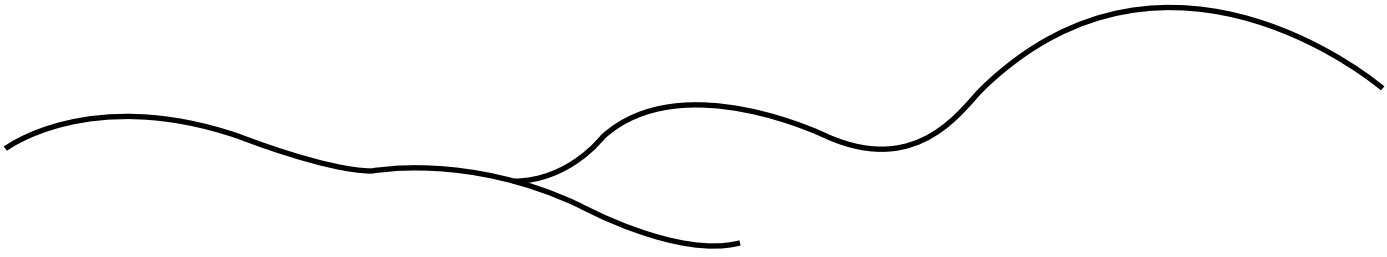
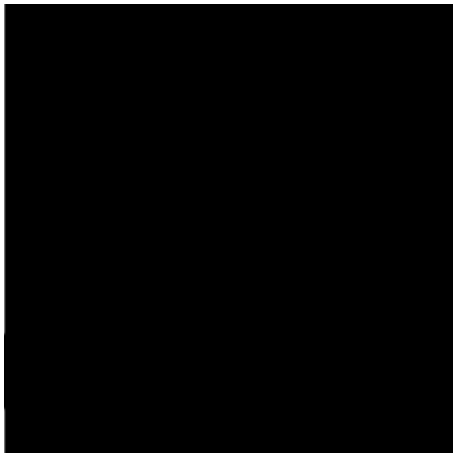


3

5B-1

Name _____

Directions: The pictures show four different phases of the moon. Write the number "1" on the line below the new moon. Write the number "2" below the crescent moon. Write the number "3" below the half moon. Write the number "4" below the full moon.



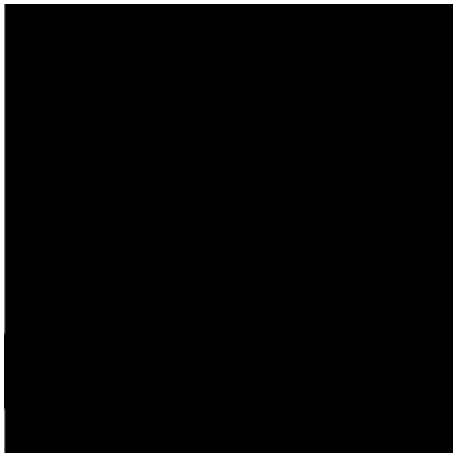
5B-1

Name **Answer Key**

Directions: The pictures show four different phases of the moon. Write the number "1" on the line below the new moon. Write the number "2" below the crescent moon. Write the number "3" below the half moon. Write the number "4" below the full moon.

2

3



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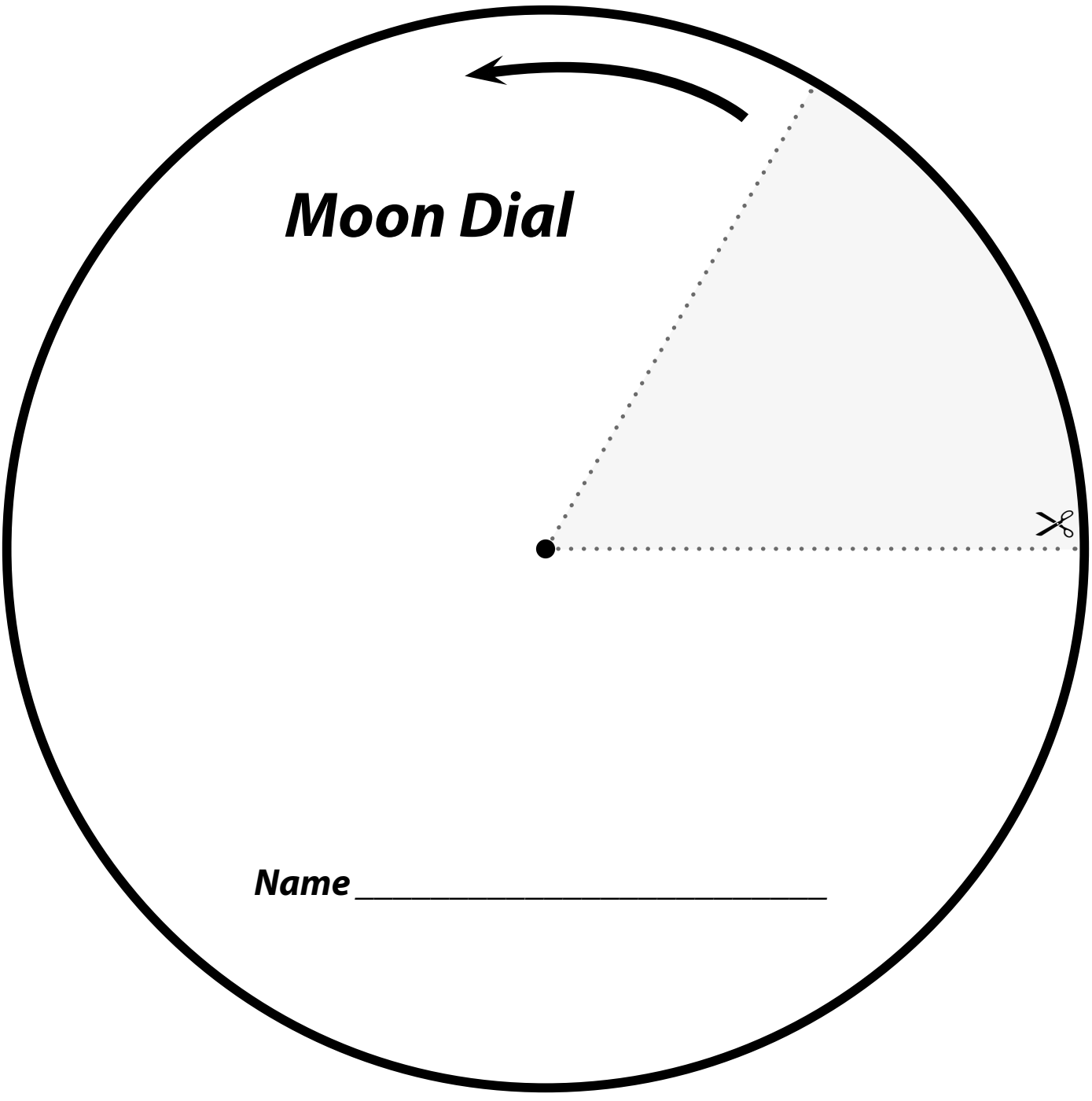
5B-2

Name _____



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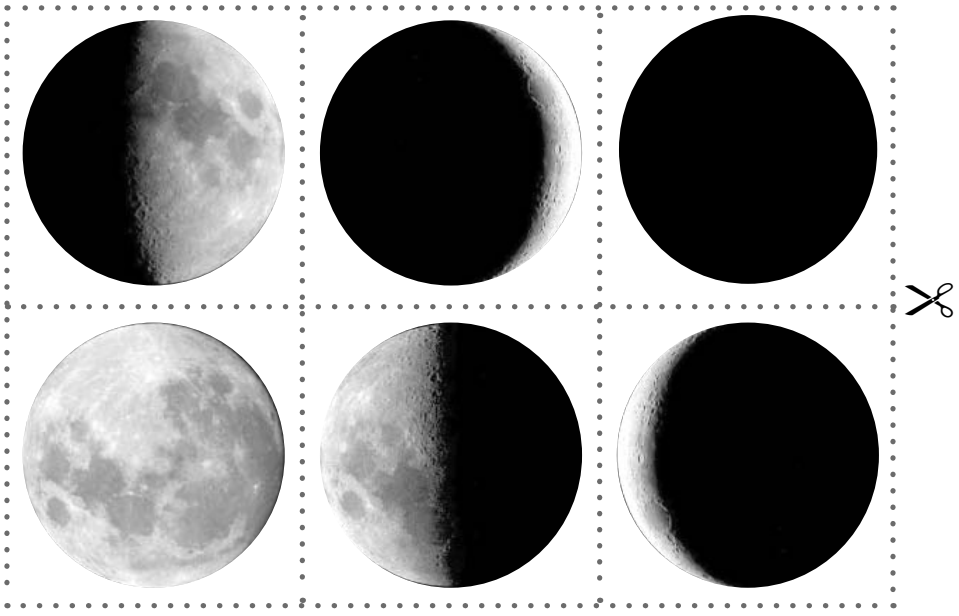
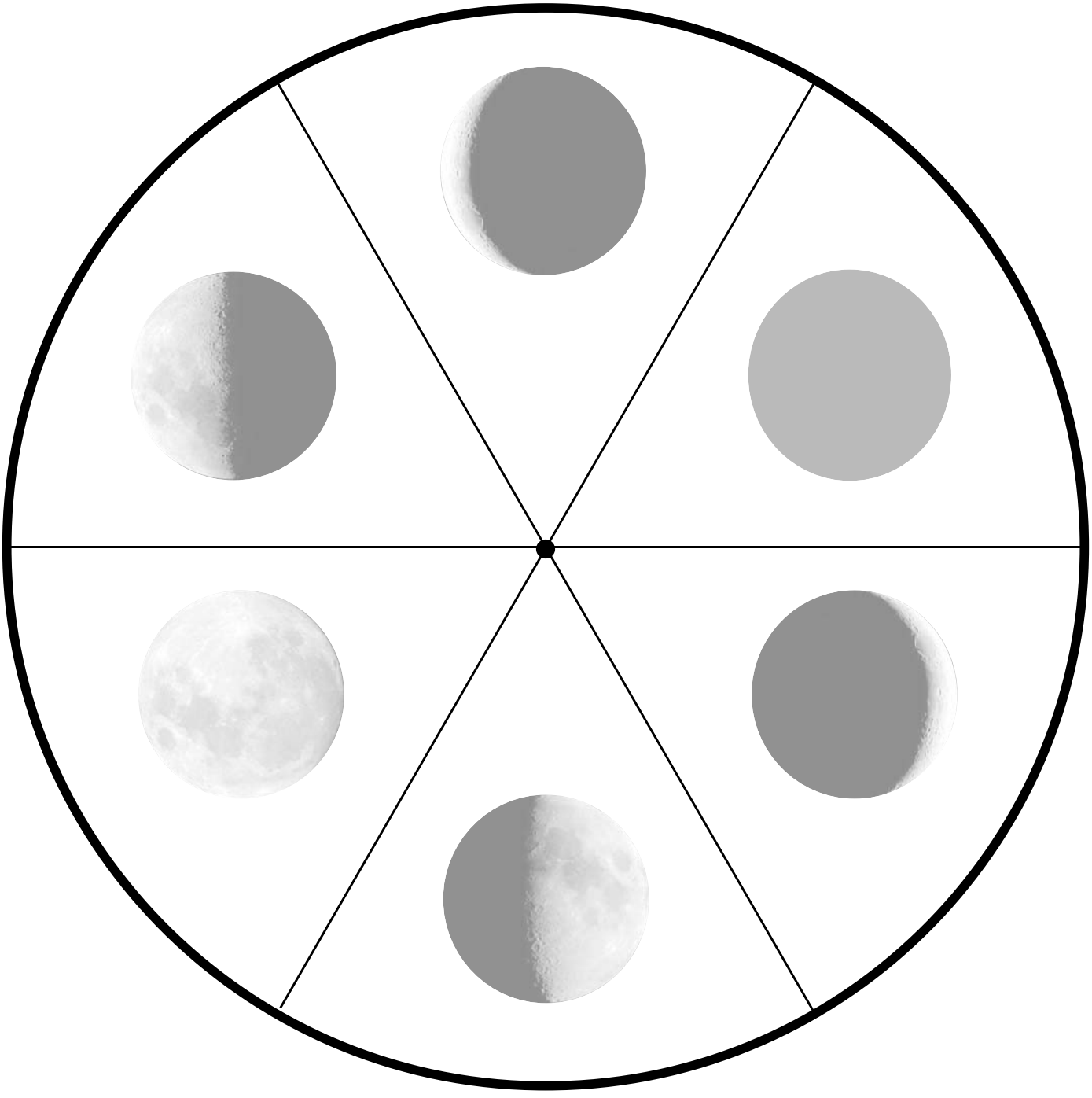
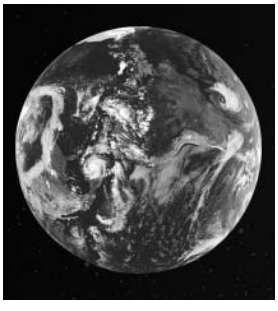
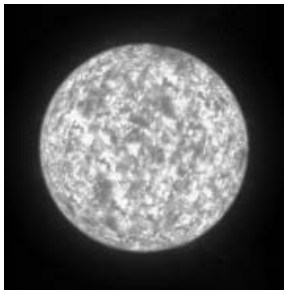
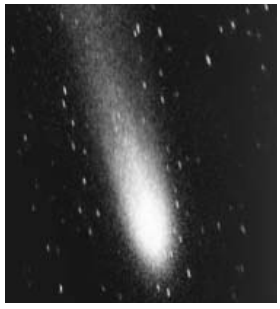
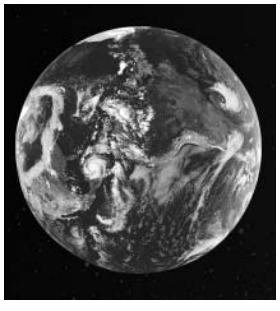
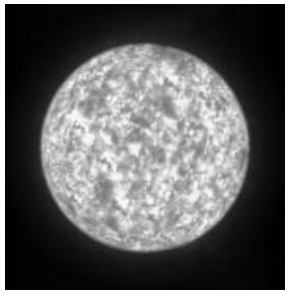
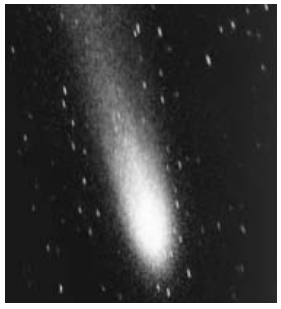
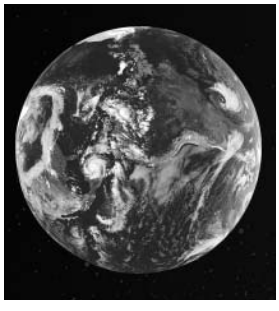
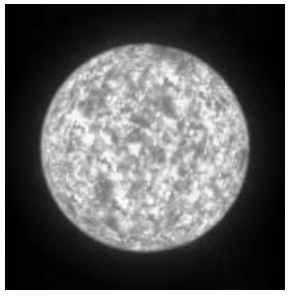
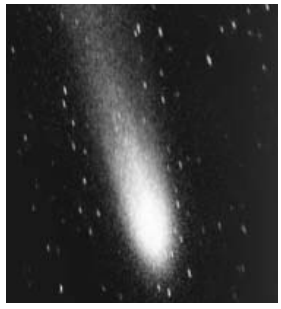
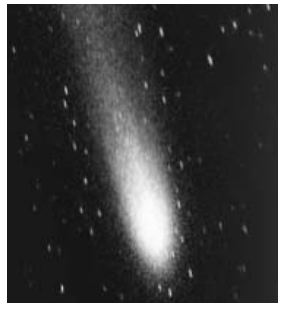


5B-2 cont. Name _____



PP-1

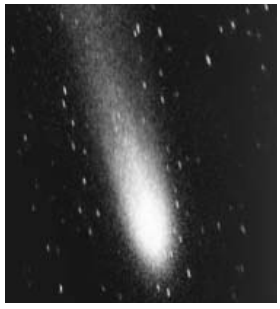
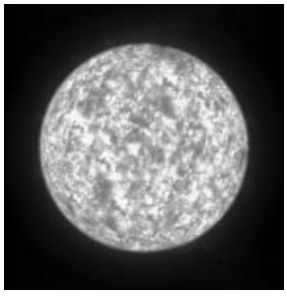
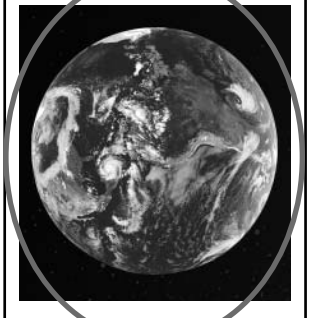
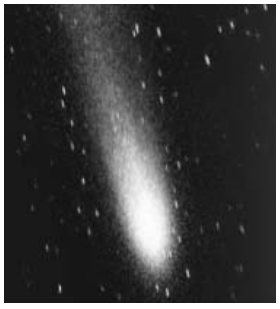
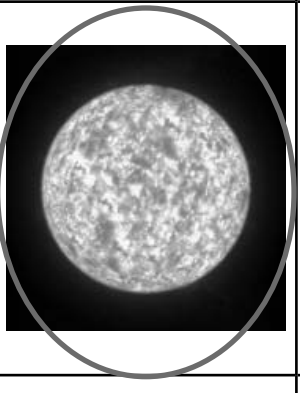
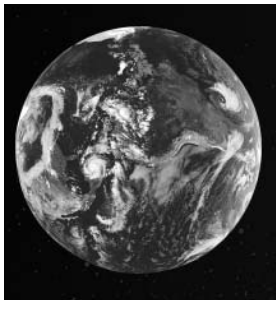
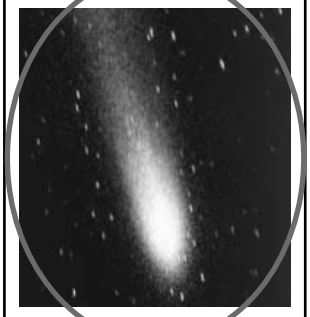
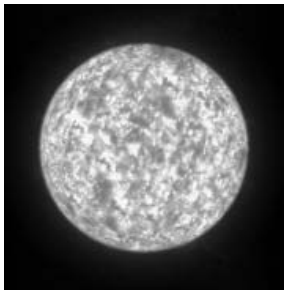
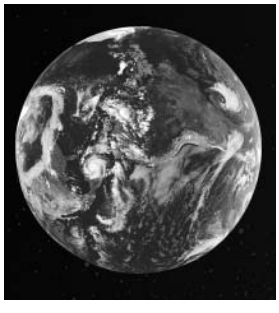
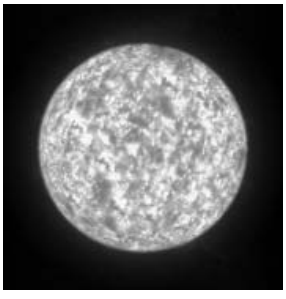
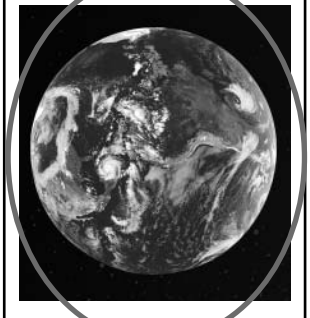
Name _____

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

	Earth	Sun	Moon	Meteor
5.				
6.				
7.				
8.				

PP-1

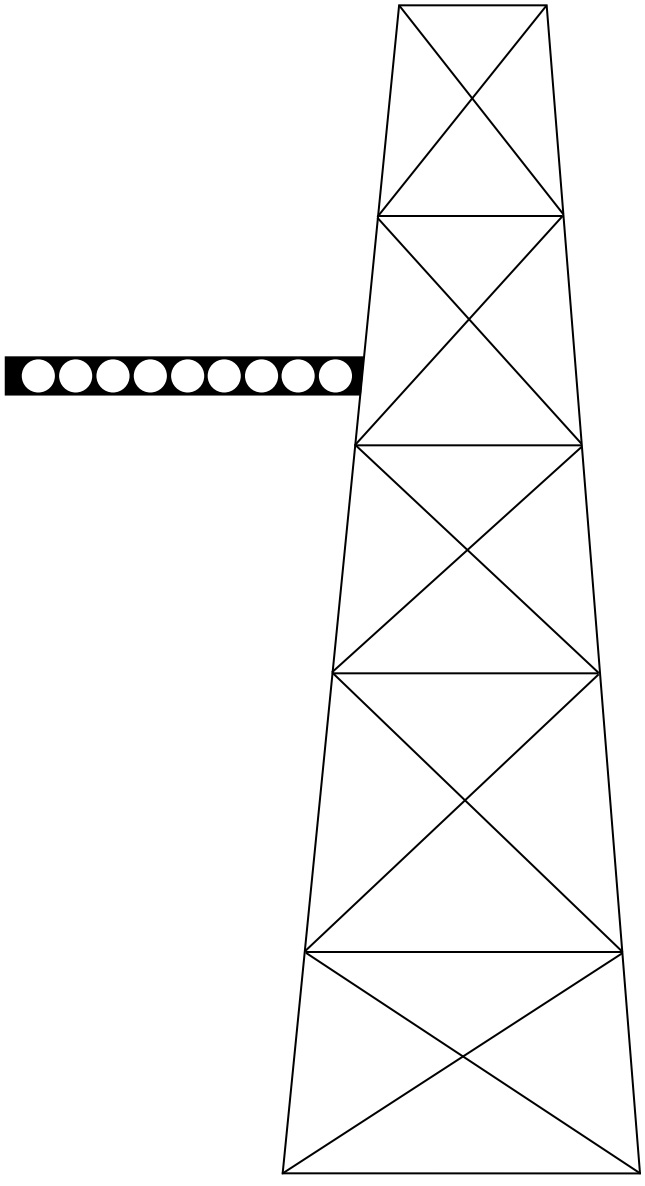
Name **Answer Key**

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

	Earth	Sun	Moon	Meteor
5.				
6.				
7.				
8.				

6B-1

Name _____



4

6B-2

Dear Family Member,

In the next few days, our class will focus our study on space exploration and the planets in the solar system. The most powerful way you can help support your child's learning about astronomy is to continue taking him/her outside to observe the sky and to talk about the planets in our solar system. Below are some additional suggestions for activities, and some words s/he is or will be learning that relate to each activity.

1. Name the Planets

Your child will be learning about the eight planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. [Note: Pluto was once considered a planet, but in 2006 was categorized as a dwarf planet.] Help your child name and color in the planets on the activity sheet. Ask your child what s/he knows about each planet.

2. Astronauts for a Day

Your child will learn about spacecraft and astronauts in the coming days. If the thought of space travel captures your child's imagination, pretend to be astronauts together. Pretend to dress up in spacesuits and helmets. Using furniture or boxes, assemble a spacecraft. Countdown to launch and pretend to land on the moon or another planet.

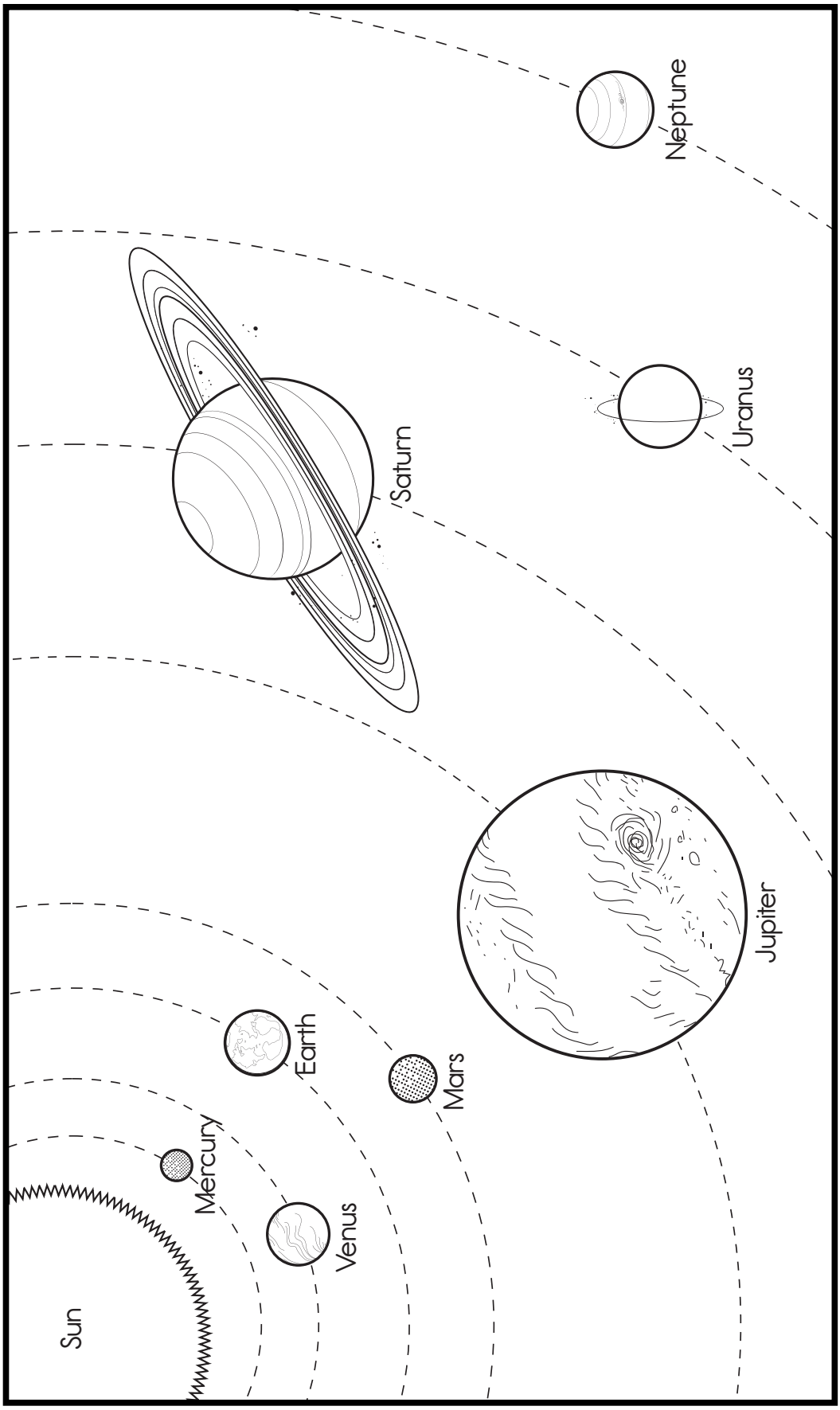
3. "That's one small step for man, one giant leap for mankind."

This is what Neil Armstrong, the first man on the moon said when he took his first step on the moon. Talk to your child about what Neil Armstrong meant. Ask your child what s/he has learned about space exploration.

4. Read Aloud Each Day

Continue to read to your child each day. Please refer to the list of books about astronomy sent home with the previous family letter.

Be sure to let your child know how much you enjoy hearing about what s/he has been learning about astronomy at school.



6B-3

Name _____

Vocabulary List for Astronomy (Part 2)

This list includes many important words your child will learn about in *Astronomy*. Try to use these words with your child in English and in your native language. Next to this list are suggestions of fun ways your child can practice and use these words at home.

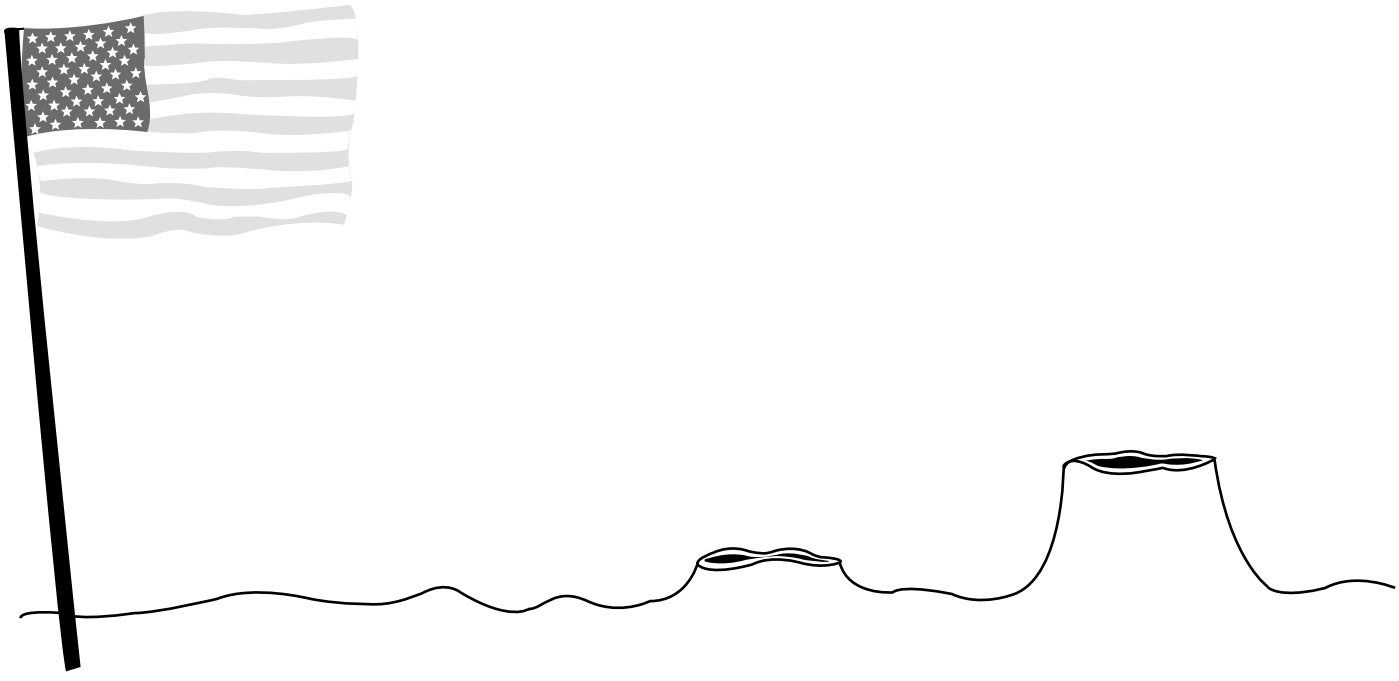
- ❑ astronant
- ❑ launch
- ❑ spacecraft
- ❑ technology
- ❑ determined
- ❑ historic
- ❑ missions
- ❑ abundant
- ❑ inner/outer
- ❑ solar
- ❑ unique
- ❑ categorize
- ❑ planets

Directions: Help your child pick a word from the vocabulary list. Then help your child choose an activity and do the activity with the word. Check off the box for the word. Try to practice a word a day in English and in your native language.

	**Draw it**
	**Use it in a sentence**
	**Find one or two examples**
	**Tell a friend about it**
	**Act it out**
	**Make up a song using it**

7B-1

Name _____

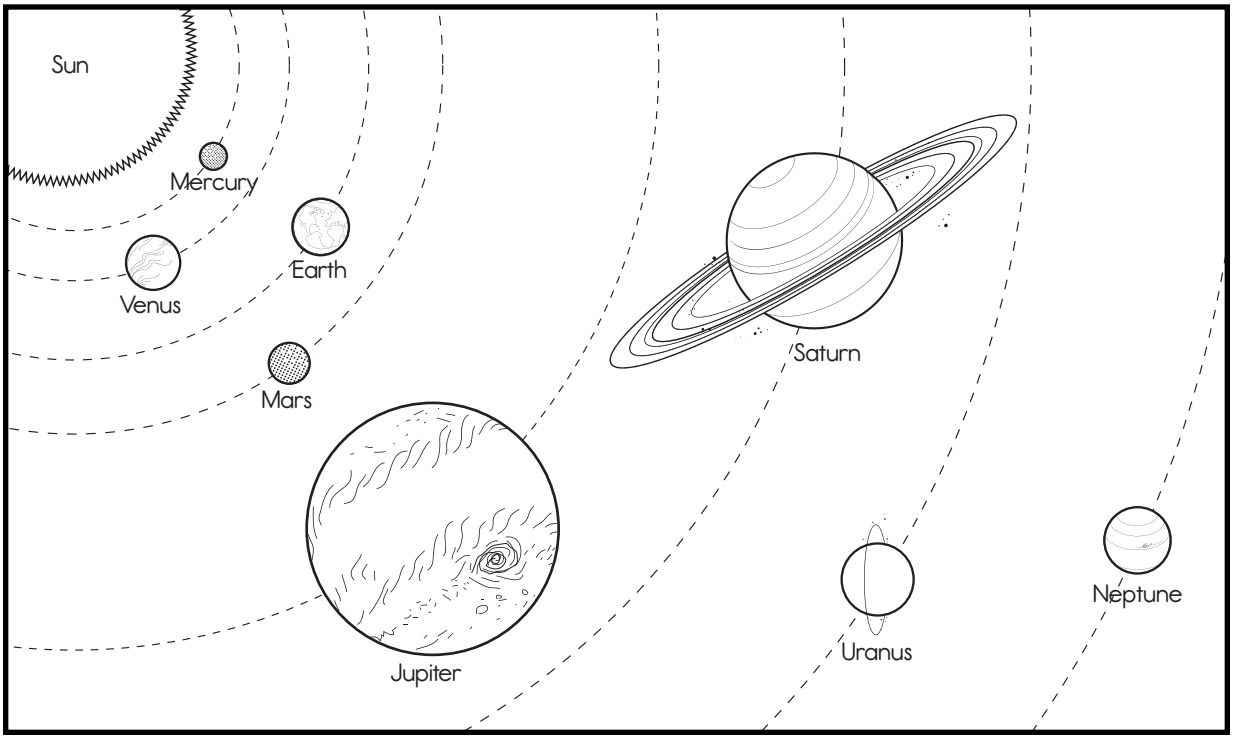


5

9B-1

Name _____

Directions: Read and answer each question appropriately 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?

_____

2. Which planet is closest to the sun?

_____

3. Is Mars larger or smaller than Earth?

_____

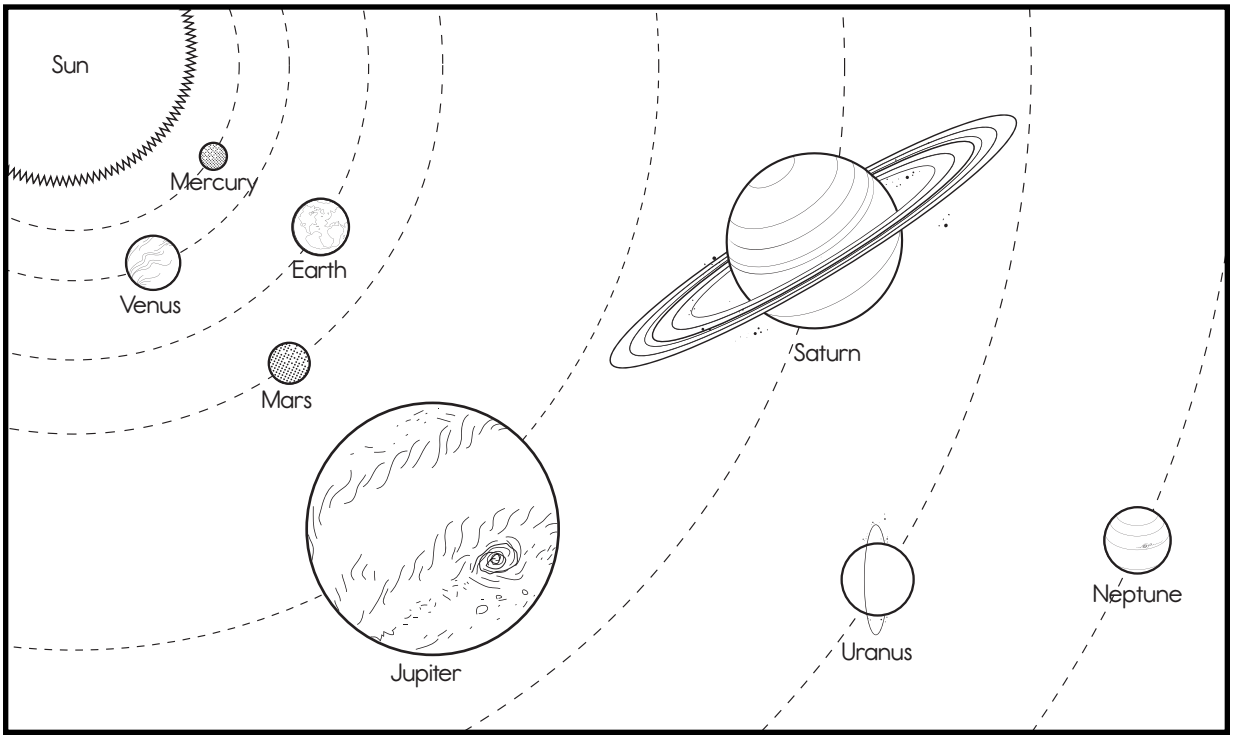
4. Which planet has a few rings around it?

_____

9B-1

Name **Answer Key**

Directions: Read and answer each question appropriately 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?

   eight

2. Which planet is closest to the sun?

   Mercury

3. Is Mars larger or smaller than Earth?

   smaller

4. Which planet has a few rings around it?

   Saturn

DA-1

Name _____

1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Directions: Listen to your teacher's instructions.

11.  

12.  

13.  

14.  

15.  

DA-1

Name _____ **Answer Key**

Directions: Listen to your teacher's instructions.

1.  
2.  
3.  
4.  
5.  
6.  
7.  
8.  
9.  
10.  

11.  

12.  

13.  

14.  

15.  

DA-2

Name _____

1.	Sun	Moon	Earth	Neptune
2.	Sun	Moon	Earth	Saturn
3.	Sun	Moon	Earth	Mercury
4.	Sun	Moon	Earth	Mars
5.	Sun	Moon	Earth	Jupiter
6.	Sun	Moon	Earth	Uranus
7.	Sun	Moon	Earth	Venus
8.	Sun	Moon	Earth	Mercury

9.	Sun	Moon	Earth	Saturn
10.	Sun	Moon	Earth	Jupiter
11.	Sun	Moon	Earth	Mars
12.	Sun	Moon	Earth	Venus
13.	Sun	Moon	Earth	Uranus
14.	Sun	Moon	Earth	Neptune
15.	Sun	Moon	Earth	Mercury

DA-2

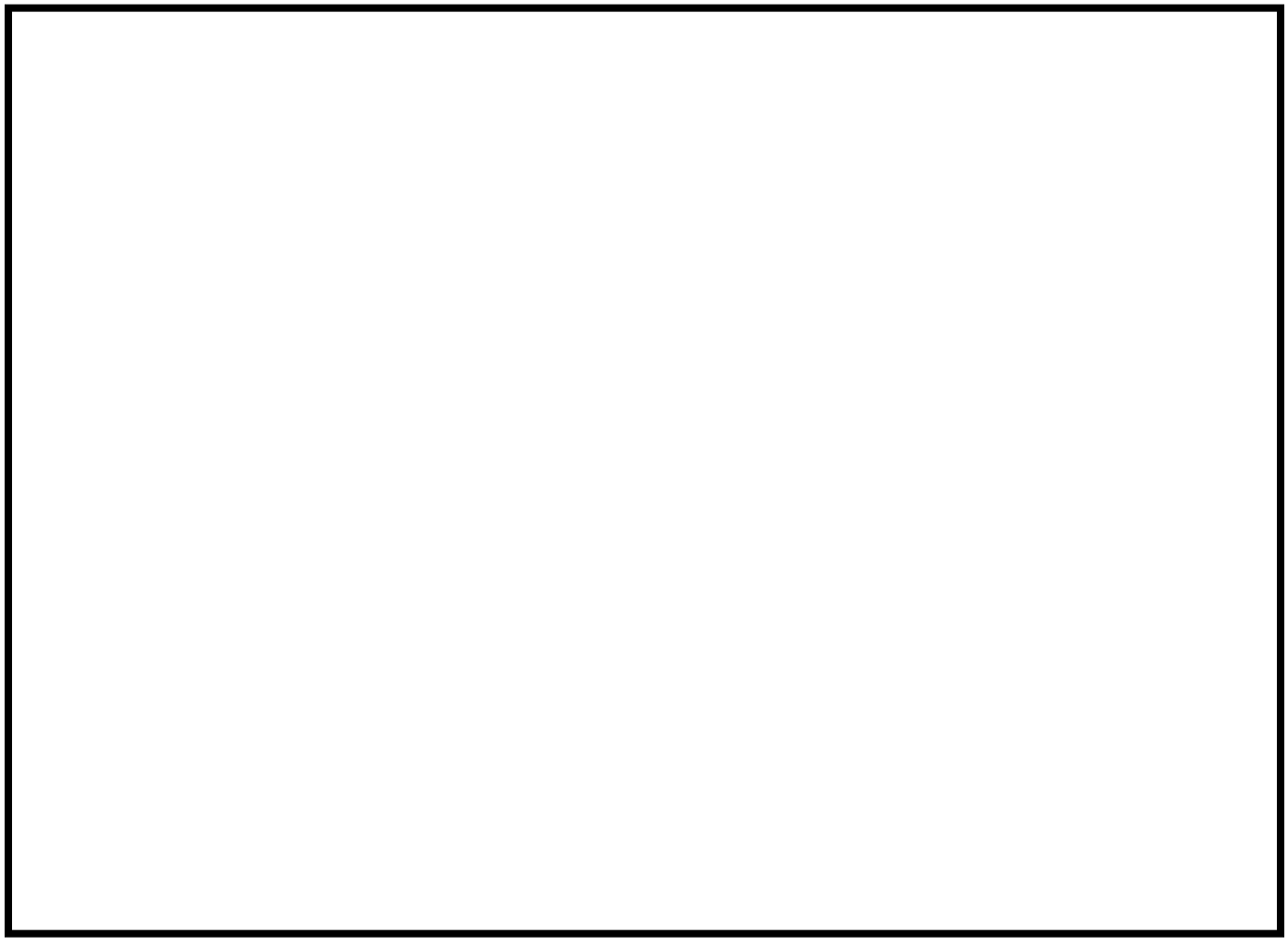
Name **Answer Key**

1.	**Sun**	Moon	Earth	Neptune
2.	Sun	Moon	**Earth**	Saturn
3.	Sun	**Moon**	Earth	Mercury
4.	Sun	Moon	Earth	**Mars**
5.	Sun	Moon	Earth	**Jupiter**
6.	**Sun**	Moon	Earth	Uranus
7.	Sun	**Moon**	Earth	Venus
8.	Sun	Moon	Earth	**Mercury**

9.	Sun	Moon	Earth	**Saturn**
10.	Sun	Moon	**Earth**	Jupiter
11.	**Sun**	Moon	Earth	Mars
12.	Sun	Moon	Earth	**Venus**
13.	Sun	Moon	Earth	**Uranus**
14.	Sun	Moon	Earth	**Neptune**
15.	Sun	**Moon**	Earth	Mercury

DA-3

My Astronomy Journal



By _____

Tens Recording Chart

Use this grid to record Tens scores. Refer to the Tens Conversion Chart that follows.

Name							

Tens Conversion Chart

Number Correct

Number of Questions	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0	10																			
2	0	5	10																		
3	0	3	7	10																	
4	0	3	5	8	10																
5	0	2	4	6	8	10															
6	0	2	3	5	7	8	10														
7	0	1	3	4	6	7	9	10													
8	0	1	3	4	5	6	8	9	10												
9	0	1	2	3	4	6	7	8	9	10											
10	0	1	2	3	4	5	6	7	8	9	10										
11	0	1	2	3	4	5	5	6	7	8	9	10									
12	0	1	2	3	3	4	5	6	7	8	8	9	10								
13	0	1	2	2	3	4	5	5	6	7	8	8	9	10							
14	0	1	1	2	3	4	4	5	6	6	7	8	9	9	10						
15	0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10					
16	0	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10				
17	0	1	1	2	2	3	4	4	5	6	6	7	7	8	8	9	9	10			
18	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10		
19	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	
20	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10

Simply find the number of correct answers the student produced along the top of the chart and the number of total questions on the worksheet or activity along the left side. Then find the cell where the column and the row converge. This indicates the Tens score. By using the Tens Conversion Chart, you can easily convert any raw score, from 0 to 20, into a Tens score.

Please note that the Tens Conversion Chart was created to be used with assessments that have a defined number of items (such as written assessments). However, teachers are encouraged to use the Tens system to record informal observations as well. Observational Tens scores are based on your observations during class. It is suggested that you use the following basic rubric for recording observational Tens scores.

9–10	Student appears to have excellent understanding
7–8	Student appears to have good understanding
5–6	Student appears to have basic understanding
3–4	Student appears to be having difficulty understanding
1–2	Student appears to be having great difficulty understanding
0	Student appears to have no understanding/does not participate

Core Knowledge Language Arts

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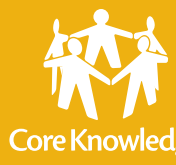

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