Core Knowledge Science Program—Domain Map

Science Content
• Sun: source of energy, light, heat • The eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune *[Note: In 2006, Pluto was classified as a dwarf planet]* • Stars: Constellations, Big Dipper The sun is a star • Earth and its place in the solar system: The shape of the earth, the horizon The earth moves (revolves) around the sun; the sun does not move The earth spins (rotates) on its axis; one rotation takes one day (24 hours) Sunrise and sunset When it is day where you are, it is night for people on the opposite side of the Earth • The Moon Phases of the moon: full, half, quarter, crescent, new

This unit contributes to meeting or exceeding the following Next Generation Science Standards:	
1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.	***Rationale:*** This unit will explicitly engage students with the disciplinary core idea ESS1.A, which is central to this Grade 1 standard. Observable patterns of movement across the sky will be explored when studying constellations, the changing phases of the moon, and seasonal differences in the day-night cycle.
1-ESS1-2. Make observations at different times of year to ***relate the amount of daylight to the time of year.***	This unit will build on the Kindergarten introduction to the seasons and apply that learning to DCI ESS1.B. In doing so, this will meet the K–2 grade band endpoint for this core idea which states, "Seasonal patterns of sunrise and sunset can be observed, described, and predicted." This core idea will be extended in later grades during Grade 3 Unit 5 *Astronomy* and Grade 5 Unit 6 A *Biography of Galileo* in order to support students as they prepare for the Grade 5 Topic *Space Systems: Stars and the Solar System*.

This unit offers the opportunity to foreshadow learning that will support the following Next Generation Science Standards:

1-PS4-2*. Make observations to construct an evidence-based account that states* ***objects in darkness can be seen only when illuminated.***

1-PS4-3*. Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.*

Rationale:

DCI PS4.B (Electromagnetic Radiation), which is central to both **1-PS4-2** and **1-PS4-3**, is introduced in this unit as it engages students with the component idea that, "Very hot objects give off light (e.g., a fire, the sun)." (*Framework,* page 134) This core idea will be further developed during Unit 7 *Introduction to Light & Sound* as well as during Grade 3 Unit 3 *Light*.

This Grade 1 unit also creates a solid foundation for the later development of PS3.B (Energy Transfer) and LS2.B (Energy Transfer in Ecosystems) with the idea that the sun's energy is a source of heat and light for the Earth which travels over a significant distance. PS3.B will first be assessed by the NGSS during the Grade 4 Topic *Energy* and LS2.B is assessed during the Grade 5 *Matter & Energy in Organisms & Ecosystems*. This early grade unit offers concrete experiences, coupled with previous learning about Plants and Animals, to foreshadow and connect to this future learning.

Potential Skills & Cross-Curricular Integrations

The connections listed below are intended as ideas for possible integration across this unit. Finding connections in math, in language arts, and in works of poetry, art, and music, may help you as you create meaningful learning experiences for your students. Connections such as these can help your students make links between various disciplines and deepen their understanding of this domain.

POTENTIAL CCSS Math Connections

MP.2 Reason abstractly and quantitatively. *(1-ESS1-2)*

MP.4 Model with mathematics. *(1-ESS1-2)*

MP.5 Use appropriate tools strategically. *(1-ESS1-2)*

1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. *(1-ESS1-2)*

1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. *(1-ESS1-2)*

POTENTIAL CCSS ELA Connections

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). *(1-ESS1-1 and 1-ESS1-2)*

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. *(1-ESS1-1 and 1-ESS1-2)*

POTENTIAL Cross-Curricular Connections

Potential Links:
Geography: Spatial Sense—Working with maps, globes, and other geographic tools

Mathematics: Recognize fractions as part of a whole: ½, ⅓, ¼ *(with regards to the visible portions of the moon across its phases)*

ELA: Poetry—"My Shadow" by Robert Louis Stevenson

When introducing the planets in our solar system, also consider foreshadowing the future study of Ancient Greek mythology and civilization, which will occur in Grade 2 English Language Arts (e.g., CKLA Domain Anthology, *Greek Myths*) and in Grade 2 History, Geography, Civics, and the Arts (e.g., the HGCA Unit *Ancient Greek Civilization & Sculpture*)

Prior Knowledge

Core Knowledge Kindergarten Sequence
Season & Weather

- The sun: source of light and warmth
- The four seasons and characteristic weather patterns during the different seasons
- Temperature: thermometers are used to measure temperature

CKLA Kindergarten
Domain Anthology, *Seasons & Weather*

- Demonstrate understanding of the following units of time and their relationship to one another: day, week, month, year
- Name the four seasons in cyclical order, as experienced in the United States, and correctly name a few characteristics of each season
- Characterize winter as generally the coldest season, summer as generally the warmest season, and spring and autumn as transitional seasons
- Name at least one month in a specific season while referring to a calendar

Core Knowledge Science (Previously taught units in the CK Science program)
Kindergarten Unit 4 *Seasons & Weather*

- Describe how the sun affects the temperature
- Describe how sunlight affects materials on Earth (K-PS3-1)

CKLA Grade 1 Objectives

The following objectives are addressed through the Core Knowledge Language Arts program (CKLA), which builds students' background knowledge in certain domains of literature, science, and history. To learn more about how and why the Listening & Learning Strand of CKLA approaches science content through read-alouds and ELA instruction, read more about the CKLA program.

Domain Anthology, *Astronomy*

- 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
- 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

What Students Will Learn in Future Grades

Core Knowledge Sequence
Grade 2 *Cycles in Nature*

A. Seasonal Cycles

- Earth's orbit around the sun and the four seasons
- Seasons and life processes

B. The Water Cycle *[A cycle powered by the sun]*

- Evaporation and condensation

Grade 3 *Astronomy*

- The "Big Bang" as one theory
- The universe: an expanse almost beyond imagining
- Galaxies: Milky Way and Andromeda
- Our solar system:
  Sun: source of energy (heat and light)
  The eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune *[and the dwarf planet Pluto]*
- Planetary motion—orbit and rotation:
  How day and night on earth are caused by the earth's rotation
  Sunrise in the east and sunset in the west
  How the seasons are caused by the earth's orbit around the sun and the tilt of the earth's axis
- Gravity, gravitational pull:
  Gravitational pull of the moon (and to a lesser degree, the sun) causes ocean tides on earth
  Gravitational pull of "black holes" prevents even light from escaping
- Asteroids, meteors ("shooting stars"), comets, Halley's Comet
- How an eclipse happens
- Stars and constellations, Orienteering (finding your way) by using North Star, Big Dipper
- Exploration of space:
  Observation through telescopes
  Rockets and satellites: from unmanned to manned flights
  Apollo 11, first landing on the moon: "One small step for a man, one giant leap for mankind."
  Space shuttle
- Biography of Copernicus (had new sun-centered idea about the solar system)
- Biography of Mae Jemison (astronaut and medical pioneer)

Grade 4 *Meteorology*

- The water cycle (review from Grade 2): evaporation, condensation, precipitation
- The atmosphere—how the sun and the earth heat the atmosphere

Grade 5 *Science Biographies*

- Biography of Galileo

Grade 5 *World History—The Reformation*

- Copernicus and Galileo: Conflicts between science and the church
- Ptolemaic (earth-centered) vs. sun-centered models of the universe

Core Vocabulary

The following list contains the core vocabulary words suggested for purposeful integration across this Grade 1 unit. ***Boldfaced*** *terms could be introduced and/or reviewed with students using a Word Work activity, as modeled by the Core Knowledge Language Arts program (CKLA). 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 across the lessons, students should acquire a good understanding of most of these words and begin to use some in conversation.*

Our Solar System

system, *planet, moon,* ***orbit***, *revolve, path, ellipse, elliptical, gravity,* ***celestial***, *body, star, twinkle, shine, sun, solar, energy, light, heat, rays, shadow, [names of the eight planets], dwarf, pluto, rings, gas, giant, storm, rocky, frozen, inner, outer, space, expanse, void, universe, astronomy, astronomer, telescope, observatory,* ***constellation***, *Big Dipper, star map, myth, asteroid, comet, meteor, debris, shooting/falling star, meteorite, launch, rocket, shuttle,* ***satellite***, *Hubble, probe, lander, rover, space station, spacecraft, mission, technology*

Earth's Place in the Solar System

Earth, shape, ***sphere***, *globe,* ***horizon***, *east, west, day, night, sunrise, sunset, dusk, dawn,* ***axis***, *rotate, spin, side, opposite, dark, light, hour, month, year,* ***revolve***, *motion, path, Moon, lunar, phase, visible, reflect, sunlight, moonlight, crater, full moon, half/quarter moon, crescent moon, new moon, calendar, observe,* ***investigate***, *record, describe, explain, predict*

Potential Misconceptions

Students have been shown to learn significantly more science when their teachers demonstrate strong knowledge of potential student errors, and when the teacher plans accordingly (Sadler & Sonnert, 2016). The following incorrect statements serve as a sampling of the "intuitive theories" or "alternative conceptions" that students and teachers may actively use to describe their thinking, and which might interfere with the process of learning. The details following each statement are not intended to imply the scope of instruction for this grade, but instead provide a clearer sense of what students (of all ages) often misunderstand and/or overgeneralize when investigating and describing scientific ideas.

Misconception: "The sun revolves around the Earth causing day and night."
Many students find it counter-intuitive that it is the Earth that moves (rotates/spins) to cause day and night, and not the sun. The sun's apparent movement across the sky during the day can lead students to this common misconception. This concept can be a good opportunity for teachers and students to discuss the scope and timeframe of an investigation. That is, day-to-day observations of the sun from relatively the same location may not be enough to convince someone of the true relationship between the sun and the Earth. Instead, knowledge of time/daylight differences across the globe, discussions of the horizon and the shape of the Earth, and patterns of seasonal change in the day-night cycle can help to build correct understanding over time.

Misconception: "The moon shines like the sun."
The light seen from the moon is actually sunlight that is reflected off of the moon's surface. Consider probing your students' thinking about this misconception when discussing the phases of the moon and the origins of "moonlight." Grade 1 Unit 7 *An Introduction to Light & Sound* will help to reinforce and extend learning about the nature of light and the sun.

Misconception: "The phases of the moon are caused by the shadow of the earth."
The waxing and waning of the moon are due to the positions of the Earth, moon, and sun relative to one another, but they are not caused by Earth's shadow. Instead, **lunar eclipses** are caused by the shadow (umbra) of the Earth. Particularly useful to uncover this misconception are photos of a Gibbous moon, which can be discussed relative to the spherical shape of the Earth and the shape of its shadow/umbra (i.e., the shadow of the Earth is not concave).

Misconception: "The seasons are caused by the earth's changing distance from the sun."
Students of all ages (including college and adult learners) have difficulty understanding and explaining the causes of the seasons. The root misconception behind this has been identified as a belief that the earth orbits the sun in an elongated elliptical path (Galili & Lavrik, 1998; Sadler, 1998). Other students, citing the tilt of the Earth on its axis, believe that the changing distance between a hemisphere and the sun is the cause of seasons (e.g., "summer occurs because our hemisphere is closer to the sun"). Teachers should be sure to understand that the distance to the sun changes relatively little, and that these minor changes cannot explain seasonal variations.

Key points for instruction:
It is recommended that students first master the idea that the Earth is spherical and that it rotates on its axis before they can be expected to explain the day-night cycle, the seasons, and the phases of the moon (Vosniadou, 1991). Also critical to these explanations is for students to have an understanding of the relative size, motion, and distance/orientation of the sun, moon, and Earth (Sadler, 1987). At this early grade level, students are not expected to explain the seasons or the cause of the phases of the moon Instead, they will be focusing on the development of key terms and language that will support later discussions in upper elementary and middle school. Grade 1 students should investigate the shape of the Earth, its horizon, and the day-night cycle to develop early explanations of these specific phenomena.

Potential Objectives for this Grade 1 Unit

The organization of the following objectives reflects the order in which they are expected to be addressed. The proposed timing within the unit ("beginning," "middle," or "end") and aligned NGSS are also noted. In addition to daily lessons focused on each objective, days have been built into the unit for review and assessment.

Beginning

- Describe characteristics of the sun
- Describe how the sun affects living things on the Earth
- Describe characteristics of the Earth
- Using a model, demonstrate how the Earth spins
- Explain what causes day and night
- Examine patterns in order to identify the season (i.e., winter, spring, summer, fall) with the longest/shortest amount of daylight (1-ESS1-2)
- Describe the Earth's orbit

Middle

- Describe characteristics of the moon
- Identify the four phases of the moon (1-ESS1-1)
- Describe characteristics of stars
- Explain what a constellation is
- Identify when the sun, moon, and stars are visible in the sky (1-ESS1-1)
- Predict where the sun, moon, and stars will appear in the sky at different times of day (1-ESS1-1)

End

- Describe characteristics of the planet Mars
- Compare characteristics of the planets Mercury and Venus to Earth
- Contrast characteristics of the planets Jupiter and Saturn to Earth
- Describe characteristics of the planets Uranus and Neptune
- Identify similar features among all eight planets

Potential Big Guiding Questions

Essential Questions:

- **How does the shape of the Earth affect your everyday life?**
- **Can you predict how the objects in our sky move?**
- **How do the Earth, sun, and moon appear in space?**

RE: the Sun and Earth

- Why does the sun burn you?
- How does the sun bring life to our planet?

- Does the sun rise at the same time every day?
- Do we ever see the sun at nighttime?
- How can it be daytime in one part of the world and nighttime in another?
- What is a timezone?
- Why is it not a good idea to call a friend in Australia at noon?
- What causes the cycle of night and day?
- How long do you think it takes the Earth to complete one revolution?
- If you are ___ years old, how many times has the Earth revolved around the sun (in your lifetime)?
- How can the Earth be moving if we can't feel it?
- How are the sun and Earth alike? How are they different?

Re: The Moon and Stars

- Why can't you see the stars during the daytime?
- Can you see the moon during the day?
- Can a single star be a constellation?
- How can stars be large if they look so small in the sky?
- What makes the Moon appear to glow?
- How is the moon like the Earth? How is it different?

Re: The Eight Planets

- Could humans survive on Mars?
- What's it like inside the planet Jupiter?
- Why is Pluto not considered a planet anymore?

Potential Assessment Opportunities

The following assessment tasks serve as a sampling of how students can demonstrate mastery of lesson objectives. Each aligned objective and NGSS is noted in parentheses. In addition, the proposed timing ("beginning," "middle," or "end") is noted in order to indicate the approximate point in time the assessment would take place.

Example #1: (Beginning of Unit 2)

{**Evaluates Student Mastery of Objectives:** "Using a model, demonstrate how the Earth spins" and "Explain what causes day and night"}

Note: This assessment can be used to after Potential Activity Example #1, described below, and/or with the Grade 1 Model Lesson that is based upon the Foundation's Meaningful Instruction professional development training.

Advance Preparation:

- Styrofoam ball for each student (or each pair of students)
- Toothpick for each student or pair (Note: Toothpicks need to be long enough to go through the styrofoam ball and model the axis of the Earth)
- Markers for each student or pair
- A desk lamp

Assessment Task: Pairs of students will work together on this performance assessment to demonstrate and discuss a small model of Earth's rotation. For each pair, direct students to mark a small "x" on the ball.

T - We are going to imagine that this "x" represents where we are on the Earth.

T - We are going to pretend that the toothpick represents the Earth's axis. Model for students how to put the toothpick through the ball and how to hold their model Earth at a slight angle (approximately 23.5 degrees away from a vertical plane) to mimic the Earth's tilt. Direct students to hold both ends of the toothpick and ask them to demonstrate how their Earth representation rotates on its axis. Encourage them to pay attention to the path of their location marked by the "x."

T - Talk to your partner about what you notice about the "x" as the Earth turns, as it rotates. Why do you think it moves in that path?

Place a small lamp in the middle of the table and give each student the opportunity to rotate their model in front of the lamp. (Consider turning off your classroom lights to better simulate day and night using these small models.)

Encourage students to talk about when it is daytime or nighttime based upon the "x" location in relation to the light from the lamp.

T - How does our small model relate to the Earth and sun? If it is daytime here at our school, where the "x" is on our model, what time of day is it on the other side of the Earth? What causes day and night?

Potential Activities & Procedures

The following activities or procedures serve as a sampling of what instruction could look like in this unit. Each example was specifically designed to contribute to one or more of the aforementioned objectives. In addition, the proposed timing ("beginning," "middle," or "end") is noted in order to indicate the approximate point of instruction it would be delivered. Aligned NGSS are noted in parentheses.

Example #1: (Beginning of Unit 2)

{**Contributes to the Objective:** "Explain what causes day and night"}

Note: This activity can be used in conjunction with the Grade 1 Model Lesson that is based upon the Foundation's Meaningful Instruction professional development training.

Advance Preparation:

- A large globe (preferably attached to a stand, which replicates the Earth spinning on its axis)

- A bright lamp
- Sticker or Post-It note that can be affixed to your location on the globe

Activity: Begin with a discussion about how the Earth spins on its axis. Place a sticker on the globe so students can see where they live. (This will also assist students with following the path of movement as the globe rotates.) Slowly spin the globe and ask students to describe how the earth moves.
T - What time of day is it now, daytime or nighttime? Do you think it's possible (at this very moment) in another part of the world for it to be nighttime? (Provide students with time to think and then share ideas with a partner.) **We are going to learn today what causes day and night, and find out if it's possible for part of the world to be experiencing daytime while the other part of the world is experiencing nighttime.**
Turn all of the lights off with the exception of a lamp placed in the corner of the room
T - What object in our solar system produces light like that lamp? In what ways is this lamp like the sun? Because of (name common characteristics identified by students)**, we are going to use this lamp as a model of the sun.**
Spin the globe so the sticker is facing the lamp. Point to that side of the globe
T - What do you notice about this side of the globe? (Student responses may include, "It's bright," "Light is shining on it."). **What time of day do you think it would be for people living on this side of the Earth? Why?** (Students should conclude that it is daytime since light from the sun can be seen during the day.)
Point to the other side of the globe.
T - What about over here? What time of day do you think it is for people living here? (Students should infer that it is nighttime because the sun light is not reaching that part of the Earth.
Ask students to focus on their location (the sticker). Slowly rotate the globe and then pause. Each time ask students to indicate whether it is daytime or nighttime, and how they know. As students demonstrate understanding, ask them questions that challenge their thinking:
T - Look where (_country/continent on opposite side of world_) is on our globe relative to our model. **Would it be a good idea to call a friend who lives in that country/continent right now? Why or why not?**
T - How could we find out what time of day it is in that country/continent at this very moment? (Encourage students to think of tools or technologies that might help them to find out what time it is on the opposite side of the Earth.)
T - What about (_country/continent in the same hemisphere_)**? Could we call a friend that lives here right now? Why or why not?**

Example #2: (Middle of Unit 2)

{**Contributes to the Objective:** "Identify when the sun, moon, and stars are visible in the sky" and "Predict where the sun, moon, and stars will appear in the sky at different times of day"} **(1-ESS1-1)**

Advance Preparation:

- Draw a diagram of your school building (landscape view) and surrounding property (e.g., playground, field, etc.)
- Gather clipboards as well as yellow and gray crayons for each student (or pair of students)

- Obtain a compass (if possible provide one for each student or pair of students)
- Create a T-chart to be used as the Homework Activity Handout. On the left side, write "moon" and write "stars" on the right side. In the directions, ask students to draw an image of the "moon" and "stars" and write a description. If students have access to a compass at home, ask that they note the location of the moon (i.e, northern, southern, eastern, or western sky)

Activity: Explain to students that they will be tracking the sun's location over several days. (**Safety Note:** Before engaging in this activity, explain to students that they **should not** look directly at the sun.) Provide each student (or pair of students) with a diagram of your school, a clipboard, and a yellow crayon. In the morning, walk out to the school yard and locate the sun. Ask students to mark the location on their diagram (e.g., draw the sun with the yellow crayon and write 'M' or "A.M." to label it, or draw the sun and write the time below, etc.,). Using the compass identify, ask students to identify the location of the sun and label the diagram (i.e., 'E' for east or 'NE' for northeast). Repeat this process at approximately noontime and again at the end of the school day.

You may wish to extend this activity to include observations of the moon during the daytime if/when it is visible. (To help identify when/where the moon may be visible to you during the day, consider using this webpage: http://www.timeanddate.com/astronomy/moon/light.html.) During the activity it is important remind students of safety (e.g., not to look directly at the sun) and you may wish to have students put their hand up to block the sun so they do not accidently look at it while scanning the sky for the moon. When they locate the moon, each student can draw an image on their landscape diagram with a gray crayon and use the compass to identify its orientation in the sky. If the conditions are not optimal, you may wish to have the students only complete their observations at night as part of a homework assignment.

Homework Activity: Ask students to observe the moon and stars at night.
This task involves each student drawing a picture of the moon (e.g., the phase), using a compass (if available) to identify its orientation in the sky, and writing a phrase or several sentences to describe what they have seen. Students should also draw several images of stars they view in the sky and write a brief description.

After students collect data about what appears in the sky during the day and at night as well as the general locations of these celestial bodies in the sky over time, engage students in a discussion about their findings.
T - What could we observe in the sky during the day?
T - Why do you think we couldn't see the stars during the day?
T - (If you didn't see the moon) Have you ever seen the moon during the daytime?
T - How did the sun's location change during the day?
T - Where do you think we will find the sun in the sky tomorrow morning? Where do you expect it to be at the end of the school day tomorrow?
T - Do you think we will be able to see the sun/moon/stars again tomorrow? When (morning or night)? Repeat this activity over the course of several days in order for students to observe patterns in the sun's and moon's location.

Websites & Media

NASA' Space Place: http://spaceplace.nasa.gov/

During this unit, consider reviewing NASA's Space Place sections on the Sun and the Solar System. These pages have excellent information to help answer questions that you might hear from your students such as, "Why does the sun burn you?" and "What's it like inside Jupiter?"

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

This website is full of kid-friendly information and games, including information about the current crew aboard the International Space Station and about future plans for possible manned missions to Mars.

PBS Kids—Ready Jet Go! Clips with Astronaut Amy: http://pbskids.org/readyjetgo/video.html

Clips from the astronomy-focused animated series, Ready Jet Go!, could be useful to review information learned during this domain-based unit. Particularly, "Astronomer Amy" Mainzer offers excellent clips of real space exploration missions and concepts. Using clips from the fictional series itself, students can also learn and discuss ideas such as how the International Space Station stays in orbit without falling back to Earth and without flying out into space.

Starry Night—Free Classroom Resources:
http://www.starrynighteducation.com/resources_free.html

Starry Night offers interactive simulations of astronomy and earth science concepts as part of an array of apps that are available for purchase. The website also offers free resources such as free interactive sky charts and the audio pronunciation guide to help you build confidence in naming celestial bodies.

Weather Underground International Webcams:
https://www.wunderground.com/webcams/index.html?range=intl

The Weather Underground network, which may have been introduced to your students by Kindergarten teachers during *Seasons & Weather* (Kindergarten Unit 4), offers live webcams of conditions around the U.S. and the world. Using two or more live webcams (e.g., in the U.S., Japan, Australia, etc.), consider having students make observations about and discuss the time of day in different parts of world.

Supplemental Trade Books

- A Guide to the Planets, by Sue Whiting (National Geographic Society, 2004) ISBN 0792248171
- Blast Off! A Space Counting Book, by Norma Cole and illustrated by Marshall H. Peck (Charlesbridge, 1994) ISBN 088106498X
- Earth Cycles, by Michael Elsohn Ross and illustrated by Gustav Moore (Millbrook Press, 2003) ISBN 0761319778
- Find the Constellations, by H. A. Rey (Houghton Mifflin Books for Children, 2008) ISBN 054713178X
- Going Around the Sun: Some Planetary Fun, by Marianne Berkes (Dawn Publications, 2008) ISBN 158469100X
- How Much is a Million? 20th Anniversary Edition, by David M. Schwartz and illustrated by Steven Kellogg (HarperCollins, 2004) ISBN 0688099335
- If You Decide to Go to the Moon, by Faith McNulty and illustrated by Steven Kellogg (Scholastic Press, 2005) ISBN 0590483595
- Me and My Place in Space, by Joan Sweeney and illustrated by Annette Cable (Crown Publishers, 1998) ISBN 0517709686
- Midnight on the Moon (Magic Tree House, No. 8), by Mary Pope Osborne and Sal Murdocca (Random House Books for Young Readers, 1996) ISBN 0679863745
- My Book of Space, by Ian Graham (Kingfisher, 2001) ISBN 0753453991
- Once Upon a Starry Night: A Book of Constellations, by Jacqueline Mitton and illustrated by Christina Balit (National Geographic Children's Books, 2009) ISBN 1426303912
- Our Solar System, by Seymour Simon (Collins, 2007) ISBN 0061140082
- Planets: A Solar System Stickerbook, by Ellen Hasbrouck and illustrated by Scott McDougall (Little Simon, 2001) ISBN 068984414X
- Reaching for the Moon, by Buzz Aldrin and illustrated by Wendell Minor (Collins, 2008) ISBN 0060554479
- Solar System: The Best Start in Science (Science Everywhere!), by Helen Orme (New Forest Press, 2010) ISBN 1848982925
- Space: A Nonfiction Companion to Midnight on the Moon, by Will Osborne and Mary Pope Osborne (Random House Books for Young Readers, 2002) ISBN 037581356X
- Stargazers, by Gail Gibbons (Holiday House, 1999) ISBN 0823415074
- Sun Up, Sun Down, by Gail Gibbons (Voyager Books, 1987) ISBN 015282782X
- The Big Dipper, by Franklyn M. Branley and illustrated by Molly Coxe (HarperCollins, 1991) ISBN 0064451003
- The Magic School Bus: Lost in the Solar System, by Joanna Cole and illustrated by Bruce Degen (Scholastic Inc., 1990) ISBN 0590414291
- The Moon Seems to Change, by Franklyn M. Branley and illustrated by Barbara and Ed Emberley (HarperCollins, 1987) ISBN 0064450651
- The Night Sky, by Felix James (National Geographic Society, 2001) ISBN 0792289552
- The Sun is My Favorite Star, by Frank Asch (Voyager Books, 2000) ISBN 0152063978
- The Sun, by Anita Garmon (National Geographic Society, 2002) ISBN 0792285093

- There's No Place Like Space! All About Our Solar System, by Tish Rabe and illustrated by Aristedes Ruiz (Random House Inc., 1999) ISBN 0679891153
- What Makes Day and Night, by Franklyn M. Branley and illustrated by Arthur Dorros (HarperCollins, 1986) ISBN 0064450503
- What the Moon is Like (Let's-Read-and-Find-Out-Science, Stage 2), by Franklyn M. Branley and illustrated by True Kelley (HarperCollins, 2000) ISBN 0064451852