

Unit Overview	
Content Area: Earth and Space Science	
Unit Title: Earth's Patterns/ Sun and Moon	Unit: 2
Target Course/Grade Level: 1	Timeline: 19 days
<p>Unit Summary:</p> <p>In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The cross cutting concept of <i>patterns</i> is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in <i>planning and carrying out</i> investigations and analyzing and interpreting data. Students are also expected to use these practices to demonstrate an understanding of the core ideas.</p> <p>This unit is based on 1-ESS1-1 and ESS1-2</p>	
Learning Targets	
NJSLS-Science	
1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]
1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

8.1.2.E.1	Use digital tools and online resources to explore a problem or issue.
8.2.2.A.2	Describe how designed products and systems are useful at school, home, and work.
8.2.2.A.3	Identify a system and the components that work together to accomplish its purpose.
8.2.2.A.4	Choose a product to make and plans the tools and materials needed.
8.2.2.A.5	Collaborate to design a solution to a problem affecting the community.
8.2.2.B.1	Identify how technology impacts or improves life.
8.2.2.B.3	Identify products or systems that are designed to meet human needs.
8.2.2.B.4	Identify how the ways people live and work has changed because of technology.
8.2.2.C.1	Brainstorm ideas on how to solve a problem or build a product.
8.2.2.C.2	Create a drawing of a product or device that communicates its function to peers and discuss.
8.2.2.C.3	Explain why we need to make new products.
8.2.2.D.1	Collaborate and apply a design process to solve a simple problem from everyday experiences.
Disciplinary Core Ideas	
<p><u>ESS1.A: The Universe and its Stars</u></p> <ul style="list-style-type: none"> Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) <p><u>ESS1.B: Earth and the Solar System</u></p> <ul style="list-style-type: none"> Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2) 	
Science and Engineering Practices	
<p><u>Planning and Carrying Out Investigations</u></p> <ul style="list-style-type: none"> Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1),(1-PS4-3) <p><u>Planning and Carrying Out Investigations</u></p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to collect data that can be used to make comparisons. 	

(1-ESS1-2)

Analyzing and Interpreting Data

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

NJSLS Connections

Primary Interdisciplinary Connections:

English Language Arts/Literacy:

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),(1-ESS1-2) W.1.7

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

Mathematics:

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

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

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

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.OA.A.1

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) 1.MD.C.4

Unit Essential Questions

1. *What patterns of change can be predicted when observing the sun, moon, and stars?*
2. *What is the relationship between the amount of daylight and the time of year?*

Unit Understandings

- Model the rotation of Earth to explain day and night
- Represent and explain the daily apparent motion of the Sun
- Create models to understand length and direction of shadows in daily patterns.
- Identify the cyclical phases of the Moon
- Describe general characteristics of each season specific to their region
- Relate how seasonal weather patterns affect their daily
- Model how the Earth orbits the Sun
- Understand that Earth’s orbit around the Sun causes seasons
- Carry out an investigation to compare relative amounts of daylight during each season
- Explain why we cannot see stars during the day
- Describe a constellation as a predictable star pattern

	<ul style="list-style-type: none"> • Identify common constellations.
<p>Unit Learning Targets (Outcomes) – Formative Assessment <i>Students who understand the concepts are able to ...</i></p>	
<ul style="list-style-type: none"> • Observe and use patterns in the natural world as evidence and to describe phenomena. • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. • Use observations of the sun, moon, and stars to describe patterns that can be predicted. Examples of patterns could include. <ul style="list-style-type: none"> ○ The sun and moon appear to rise in one part of the sky, move across the sky, and set. ○ Stars other than our sun are visible at night but not during the day. (<i>Assessment of star patterns is limited to stars being seen at night and not during the day.</i>) • <i>Observe and use patterns in the natural world as evidence and to describe phenomena.</i> • <i>Make observations (firsthand or from media) to collect data that can be used to make comparisons.</i> • <i>Make observations at different times of the year to relate the amount of daylight to the time of year. (Note: The emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall; assessment is limited to relative amounts of daylight, not to quantifying the hours or time of daylight.)</i> 	
<p>Cross Cutting Concepts:</p> <p><u>Patterns</u></p> <ul style="list-style-type: none"> • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2) <p><i>Connections to Nature of Science</i></p> <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> • Science assumes natural events happen today as they happened in the past. (1-ESS1-1) • Many events are repeated. (1-ESS1-1) 	
<p>Integration of Technology: Web-based textbook, interactive whiteboard, interactive texts, videos, digital board builder</p>	
<p>Technology Resources:</p> <p>http://www.knowingscience.com/teacher-resources-grade-1-earth-and-space-science</p>	
<p>Opportunities for Differentiation: Differentiation and support tips, which includes suggestions for ELL, struggling students, and accelerated students, are available below the instructional practice section of each model lesson.</p>	
<p>Career Ready Practices: <i>In this unit the following career ready practices are addressed</i></p> <p>CRP1: Act as a reasonable and contributing citizen and employee</p> <p>CRP2: Apply appropriate academic and technical skills</p> <p>CRP3: Attend to personal health and financial well-being</p> <p>CRP4: Communicate clearly and effectively and with reason</p>	

CRP5: Consider the environmental, social and economic impacts of decisions
CRP6: Demonstrate creativity and innovation
CRP7: Employ valid and reliable research strategies
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them
CRP9: Model integrity, ethical leadership and effective management
CRP10: Plan education and career paths aligned to personal goals
CRP11: Use technology to enhance productivity
CRP12: Work productively in teams while using cultural global competence

Prior Learning- by the end of Grade 1, students understand that:

- This is the first formal opportunity for students to engage with the disciplinary core ideas.

Evidence of Learning

Summative Assessment

Sun and Moon

1. The student will model the Earth's rotation and be able to explain the difference between day and night.
2. The students will be able to explain how and why a shadow moves throughout the day.
3. The student will identify the phases of the moon with assistance of the phases of the moon viewer on page 35-36.

The Seasons

1. The students will describe the general characteristics of each season.
2. The students will explain that the Earth's orbit around the Sun causes the changes in the season.
3. Students will model how the Earth orbits the Sun using their own body.

Star Patterns

1. The students will be able to explain why stars cannot be seen during the day
2. The student will define a constellation as a star pattern.

Equipment needed: Whiteboard, laptops, headphones, and hands-on materials for lessons

Teacher Instructional Resources (Hyperlinks):

<http://www.knowingscience.com/teacher-resources-grade-1-earth-and-space-science>

Modifications for ELL's, Special Education, 504, and Gifted and Talented Students:

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies](#) for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles
(http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

<u>ACTIVITIES</u>	<u>MATERIALS</u>
<p>Grade 1 Knowing Science Earth Science Textbook Course: Earth Science Unit: Sun and Moon Concept: Sun and Moon</p>	
<p>Session 1: What makes day and night?</p> <p>D1- Discuss what you do at day/night (chart) Discuss what makes it different? -Read What Makes Day and Night D2-Use lamp and blow up globe to represent earth spinning and show light (see page 20) -Do activity sheet 1 Day and Night</p>	<p>Light bulb, lamp, glow in dark stars</p> <ul style="list-style-type: none"> • Activity Sheet 1: Day and Night • Earth’s Patterns Kit • <u>What Makes Day and Night by Franklyn Branley</u>
<p>Session 2: Why does the Sun appear to move across the daytime sky? Read <u>Where Does the Sun Go at Night?</u> Refer to previous days list/ What makes it different how can we divide the lists further? (morning/afternoon)</p>	<p>Activity Sheet 2: The Sun’s Path</p>

<p>Do Activity Sheet 2: The Sun's Path</p>	
<p>Session 4: How does the Moon move in the sky? "Long before clocks people told time with shadows!" Do Activity Sheet 3: Shadow Clocks Check shadows throughout day. Option 2- Shadow sidewalk chalk as class**</p>	<p>Activity Sheet 3: Shadow Clocks</p> <ul style="list-style-type: none"> • Sundial Kit • Glue (optional) • Rulers, one for each group
<p>Session 4: How does the Moon move in the sky? D1-Read <u>The Moon Seems to Change (and Brainpop Video)</u> D2-Label Moon phases/ Activity Sheet 4: The Moon D3- Moon Phases Craft D4- Any Extensions</p> <p>*Home extension send home chart and moon phases for project</p>	<p>Activity Sheet 4: The Moon (includes reading and Moon Phases Spin Wheel template)</p> <ul style="list-style-type: none"> • Brass fasteners • Optional: cardstock, construction paper, or any other heavyweight paper • General craft supplies (scissors) <p>Moon brainpop jr Moon Books <u>The Moon Seems to Change</u></p>
<p>Grade 1 Knowing Science Earth Science Textbook Course: Earth Science Unit: The Seasons Concept: Seasons</p>	
<p>Session 1: What are the characteristics of each season? Each day read a season book and chart (temp/clothing/ what you see in nature/activities you can do) Students can complete one page in their seasons book</p>	<p><u>Exploring Fall</u> <u>Exploring Spring</u> <u>Exploring Summer</u> <u>Exploring Winter</u> Activity Sheet 1: Season to Season (stapled 4 pages)</p>
<p>Session 2: What makes the seasons? Read- <u>Reason for Seasons</u> Light experiment with students body and light (see page 43)</p>	<p>Light bulb with holder</p> <ul style="list-style-type: none"> • "Seasons Signs" (see Preparing for the Lesson) • Activity Sheet 2: Earth's Orbit • Earth's Patterns Kit
<p>Session 3: What are our final seasonal observations? What did you observe? Ask questions from pg 44</p>	

<p>Grade 1 Knowing Science Earth Science Textbook Course: Earth Science Unit: Star Patterns Concept: Constellations</p>	
<p>Session 1: How do we see the stars? Read <u>Jump into Science: Stars</u> Discuss when we see stars/have you seen stars Turn out lights to see stars Activity Sheet 1: Day and Night.</p>	<p>Glow in the dark stars • Light bulb with holder • Activity Sheet 1: Day and Night</p>
<p>Session 2: What are star patterns? Read <u>The Big Dipper</u> Do activity sheet 3 with Big Dipper and stars D2- Give out black paper/ stars/ chalk Create own Constellation</p>	<ul style="list-style-type: none"> • Activity Sheet 2: Star Stories (High) • Activity Sheet 3: Constellation Outlines • Constellation Cards (optional) • Activity Sheet 4: Make a Constellation (optional) • Constellation Kit <p><u>The Big Dipper</u></p>