



## Grade 5 Science

### Unit # 2 – Earth and Space Science

### Topic 7 Patterns in Space – 18 Days

**Unit Overview:** In Topic 3 students will learn how patterns in the natural world contribute to the interactions of Earth’s four spheres – Geosphere, hydrosphere, atmosphere, and biosphere. Water is the primary emphasis in Topic 4. Students will explore the water cycle and the interactions among water and land. Topic 5 focuses on renewable and non-renewable resources on Earth and how humans use the resources. Topic 6 and **Topic 7** both investigate the Solar System. Students will develop models to observe brightness, orbits, and object sizes. Students should be able to recognize the position of the Earth, and key characteristics of the sun, planets, and other space objects. Students will then study patterns of the moon phases, star movement, rotation and revolution of Earth.

**Topic Essential Question:** How do patterns change from day to day and season to season?

#### Lessons

- Topic Launch/Quest Kickoff
- Lesson 1 Earth’s Gravitational Forces
- Lesson 2 Earth’s Movements in Space
- Lesson 3 Patterns Over Time
- Topic Close –Assessment, Quest Findings

#### NYSSLS Performance Expectations

**5-ESS1-1. Support an argument that differences in the apparent brightness of the Sun compared to other stars is due to their relative distances from Earth. [Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]**

**5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the Sun, moon, and some stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]**

**5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. [Clarification Statement: “Down” is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]**

#### Topic Opener

**PE:** 5-ESS1-2

**SEP:** Analyzing and Interpreting Data; Constructing Explanations and Designing Solutions

**DCI:**

**ESS1.B - Earth and the Solar System**

- The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)

**CCC:** Patterns; Cause and Effect

#### Savvas

**Highlighted labs are important to the understanding of the instructional concepts in this lesson and must be completed during Science instructional time.**

- **uConnect Lab – How can spinning affect a planet's shape?**
- Quest Kickoff – Plan a Trip Around the World of Patterns
- Leveled Readers
- STEM Engineering Reader
- Reading Check – Sequence

**Lesson 1 – Earth’s Gravitational Forces**

**PE:** 5-PS2-1

**SEP:** Developing and Using Models; Engaging in Argument from Evidence

**DCI:**

**PS2.B** – Types of Interactions

- The gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center. (5-PS2-1)

**CCC:** Cause and Effect

**Savvas**

**Guiding Objectives**

- Students will demonstrate that Earth’s gravity pulls objects toward the center of Earth.

**Literacy Skill**

- Sequence

**Vocabulary**

- gravity

**Academic Vocabulary**

- exert

**Connect** - TE/SB p. 278

- STEM Connection

**Investigate** - TE/SB pp. 279-280

- **Investigate Lab – How long do objects take to fall?**

- Video – Earth’s Gravitational Forces

- Virtual Lab – Gravity Here and There

- Literacy Toolbox – Sequence

**Synthesize** - TE/SB pp. 281-282

- Interactivity – The Force of Gravity

- *u*Be a Scientist

- Science Practice Toolbox – Engage in Argument from Evidence

- Quest Connection

**Demonstrate** – TE/SB p. 282

- Lesson 1 Check

- Lesson Quiz 1

- **Quest Check-In Lab – How does gravity affect matter?**

**Lesson 2 – Earth’s Movements in Space**

**PE:** 5-ESS1-2

**SEP:** Analyzing and Interpreting Data; Constructing Explanations and Designing Solutions

**DCI:**

**ESS1.B** - Earth and the Solar System

- The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.

(5-ESS1-2)

**CCC:** Patterns

**Savvas**

**Guiding Objective:**

- Students will demonstrate that night and day are caused by the rotation of earth around its axis once a day.
- Students will explain that Earth revolves around the sun about once a year.
- Students will describe why the amount of daylight is different depending on the time of the year.

**Literacy Skill**

- Sequence

**Vocabulary**

- axis
- rotation
- revolution

**Academic Vocabulary**

- pattern

**Connect** - TE/SB p. 284

- Local -to-Global Connection

**Investigate** - TE/SB pp. 285-289

- Video – Earth’s Movements in Space
- ***uInvestigate Lab – How are we spinning?***
- Math Toolbox – Convert Measurements
- Quest Connection
- Visual Literacy Connection – What is the movement of earth’s moon in space?

**Synthesize** - TE/SB pp. 290; 292

- Interactivity – Earth’s Rotation: Day and Night
- Quest Check-In – Sun Up, Sun Down

**Demonstrate** – TE/SB p. 291

- Lesson 2 Check
- Reading Check - Sequence
- Lesson 2 Quiz

<p><b><u>Lesson 3 – Patterns Over Time</u></b>  <b>PE:</b> 5-ESS1-1; 5-ESS1-2  <b>SEP:</b> Engaging in Argument from Evidence  <b>DCI:</b>  <b>ESS1.A – The Universe and its Stars</b></p> <ul style="list-style-type: none"> <li>• The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1)</li> </ul> <p><b>ESS1.B - Earth and the Solar System</b></p> <ul style="list-style-type: none"> <li>• The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)</li> </ul> <p>CCC: Patterns</p>	<p><b>Savvas</b>  <b>Guiding Objective:</b></p> <ul style="list-style-type: none"> <li>• Students will demonstrate why the sun, moon, and stars appear at different times.</li> <li>• Students will describe why shadows change size and direction during the day.</li> </ul> <p><b>Literacy Skill</b></p> <ul style="list-style-type: none"> <li>• Sequence</li> </ul> <p><b>Vocabulary</b></p> <ul style="list-style-type: none"> <li>• shadow</li> <li>• constellation</li> </ul> <p><b>Academic Vocabulary</b></p> <ul style="list-style-type: none"> <li>• related</li> </ul> <p><b>Connect - TE/SB p. 294</b></p> <ul style="list-style-type: none"> <li>• Curriculum Connection</li> </ul> <p><b>Investigate - TE/SB pp. 295-299; 300-301</b></p> <ul style="list-style-type: none"> <li>• Video – Patterns Over Time</li> <li>• <b>Investigate – What star patterns can you see?</b></li> <li>• Be a Scientist</li> <li>• Model It!</li> <li>• Visual Literacy Connection – How do we identify star patterns in the sky?</li> <li>• Crosscutting Concepts Toolbox – Patterns</li> <li>• Reading Check – Sequence</li> <li>• Quest Connection</li> </ul> <p><b>Synthesize - TE/SB pp. 299; 303</b></p> <ul style="list-style-type: none"> <li>• Interactivity – Phases of the Moon</li> <li>• Quest Check-In – Moon Sighting</li> </ul> <p><b>Demonstrate – TE/SB p.302</b></p> <ul style="list-style-type: none"> <li>• Lesson 3 Check</li> <li>• Lesson 3 Quiz</li> </ul>
<p><b><u>Topic Close</u></b></p> <ul style="list-style-type: none"> <li>• Topic Assessment and Remediation TE/SB pp. 308-313</li> <li>• Quest Finding and Reflection TE/SB p. 306</li> </ul>	<p><b><u>Topic 7 Enrichment</u></b></p> <p><b>Topic 7 - Lesson 1 Enrichment</b></p> <ul style="list-style-type: none"> <li>• Enrichment Activity TE p. 281</li> </ul> <p><b>Topic 7 - Lesson 2 Enrichment</b></p> <ul style="list-style-type: none"> <li>• Enrichment Activity TE p. 290</li> </ul> <p><b>Topic 7 - Lesson 3 Enrichment</b></p> <ul style="list-style-type: none"> <li>• Enrichment Activity TE p. 299</li> </ul>

<p><b>English Language Learners (ELL) Enhancements</b> To access <a href="#">hyperlinked</a> material, you must be logged into your BPS Google Drive</p>	<p><b><u>Listening</u></b></p> <ul style="list-style-type: none"> <li>● <b><u>Cross- Linguistic Practices</u></b>: Gives students opportunities to make connections between what they hear and their home language (For example, allow students to listen to a passage and identify cognates).</li> <li>● <b><u>Activating Prior Knowledge</u></b> Activating prior knowledge means both eliciting from students what they already know and building initial knowledge that they need in order to access upcoming content.</li> <li>● <b><u>Visuals</u></b> - GIFs, pictures- will assist students in understanding what they are listening to. Use <b><u>visual thinking strategies</u></b> to set the lens for learning.</li> <li>● Video to review or introduce a topic – use <b><u>closed captioning</u></b> to help students see the words and pronunciations while they listen to the content.</li> <li>● <b><u>Word stretching / Vowel stretching</u></b> when instructing allows student to listen closely to the pronunciation of the word.</li> <li>● <b><u>Performance Level Descriptors</u></b> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of listening. Scroll for grade 5.</li> </ul> <hr/> <p><b><u>Speaking</u></b></p> <ul style="list-style-type: none"> <li>● <b><u>Sentence Stems/Frames</u></b> - to begin a sentence - such as <i>Evolution is...</i> or <i>I think that evolution is...</i></li> <li>● <b><u>Academic Conversation Starters</u></b>: Have a visual of a list of academic sentence starters that students can refer to in a discussion.</li> <li>● <b><u>Choral Reading</u></b> - To build fluency, self-confidence and motivation with <a href="#">reading/speaking</a>.</li> <li>● Create <b><u>movement</u></b> to go with the word. Movement can be a motivating factor, as well as a kinesthetic tool for conceptualizing the rhythm and flow of fluent reading while triggering brain function for optimal learning.</li> <li>● <b><u>Performance Level Descriptors</u></b> This document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of speaking. Scroll for grade 5.</li> </ul> <hr/> <p><b><u>Reading</u></b></p> <ul style="list-style-type: none"> <li>● Supplementary Text to help reinforce concepts.</li> <li>● <b><u>Visual Aids</u></b> - Pictures or models to support vocabulary words and concepts</li> <li>● Video to review or introduce a topic - use <b><u>closed captioning</u></b> to help students read along while they listen to the content.</li> <li>● <b><u>4 Square / Frayer models</u></b> to help students gain a deeper understanding of vocabulary.</li> <li>● <b><u>Highlighting</u></b> important text to assist students in answering questions after the reading.</li> <li>● <b><u>Chunking</u></b>-Break reading of text into chunks or paragraphs</li> <li>● <b><u>Vocabulary Morphology</u></b>- Morphology relates to the segmenting of words into affixes (prefixes and suffixes) and roots or base words, and the origins of words. Understanding that words connected by meaning can be connected by spelling can be critical to expanding a student’s vocabulary.</li> <li>● <b><u>Performance Level Descriptors</u></b> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of reading. Scroll for grade 5.</li> </ul> <hr/> <p><b><u>Instructional Accommodations (depending on the student’s needs)</u></b></p> <ul style="list-style-type: none"> <li>● <b>Extended time</b> for tests in class, projects and assignments</li> <li>● <b>Directions read.</b> Broken down as necessary</li> <li>● <b>Model</b> how to complete the activity in the lesson</li> <li>● <b>Oral simplification</b> of directions or questions</li> <li>● <b>Translated version</b> of test when available. Student may have both version English and native language version</li> <li>● Use of <b><u>approved bilingual glossaries</u></b> from NYS in each subject</li> </ul>
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<p><b>Special Education Modifications</b></p> <p>Special Education students must have accommodations as per Individual Educational Plan (IEP)</p>	<p><b><u>Instructional</u></b></p> <ul style="list-style-type: none"> <li>● <b>Pre-teach</b> vocabulary</li> <li>● Use <b>picture vocabulary</b></li> <li>● Scaffold <b>Depth of Knowledge</b> questions</li> <li>● Provide copy of notes/<b>notes in “cloze”</b> form</li> <li>● Use of <b>Think, Pair, and Share</b> strategy to help process information</li> <li>● <b>Scaffold</b> written assignments with the use of <b>graphic organizers</b></li> <li>● Allow for <b>multiple ways to respond</b> (verbal, written, response board)</li> <li>● Provide <b>model of performance task</b></li> <li>● <b>Modify informational text</b> to fit the needs of the students</li> <li>● Provide a digital or paper <b>interactive notebook</b></li> <li>● Present complex <b>tasks in multiple ways</b></li> <li>● Provide <b>mnemonic strategies</b> for scientific concepts</li> </ul> <hr/> <p><b><u>Technology:</u></b></p> <ul style="list-style-type: none"> <li>● <b>Audio</b> reading of text</li> <li>● <b>Text to type</b> functions</li> <li>● <b>Videos</b> to clarify/visualize science concepts</li> <li>● <b>Record class lecture/discussions</b> and make accessible to student</li> <li>● <b>Nearpod-</b> interactive presentations of notes</li> </ul> <hr/> <p><b><u>In Class Assessments</u></b></p> <ul style="list-style-type: none"> <li>● Provide <b>multiple options</b> for projects</li> <li>● <b>Use of timer</b> in class</li> <li>● Break all complex tasks into chunks</li> </ul>
<p><b>Step Up to Writing</b></p> <p>Step Up to Writing Materials can be found in BPS Science K-12 Schoology Folder Grade 5 Resources Grade 5 SUTW materials</p>	<ul style="list-style-type: none"> <li>● Easy Two-Column Notes</li> <li>● Breaking Down Definitions</li> <li>● Paragraph Frame- What I Learned</li> <li>● <b><u>Performance Level Descriptors</u></b> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of writing. Scroll for grade 5.</li> </ul>
<p><b>Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom</b></p>	<ul style="list-style-type: none"> <li>● Materials, resources, and/or discussions address diverse cultural backgrounds and real-world applications</li> <li>● Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population</li> <li>● All students are given an opportunity to engage in science discourse</li> <li>● Teacher demonstrates high expectations for all students</li> </ul>