

Supplemental Materials for Standard 2 - Earth and Space Science

The materials on the following pages are supplemental to the core. Each objective in Standard 2 has a sheet of information vital to student learning of science and the scientific processes inherent in the core. They are intended to give guidance to the teacher on the following topics:

- The Big Ideas go beyond discrete facts or skills to focus on larger concepts, principles, or processes (Grant Wiggins and Jay McTighe, *Understanding by Design*, 1998, p. 10). Big Ideas are cumulative, meaning that students revisit ideas that are previously developed, but in more and more complex ways at each successive grade level. This allows teachers to anchor learning at the beginning of the grade level to “concepts and reasoning abilities that young children bring with them” (NRC, 2008).
- Indicators provide both Measureable Outcomes framed by Standard 1 objectives and Big Ideas and measurable indicators of student content knowledge and scientific processing for teachers.
- Science language is the language that students should use when conversing on each objective within the standard. Students may not be expected to spell and read each and every term.
- Guidance for combining Content and Process are suggested strategies teachers may use to teach the core. One-letter abbreviations (L, M, A, S) are included to show how the science learning may be integrated into Language Arts, Mathematics, Arts, and Social Studies concepts. Science content should never be taught as content alone, but should be taught through the process of scientific practice, embedding content into inquiry, hands-on learning, experimentation, interpretation of evidence, and communication of findings. “When students engage in science as practice, they develop knowledge and explanations of the natural world as they generate and interpret evidence.” (*Ready, Set, Science: Putting Research to Work in K-8 Science Classrooms*, pg. 34)
- According to the National Science Education Standards, it is important to help students “establish connections between the natural and designed worlds.” Guidance for combining Science, Technology, and Society provide support to teachers in this area.
- A key for interpreting the abbreviations used in the supplementary materials is found at the bottom of the page.

Important Note: A guide for reading the supplementary materials is found in Appendix B.

Subject	Grade	Standard	Objective
Science	K	2. Earth and Space Science	2. Observe and describe changes in day and night.
Content Big Ideas		Standard 1 Big Ideas – Intended Learning Outcomes	Science, Technology, and Society Big Ideas
<p>(E) Change is something that happens to many things.</p> <p>(E) Some changes are so slow or so fast that they are hard to see.</p>		<p>(PoS) People can often learn about things around them by just observing those things carefully (raise questions about the world around them, be willing to seek answers to some of those questions by making careful observations).</p> <p>(CoS) People are more likely to believe your ideas if you can give reasons for them (ask “How do you know?” in appropriate situations and attempt reasonable answers when others ask them the same questions).</p> <p>(NoS) When doing science activities, it is often helpful to work with a team and to share findings with others.</p>	<p>(T) People use appropriate tools and models to investigate the world.</p> <p>(A) People working alone or in groups often invent new ways to solve problems and get work done.</p> <p>(S) The tools and ways of doing things that people have invented affect all aspects of life.</p>
Indicators: Measureable Outcomes framed by Standard 1 Big Ideas			
<p>Indicator 1. Compare and contrast light and dark in a day-night cycle and identify the changes as a pattern.</p> <p>Indicator 2. Investigate, interpret, and explain to others that the sun provides heat and light to Earth.</p> <p>Indicator 3. Examine what happens when you block the sun’s light. Explore shadows and temperature changes.</p>			
<p>Science language students should be able to use correctly: pattern, change, heat, light, temperature, shadow.</p>			
Guidance for Combining Content and Process			Guidance for Combining Science, Technology, and Society
<p>Suggested Strategies</p> <p>Have the student explore shadows moving as the light source moves. Investigate the following questions (and others that you or your students choose): (PoS)</p> <ul style="list-style-type: none"> • How are shadows different at different times of the day? How can you use a camera to explore shadow movement? • What happens to a shadow as a light source (like a flashlight) moves? <p>Investigate activities that can be done easier in the light than in the dark. Compare results (e.g., name writing, line up for recess, sleep, storytelling). (L) (PoS)</p> <p>Investigate how the Earth blocks the sun’s light using a flashlight and a globe. (PoS)</p> <p>Have the students place an ice cube outside in the sunshine and another in the shade. Investigate: Does an ice cube melt faster in the shade or in sunlight? (PoS)</p> <p>During literacy seat work time have students create word and picture reports of their findings on the above investigations. (L) (CoS) (NoS)</p>			<p>(T) Students use age-appropriate tools to investigate (camera, flashlight, world globe, ice cube).</p> <p>(A) Some devices are made to use during the day, others to use at night.</p> <p>(S) Staying up all night is not healthy.</p>
Earth and Space Science	Curriculum Connections		Applications: Science, Technology, and Society
<p>(E) Earth science</p> <p>(SS) Space science</p>	<p>(M) Mathematics</p> <p>(L) Language Arts</p>	<p>(FA) Fine Arts</p> <p>(SS) Social Studies</p>	<p>(T) Tools of science</p> <p>(A) Applications of science</p> <p>(S) Implications of science for people</p>
		<p>Processes, Communication, and Nature of Science</p> <p>(PoS) Processes of science</p> <p>(CoS) Communication of science</p> <p>(NoS) Nature of science</p>	