

## 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	1. Investigate non-living things.
<b>Content Big Ideas</b>		<b>Standard 1 Big Ideas – Intended Learning Outcomes</b>	<b>Science, Technology, and Society Big Ideas</b>
(E) Change is something that happens to many things. (E) Some changes are so slow or so fast that they are hard to see.	(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). (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). (NoS) When doing science activities, it is often helpful to work with a team and to share findings with others.	(T) People use appropriate tools and models to investigate the world. (A) People working alone or in groups often invent new ways to solve problems and get work done. (S) The tools and ways of doing things that people have invented affect all aspects of life.	
<b>Indicators: Measureable Outcomes framed by Standard 1 Big Ideas</b>			
<p><b>Indicator 1. Observe and record that big rocks break down into small rocks, e.g., boulders, rocks, pebbles, sand and record the results of observations.</b></p> <p><b>Indicator 2. Demonstrate how water and wind move non-living things.</b></p> <p><b>Indicator 3. Sort, group, and classify Earth materials, e.g., hard, smooth, rough, shiny, flat.</b></p>			
<b>Science language students should be able to use correctly:</b> wind, rivers, soil, change.			
<b>Guidance for Combining Content and Process</b>			<b>Guidance for Combining Science, Technology, and Society</b>
<p><b>Suggested Strategies</b></p> <p>In small groups, have students build a sand structure of their choosing in a sensory table. Ask them to investigate the following questions (and others that you or your students choose): (PoS) (NoS) (CoS)</p> <ul style="list-style-type: none"> <li>• What happens to your sand structure when wind or water is applied?</li> <li>• Will water run up the sand hill in your sensory table?</li> </ul> <p>In small groups have the students simulate a rock breaking activity utilizing such materials as hard candy, bread, graham crackers, and soda crackers. Have the students break the objects in plastic bags by hitting them with whatever tools they choose. Then, the teacher conducts a rock breaking activity with rocks of varying hardness, e.g., granite, sandstone, mica. Connect the two activities. Then ask them to investigate the following questions (and others that you or your students choose): (PoS) (NoS) (CoS)</p> <ul style="list-style-type: none"> <li>• What rocks (materials) break easily?</li> <li>• Do some rock (materials) break easier than others?</li> </ul> <p>Show pictures of landscapes (e.g., Goblin Valley, Arches, Natural Bridges). Have the students show examples of water changes and wind changes as they relate to the sensory table experience. (FA) (PoS)</p> <p>Collect examples of earth materials (e.g., soil, sand, rocks). Have the students investigate the following questions (and others that you or your students choose): (PoS)</p> <ul style="list-style-type: none"> <li>• Can you sort these earth materials?</li> <li>• In what different ways can you sort them?</li> </ul> <p>During literacy seat work time have students create word and picture reports of their findings on the above investigations. (L) (CoS)</p>			(T) Students use age-appropriate tools for investigations (sensory table, safety goggles, magnifying glass) (A) Students should be able to see rocks as tools that can be used to hammer, sand, crush, and grind. (S) Rocks are used in many social applications like highways, dams, houses, apartments, and jewelry
<b>Earth and Space Science</b>	<b>Curriculum Connections</b>	<b>Processes, Communication, and Nature of Science</b>	<b>Applications: Science, Technology, and Society</b>
(E) Earth science (SS) Space science	(M) Mathematics (L) Language Arts	(FA) Fine Arts (SS) Social Studies (PoS) Processes of science (CoS) Communication of science (NoS) Nature of science	(T) Tools of science (A) Applications of science (S) Implications of science for people