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 1objectives 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.
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<td>Science</td>
<td>Second</td>
<td>2. Earth and Space</td>
<td>2. Observe and record the recognizable objects and patterns in the night sky.</td>
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### Content Big Ideas

(S) There are recognizable patterns among objects in the night sky.

### Standard 1 Big Ideas – Intended Learning Outcomes

(PoS) When science investigation is done the way it was done before, we expect to get a very similar result.

(NoS) Sometimes people aren’t sure what will happen because they don’t know everything that might have an effect.

(CoS) When doing science activities, it is often helpful to work with a team and to share findings with others. All team members should reach their own individual conclusions, however, about what the findings mean.

(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.

### Indicators: Measureable Outcomes framed by Standard 1 Big Ideas

**Indicator 1.** Observe, describe, and record patterns in the appearance and apparent motion of the moon in the night sky.

**Indicator 2.** Observe and describe the number, arrangement and color/brightness of stars in the night sky.

**Science language students should be able to use correctly:** arrangement, patterns, location, variations, constellations, moon phases.

### Guidance for Combining Content and Process

**Suggested Strategies**

During a time when the moon is visible at night, students can keep a nightly journal recording the appearance and location of the moon in the sky for one week. The product can be the journal and reflective discussion/writings/opinions. (L) (PoS) (CoS)

Students can make an observation of the night sky to record the estimated number of stars, the apparent color/brightness of the stars and the arrangement of stars in the sky. After making observations, students can discuss findings in groups and develop their conclusions about the patterns and variations of the stars in the sky. (L) (M) (PoS) (NoS)

(T) Students can use magnifiers (e.g. binoculars, telescopes) to help see things they could not see without them.

(A) Students can explain how objects in the night sky are used for navigation (e.g. GPS, north star, star patterns).

(A) Students can understand that space exploration has produced data to answer questions about the moon and stars.

(S) Students can evaluate factors in the environment that might limit viewing of the night sky.

### Curriculum Connections

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<th>Earth and Space Science</th>
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<th>Processes, Communication, and Nature of Science</th>
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<td>(SS) Space science</td>
<td>(L) Language Arts</td>
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<td></td>
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