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.
## Big Ideas

**E** Some changes, such as changes in weather can vary based on season and location.

**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.** Compare and contrast the seasonal weather patterns during the school year.

**Indicator 2.** Analyze and interpret data such as temperatures in different locations and different times.

**Science language students should be able to use correctly:** seasonal, variations, analyze, interpret, temperature, precipitation, thermometer, rain gauge, weather vane, data, conclusions, location, patterns.

## Guidance for Combining Content and Process

### Suggested Strategies

Students can record and interpret weather data using a graph with numbered axes for temperature and pictographs for precipitation (rainy/snowy), cloud cover (cloudy/sunny), and wind conditions (windy/not windy) if applicable. They can repeat data collection during each season and then compare and discuss the variations. (L) (M) (PoS) (CoS) (NoS)

Students can conduct a simple experiment (making predictions, gathering data and forming conclusions) to determine the variations in temperature of various locations (grass/asphalt, sun/shade, your school/another area) and different times of day (morning/afternoon). The product could be a video mini-weather report, newspaper article, charts, graphs, or various kinds of computer presentations. (L) (M) (FA) (PoS) (CoS) (NoS)

Student products could be a video mini-weather report, newspaper article, charts, graphs, various kinds of computer presentations, etc. (L) (M) (FA) CoS

### Guidance for Combining Science, Technology, and Society

(T) Students can measure weather data using weather instruments such as a thermometer, rain gauge, and weather vane.

(T) Students can gather and record weather data on paper or using the internet.

(A) Students can evaluate the changes in our daily lives based on changes in the weather.

(S) Students can evaluate the economic/agricultural impacts of extreme weather.

## Subject Grade Standard Objective


## Curriculum Connections

<table>
<thead>
<tr>
<th>Earth and Space Science</th>
<th>Curriculum Connections</th>
<th>Processes, Communication, and Nature of Science</th>
<th>Applications: Science, Technology, and Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>(E) Earth science</td>
<td>(M) Mathematics</td>
<td>(PoS) Processes of science</td>
<td>(T) Tools of science</td>
</tr>
<tr>
<td>(SS) Space science</td>
<td>(L) Language Arts</td>
<td>(CoS) Communication of science</td>
<td>(A) Applications of science</td>
</tr>
<tr>
<td></td>
<td>(SS) Social Studies</td>
<td>(NoS) Nature of science</td>
<td>(S) Implications of science for people</td>
</tr>
</tbody>
</table>