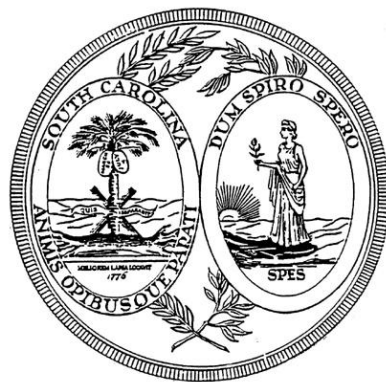


# South Carolina Academic Standards and Performance Indicators for Science 2014



**Instructional Unit Resource**

**1<sup>st</sup> Grade**

# ***South Carolina Academic Standards and Performance Indicators for Science 2014***

## ***First Grade Science Instructional Unit Resource***

As support for implementing the *South Carolina Academic Standards and Performance Indicators for Science 2014*, the standards for First Grade have been grouped into possible units. In the Overview of Units below, the titles for those possible units are listed in columns. Refer to the Overview document to note these unit titles and how Standards, Conceptual Understandings, Performance Indicators, Science and Engineering Practices, and Crosscutting Concepts align. Following the Overview of Units, an Instructional Unit document is provided that delivers guidance and possible resources in teaching our new *South Carolina Academic Standards and Performance Indicators for Science 2014*. The purpose of this document is to provide guidance as to how all the standards in this grade may be grouped into units and how those units might look. Since this document is merely guidance, districts should implement the standards in a manner that addresses the district curriculum and the needs of students. This document is a living document and instructional leaders from around the state will continuously update and expand these resource documents. These documents will be released throughout the 2016-2017 school year with the intentionality of staying ahead of instruction. Teachers should also note that links to the Standards document, A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas, the SEP Support Document, and the Support Document 2.0 are embedded throughout the Instructional Unit format for reference.

### **Acknowledgments**

Jean Baptiste Massieu, famous deaf educator, made a statement that is now considered a French proverb. “Gratitude is the memory of the heart. Indeed, appreciation comes when you feel grateful from the depths of your heart. The head keeps an account of all the benefits you received and gave. But the heart records the feelings of appreciation, humility, and generosity that one feels when someone showers you with kindness.” It is with sincere appreciation that we humbly acknowledge the dedication, hard work and generosity of time provided by teachers and instructional leaders across the state that have made and are continuing to make the Instructional Unit Resources possible.

### Grade 1 Overview of Units

Unit 1	Unit 2	Unit 3		Unit 4	
PHYSICAL SCIENCE: EXPLORING LIGHT AND SHADOWS	EARTH SCIENCE: EXPLORING SUN AND MOON	EARTH SCIENCE: EARTH'S NATURAL RESOURCES		LIFE SCIENCE: PLANTS AND THEIR ENVIRONMENTS	
Standard	Standard	Standard		Standard	
1.P.2	1.E.3	1.E.4		1.L.5	
Conceptual Understanding	Conceptual Understanding	Conceptual Understanding		Conceptual Understanding	
1.P.2A	1.E.3A	1.E.4A	1.E.4B	1.L.5A	1.L.5B
Performance Indicators	Performance Indicators	Performance Indicators		Performance Indicators	
1.P.2A.1 1.P.2A.2 1.P.2A.3 1.P.2A.4	1.E.3A.1 1.E.3A.2 1.E.3A.3 1.E.3A.4 1.E.3A.5	1.E.4A.1 1.E.4A.2 1.E.4A.3	1.E.4B.1 1.E.4B.2	1.L.5A.1 1.L.5A.2	1.L.5B.1 1.L.5B.2 1.L.5B.3
*Science and Engineering Practices	*Science and Engineering Practices	*Science and Engineering Practices		*Science and Engineering Practices	
1.S.1A.2 1.S.1A.3 1.S.1A.4 1.S.1A.8	1.S.1A.2 1.S.1A.3 1.S.1A.4 1.S.1A.8 1.S.1B.1	1.S.1A.2 1.S.1A.3 1.S.1A.4 1.S.1A.8		1.S.1A.2 1.S.1A.3 1.S.1A.4 1.S.1A.6 1.S.1A.8	
*Crosscutting Concepts	*Crosscutting Concepts	*Crosscutting Concepts		*Crosscutting Concepts	
1, 2, 7	1, 2, 7	1, 2, 5, 7		1, 2, 6, 7	

*\*Teachers have the discretion to enhance the selected SEP's and CCCs.*

<b>Unit Title</b>
Earth Science: Exploring the Sun and Moon
<b>Standard</b>
<a href="http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf">http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf</a>
1.E.3: The student will demonstrate an understanding of the patterns of the Sun and the Moon and the Sun’s effect on Earth.

**Conceptual Understanding**  
 1.E.3A. Objects in the sky move in predictable patterns. Some objects are better seen in the day sky and some are better seen in the night sky. The Sun is a star that provides heat and light energy for Earth.

**New Academic Vocabulary**  
 Some students may need extra support with the following academic vocabulary in order to understand what they are being asked to understand and do. Teaching these terms in an instructional context is recommended rather than teaching the words in isolation. A great time to deliver explicit instruction for the terms would be during the modeling process. Ultimately, the student should be able to use the academic vocabulary in conversation with peers and teachers. These terms are pulled from the essential knowledge portion of the Support Doc 2.0 (<http://ed.sc.gov/instruction/standards-learning/science/support-documents-and-resources/>) and further inquiry into the terms can be found there.

Rotate	Sunrise	Sunset	Telescope	Satellite
Sun	Moon	Earth	Seasons	Warming effect
Crescent moon	Quarter moon	Gibbous moon	New moon	Full Moon
Revolve				

**Performance Indicators**  
 Text highlighted below in *orange* and *italicized/underlined* shows connections to SEP’s

1.E.3A.1 *Use, analyze, and interpret data* from observations to describe and predict seasonal patterns of sunrise and sunset.

1.E.3A.2 Use data from personal observations to describe, predict, and *develop models* to exemplify how the appearance of the moon changes over

time in a predictable pattern.

1.E.3A.3 Obtain and communicate information to describe how technology has enabled the study of the Sun, the Moon, planets, and stars.

1.E.3A.4 Conduct structured investigations to answer questions about the effect of sunlight on Earth's surface.

1.E.3A.5 Define problems related to the warming effect of sunlight and design possible solutions to reduce its impact on a particular area.

#### **\*Science and Engineering Practices**

Support for the guidance, overviews of learning progressions, and explicit details of each SEP can found in the Science and Engineering Support Doc ([http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete\\_2014SEPsGuide\\_SupportDoc2\\_0.pdf](http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf)). It is important that teachers realize that the nine science and engineering practices are not intended to be used in isolation. Even if a performance indicator for a given standard only lists one of the practices as a performance expectation, scientists and engineers do not use these practices in isolation, but rather as part of an overall sequence of practice. When educators design the learning for their students, it is important that they see how a given performance expectation fits into the broader context of the other science and engineering practices. This will allow teachers to provide comprehensive, authentic learning experiences through which students will develop and demonstrate a deep understanding of scientific concepts.

1.S.1A.2 Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

1.S.1A.3 With teacher guidance, conduct structured investigations to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to collect qualitative and quantitative data, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.

1.S.1A.4 Analyze and interpret data from observations, measurements, or investigations to understand patterns and meanings.

1.S.1A.8 Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions about the natural world, (2) understand phenomena, (3) develop models, or (4) support explanations. Communicate observations and explanations clearly through oral and written language.

1.S.1B.1 Construct devices or design solutions to solve specific problems or needs: (1) ask questions to identify problems or needs, (2) ask questions about the criteria and constraints of the devices or solutions, (3) generate and communicate ideas for possible devices or solutions, (4) build and test devices or solutions, (5) determine if the devices or solutions solved the problem, and (6) communicate the results.

#### **\*Cross Cutting Concepts** (<http://www.nap.edu/read/13165/chapter/8>)

The link above provides support from the Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012) The text in **blue** and *italicized/underlined* below provides a brief explanation of how the specific content ties to the CCC's.

1. **Patterns:** The National Research Council (2012) states "observed patterns of forms and events guide organization and classification, and they

prompt questions about relationships and the factors that influence them” (p. 84). [Patterns occur each month as the moon changes phases.](#)

2. **Cause and Effect: mechanism and explanation:** The National Research Council (2012) states that “events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts” (p. 84). [Sunlight has effects on the Earth’s surface which causes the surface to warm up when temperatures are higher.](#)

7. **Stability and change:** The National Research Council (2012) states that “For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study” (p. 84). [The warming effects of sunlight causes changes to the stability of the Earth’s environment.](#)

*\*Teachers have the discretion to enhance the selected SEP’s and CCC’s.*

#### **Prior Knowledge**

- N/A

#### **Subsequent Knowledge**

- 2.E.2A.2 - Seasonal patterns over time
- 4.E.3B.1 - Patterns in the location, movement, and appearance of the Moon
- 8.E.4B.1 - Characteristics and movements of objects (moon) in the solar system
- 8.E.4B.3 - Explain how seasons, caused by the tilt of the earth’s axis as it orbits the sun
- 8.E.4B.5 - Describe how data from technologies provide information about objects in the solar system
- H.E.5A.2 - The angle of solar incidence impacts the distribution of sunlight in any location

#### **Possible Instructional Strategies/Lessons**

**Strategies and lessons that will enable students to master the standard and/or indicator.**

- 1.E.3A.2-1.E.3A.4 [Sun and Moon](#) This lesson incorporates the first four indicators and will demonstrate patterns of the sun and moon. This resource can be found at: <http://rpsec.usca.edu/workshops/sissi/sissi2014-15/sunmoon/sunmoonlessonplan-sissiblank.pdf>

- 1.E.3A.1 The Predictable Patterns of the Sun and the Seasons This lesson to investigates the predictable patterns of our sunrise and sunset and how it relates to our seasonal patterns. This resource can be found at: <http://betterlesson.com/lesson/635856/the-predictable-patterns-of-the-sun-and-the-seasons>
- 1.E.3A.2 Moon Phases Demonstration This lesson uses a model to demonstrate how the moon changes. This resource can be found at: <https://www.youtube.com/watch?v=wz01pTvuMa0>
- 1.E.3A.2 Moon Phases Lesson Plan This lesson will show kids how the moon changes its appearance throughout the month. This resource can be found at: <http://spaceracers.org/pdf/moon-phases-lesson-plan.pdf>
- 1.E.3A.3 Telescopes and Constellations This lesson will allow students to create a telescope. This resource can be found at: <http://www.cpalms.org/Public/PreviewResourceLesson/Preview/46421>
- 1.E.3A.4 Feel the Heat This teacher led inquiry resource allows students to demonstrate and observe the effects of sunlight on the Earth's surface. This resource can be found at: [https://www.boreal.com/www.boreal.com/images/kindergarten\\_temp\\_probe\\_final.pdf](https://www.boreal.com/www.boreal.com/images/kindergarten_temp_probe_final.pdf)
- 1.E.3A.4 Sun and Shadows This lesson allows students to conduct investigations that help them discover how the Sun appears to move, how shadows change over time, and how the angle at which light shines changes the brightness and spread of the light. This resource can be found at: <http://rpsec.usca.edu/Workshops/SISSI/LessonPlans/SunandMoon/SunShadowsLessonPlan.pdf>
- 1.E.3A.5 A Place in the Shade--An Engineering Challenge This lesson allows students to create a model of protecting an ice cube that is out in the sun from melting. This resource can be found at: <http://betterlesson.com/lesson/644795/a-place-in-the-shade-an-engineering-challenge>
- 1.E.3A.5 Designing a Hat (See Appendices) This lesson uses the engineering design process to create a hat to reduce the warming effects of the sun.

## Resources

- 1.E.3A.1 As the Earth Turns This resource is an interactive story about why the sun appears to move across the sky. This resource can be found at: <http://www.beaconlearningcenter.com/WebLessons/AsTheEarthTurns/default.htm>
- 1.E.3A.1 The Earth and Beyond This resource can be used to show sunrise and sunset. This resource can be found at: <http://www.childrensuniversity.manchester.ac.uk/interactives/science/earthandbeyond/sunrisesunset/>
- 1.E.3A.2 Moon Phases This resource is an animation of the phases of the moon. This resource can be found at: <http://www.sumanasinc.com/webcontent/animations/content/moonphase.html>
- 1.E.3A.3 Telescopes for Kids This is an interactive website where students learn about space exploration. This resource can be found at: [http://www.kidsastronomy.com/explore\\_index.htm](http://www.kidsastronomy.com/explore_index.htm)
- 1.E.3A.5 NASA's Climate Kids This Interactive guided tour allows students to use a climate time machine to see water levels and carbon emissions rising as time passes. This resource can be found at: <http://climatekids.nasa.gov/>

## Sample Formative Assessment Tasks/Questions

Additional sample formative assessment tasks/questions for grade bands are located at the end of each of the SEP Support Doc

([http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete\\_2014SEPsGuide\\_SupportDoc2\\_0.pdf](http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf))

- 1.E.3A.1 Sunrise and Sunset Students will draw where the sun rises and where it sets. This resource can be found at: <http://www.education.com/download/worksheet/133144/sunrise-sunset.pdf>
- 1.E.3A.2 Moon Phases This assessment allows students to match the moon phases. This resource can be found at: <https://www.teachervision.com/tv/printables/orange/se-31.pdf>
- 1.E.3A.3 Telescopes Have the students write 3 complete sentences describing how technology has helped us explore the sun, moon, planets, and stars.

## References



As the Earth Turns (n.d.). Retrieved on August 31, 2015 from <http://www.beaconlearningcenter.com/WebLessons/AsTheEarthTurns/default.htm>

Baumann, J. (n.d.) A Place in the Shade-An Engineering Challenge. Retrieved August 28, 2016 from <http://betterlesson.com/lesson/644795/a-place-in-the-shade-an-engineering-challenge>

Beitel, M. (n.d.). The Predictable Patterns of the Sun and Seasons. Retrieved August 28, 2016 from <http://betterlesson.com/lesson/635856/the-predictable-patterns-of-the-sun-and-the-seasons>

Climate Kids (2016). Retrieved on September 2, 2016 from <http://climatekids.nasa.gov/>

The Earth and Beyond (2012). Retrieved on September 2, 2016 from <http://www.childrensuniversity.manchester.ac.uk/interactives/science/earthandbeyond/sunrisesunset/>

Effects of the Sun (n.d.) Retrieved on September 2, 2016 from [http://www.bloomfield.k12.nj.us/Portals/Woonsocket/District/RIDE\\_NGSS\\_Gr0K\\_u6\\_2014May24\\_final.pdf](http://www.bloomfield.k12.nj.us/Portals/Woonsocket/District/RIDE_NGSS_Gr0K_u6_2014May24_final.pdf)

Emily M. (2014). Moon Phases Demonstration. Retrieved on September 5, 2016 from <https://www.youtube.com/watch?v=wz01pTvuMa0>

Feel the Heat (2014). Retrieved on September 2, 2016 from [https://www.boreal.com/www.boreal.com/images/kindergarten\\_temp\\_probe-\\_final.pdf](https://www.boreal.com/www.boreal.com/images/kindergarten_temp_probe-_final.pdf)

Freeman and Kaufmann (2004). The Moon Phases. Retrieved on August 31, 2016 from <https://docs.google.com/document/d/1FAAh90n-9GEYMwugkcm94oc7309fRcN3jueboe5xBwI/edit>

Modeling Shadows. (n.d.) Retrieved August 3, 2016 from <http://sciencenetlinks.com/lessons/sky-3-modeling-shadows/>

Moon Phases (n.d.). Retrieved on September 2, 2016 from <https://www.teachervision.com/moon/printable/44947.html>

Moon Phases Lesson Plan (2014). Retrieved August 28, 2016 from <http://spaceracers.org/pdf/moon-phases-lesson-plan.pdf>

National Research Council. A Framework for k-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Washington, DC: The National Academies Press, 2012. doi: 10.17226/13165.

Ruth Patrick Science Center at University of South Carolina (2014).Sun and Moon. [pdf]. Retrieved August 3, 2016 from

1<sup>st</sup> grade Instructional Unit Resource SCDE | Office of Standards and Learning

<http://rpsec.usca.edu/workshops/sissi/sissi2014-15/sunmoon/sunmoonlessonplan-sissiblank.pdf>

Ruth Patrick Science Education Center. (2014) Sun Shadows [pdf]. Retrieved August 3, 2016 from  
<http://rpsec.usca.edu/Workshops/SISSI/LessonPlans/SunandMoon/SunShadowsLessonPlan.pdf>

Sunrise sunset (2014). Retrieved on September 2, 2016 from <http://www.education.com/download/worksheet/133144/sunrise-sunset.pdf>

Telescopes and Constellations (n.d.). Retrieved August 28, 2016 from <http://www.cpalms.org/Public/PreviewResourceLesson/Preview/46421>

Telescopes for kids (n.d.). Retrieved on September 2, 2016 from [http://www.kidsastronomy.com/explore\\_index.htm](http://www.kidsastronomy.com/explore_index.htm)

## 4<sup>th</sup> Grade - Exploring the Sun and Moon

### Designing a Hat Activity

#### Materials:

- Paper plates
- Newspaper
- Construction paper
- Tape
- Glue
- Scissors
- Stapler
- Pipe cleaners

#### Procedures:

Ask the students to use the materials given to design a hat that will help reduce the warming effects of the sun. First allow students to look at already existing hat designs to obtain some ideas. When the students are finished designing and constructing their hats allow them go outside to test their designs. The students should stand in the sunlight without their hats for 3 minutes. Then ask the students to put their hats on to see if they feel a difference and observe a difference. Have students record their observations and students could redesign if time allows.

#### Standard

1.E.3: The student will demonstrate an understanding of the patterns of the Sun and the Moon and the Sun's effect on Earth.

#### Conceptual Understanding

1.E.3A. Objects in the sky move in predictable patterns. Some objects are better seen in the day sky and some are better seen in the night sky.  
The Sun is a star that provides heat and light energy for Earth.

#### Performance Indicators

1.E.3A.5 [Define problems](#) related to the warming effect of sunlight and design [possible solutions](#) to reduce its impact on a particular area.

#### Science and Engineering Practices

1.S.1B.1 [Construct devices or design solutions](#) to solve specific problems or needs: (1) ask questions to identify problems or needs, (2) ask questions about the criteria and constraints of the devices or solutions, (3) generate and communicate ideas for possible devices or solutions, (4) build and test devices or solutions, (5) determine if the devices or solutions solved the problem, and (6) communicate the results.

## 4<sup>th</sup> Grade - Exploring the Sun and Moon

### Designing a Hat Activity

#### Cross Cutting Concepts

2. **Cause and Effect: mechanism and explanation:** The National Research Council (2012) states that “events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts” (p. 84). [\*Sunlight has effects on the Earth’s surface which causes the surface to warm up when temperatures are higher.\*](#)

7. **Stability and change:** The National Research Council (2012) states that “For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study” (p. 84). [\*The warming effects of sunlight causes changes to the stability of the Earth’s environment.\*](#)

#### References

South Carolina Department of Education. (2015). South Carolina Academic Standards and Performance Indicators for Science 2014. Retrieved from [http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South Carolina Academic Standards and Performance Indicators for Science 2014.pdf](http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf)