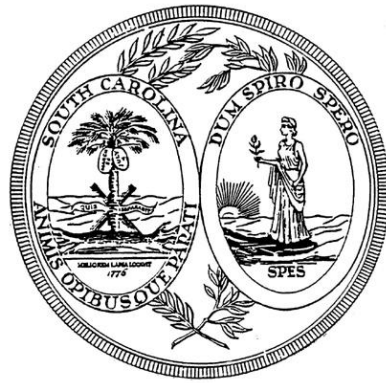


South Carolina Academic Standards and Performance Indicators for Science 2014



Instructional Unit Resource

2nd Grade

South Carolina Academic Standards and Performance Indicators for Science 2014

Second Grade Science Instructional Unit Resource

As support for implementing the *South Carolina Academic Standards and Performance Indicators for Science 2014*, the standards for Second 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 2 Overview of Units

Unit 1	Unit 2		Unit 3	Unit 4	
EARTH SCIENCE: WEATHER	PHYSICAL SCIENCE: SOLIDS AND LIQUIDS		PHYSICAL SCIENCE: EXPLORING PUSHES AND PULLS	LIFE SCIENCE: ANIMALS AND THEIR ENVIRONMENT	
Standard	Standard		Standard	Standard.	
2.E.2	2.P.3		2.P.4	2.L.5	
Conceptual Understanding	Conceptual Understanding		Conceptual Understanding	Conceptual Understanding	
2.E.2A	2.P.3A	2.P.3B	2.P.4A	2.L.5A	2.L.5B
Performance Indicators	Performance Indicators		Performance Indicators	Performance Indicators	
2.E.2A.1 2.E.2A.2 2.E.2A.3 2.E.2A.4	2.P.3A.1 2.P.3A.2 2.P.3A.3 2.P.3A.4	2.P.3B.1 2.P.3B.2 2.P.3B.3	2.P.4A.1 2.P.4A.2 2.P.4A.3 2.P.4A.4 2.P.4A.5	2.L.5A.1 2.L.5A.2 2.L.5A.3	2.L.5B.1 2.L.5B.2 2.L.5B.3 2.L.5B.4
*Science and Engineering Practices	*Science and Engineering Practices		*Science and Engineering Practices	*Science and Engineering Practices	
2.S.1A.2 2.S.1A.4 2.S.1A.8	2.S.1A.2 2.S.1A.3 2.S.1A.4 2.S.1A.7 2.S.1A.8		2.S.1A.2 2.S.1A.3 2.S.1A.4 2.S.4A.3 2.S.1B.1	2.S.1A.2 2.S.1A.4 2.S.1A.6 2.S.1A.8	
*CrossCutting Concepts	*CrossCutting Concepts		*CrossCutting Concepts	*CrossCutting Concepts	
1, 2, 3, 7	1, 2, 5, 6		1, 2, 3, 4, 5, 6, 7	1, 2, 5, 6, 7	

**Teachers have the discretion to enhance the selected SEPs and CCCs.*

Unit Title
Physical Science: Solids and Liquids
Standard
http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf
2.P.3 The student will demonstrate an understanding of the observable properties of solids and liquids and the special properties of magnets.

Conceptual Understanding
 2.P.3A. Solids and liquids are two forms of matter that have distinct observable properties. Some matter can be mixed together and then separated again. Solids and liquids can be changed from one form to another when heat is added or removed.

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.

Solid	Liquid	Properties	Translucent	Transparent
Opaque	Color	Shape	Size	Flow
Magnetism	Freezing	Sink	Weight	Shape
Buoyancy	Float	Hardness	Texture	Flexible
Boiling	Wood	Bubbly	Viscous	Foamy

Performance Indicators
 Text highlighted below in *orange* and *italicized/underlined* shows connections to SEP's
 2.P.3A.1 *Analyze and interpret data* from observations and measurements to describe the properties used to classify matter as a solid or a liquid.
 2.P.3A.2 *Develop and use models* to exemplify how matter can be mixed together and separated again based on the properties of the mixture.
 2.P.3A.3 *Conduct structured investigations* to test how adding or removing heat can cause changes in solids and liquids.

2.P.3A.4 Construct scientific arguments using evidence from investigations to support claims that some changes in solids or liquids are reversible and some are not when heat is added or removed.

***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). 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.

2.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.

2.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.

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

2.S.1A.7 Construct scientific arguments to support claims or explanations using evidence from observations or data collected.

***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.

2. **Cause and effect:** The National Research Council states “ 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). *Adding or removing heat can cause changes in solids and liquids.*

5. **Energy and matter:** The National Research Council states that this includes “Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems’ possibilities and limitations.”(p. 84) *Matter can be changed in reversible and irreversible ways as heat is added or removed and as substances are combined in mixtures and solutions.*

6. **Structure and function:** The National Research Council states that “the way in which an object or living thing is shaped and its substructure determine many of its properties and functions (p. 84). [The structure of matter determines its properties and functions. The structures of matter can determine the effects on its properties when it is combined in mixtures and solutions.](#)

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

Prior Knowledge

- K.P.4 Observable properties- magnetic attraction

Subsequent Knowledge

- 3.P.2 Properties of Matter- melting, freezing boiling
- 3.P.3 Solids, Liquids and Gas- electromagnet
- 5.P.2 Mixtures and Solutions- dissolving rate, evaporation
- 5.P.5 Magnetism

Possible Instructional Strategies/Lessons

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

- 2.P.3A.1 Ice-cream in a bag: Students will explore the changes in the states of matter. This activity will provide students with a hands-on activity to help them to visualize matter changing states from a liquid to a solid. This resource can be found at: <http://www.stevespanglerscience.com/lab/experiments/homemade-ice-cream-sick-science/>
- 2.P.3A.1 Properties of Matter: Students will investigate three main states of matter: solid, liquid, and gas. They will observe, describe, and compare physical properties of solids and liquids and they will combine solids and liquids to create mixtures and solutions. This resource can be found at: http://rpsec.usca.edu/Workshops/SISSI/LessonPlans/PropertiesSolids_LessonPlan.pdf
- 2.P.3A.2 What’s in the Mix? Different types of mixtures are pictured and described. A demonstration of how to separate a mixture of iron filings, sand, and gravel is demonstrated. This resource can be found at: <http://fc2.galenaparkisd.com/~kwashington/?OpenItemURL=S03026DC5>

- 2.P.3A.3 - 2.P.3A.4 Changing States of Matter: Observe the changes in a candle when the wick is lit to understand how matter can change from a solid to a liquid and back to a solid when heat is added and removed. This resource can be found at: http://www.giftofcuriosity.com/melting-candle-wax-to-explore-states-of-matter/#_a5y_p=1984626
- 2.P.3A.3-2.3A.4 Changing States of Matter: Water's Phase Changes: Students will understand that matter can change to different states. Students will demonstrate, design an experiment, and describe the phase changes of water (melting, freezing, evaporation, condensation). The full lesson plan can be found at <https://www.pdesas.org/ContentWeb/Content/Content/16155/Lesson%20Plan>

Resources

- Science Videos for Kids: What is Matter? This resource can be found at: <https://www.youtube.com/watch?v=68QDZAI29oE>
- Science Video for Kids: States of Matter! This resource can be found at: <https://www.youtube.com/watch?v=jmm1J2yI9tk>
- States of Matter Interactive game: This resource can be found at: <http://www.sciencekids.co.nz/gamesactivities/gases.html>

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)

- Students write paragraphs and drawings to assess their understanding of the phase change assigned to their group.
- Students will list the three states of matter and illustrate an example of each state.
- Students will name the process that takes water from one state to another (example, from liquid to gas), provide temperature (if known), provide an example and cause (increase or decrease of heat), and add a graphic, either a drawing or diagram.
- Students will be given a small sample of chex mix. They will be asked to separate the sample. Based on their findings, they will tell whether it is a mixture or solution, and why they chose their answer.

Unit Title
Physical Science: Solids and Liquids
Standard
http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf
2.P.3 The student will demonstrate an understanding of the observable properties of solids and liquids and the special properties of magnets.

Conceptual Understanding

2.P.3B. Magnets are a specific type of solid that can attract and repel certain other kinds of materials, including other magnets. There are some materials that are neither attracted to nor repelled by magnets. Because of their special properties, magnets are used in various ways.

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.

Matter	Properties	Solids	Liquid	Mixtures	Heat
Freeze	Melt	Magnetic pole	Attract	Repel	

Performance Indicators

Text highlighted below in *orange* and *italicized/underlined* shows connections to SEP's

- 2.P.3B.1 *Conduct structured investigations* to answer questions about how the poles of magnets attract and repel each other.
- 2.P.3B.2 *Analyze and interpret data* from observations to compare the effects of magnets on various materials.
- 2.P.3B.3 *Obtain and communicate information* to exemplify the uses of magnets in everyday life.

***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). 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.

2.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.

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

2.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 using oral and written language.

***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 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). *The effects of magnets on objects can be predicted based upon a pattern.*

2. **Cause and effect:** The National Research Council states “ 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). *Magnets attract or repel each other based upon the alignment of magnetic poles. Magnets affect various materials in different ways dependent upon the material's properties.*

6. **Structure and function:** The National Research Council states that “the way in which an object or living thing is shaped and its substructure determine many of its properties and functions (p. 84). *The structure of matter determines its interaction with magnets.*

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

Prior Knowledge
<ul style="list-style-type: none"> ● K.P.4 Magnetic attraction
Subsequent Knowledge
<ul style="list-style-type: none"> ● 3.P.3 Electromagnet ● 5.P.5 Magnetism

Possible Instructional Strategies/Lessons
Strategies and lessons that will enable students to master the standard and/or indicator.
<ul style="list-style-type: none"> ● 2.P.3B.1 <u>Interactions of Magnets</u> Conduct investigations on the movement and interactions of magnets when they come into contact or in proximity of each other. Keep track of the interactions using cause and effect diagrams. Draw conclusions about the properties of magnets based upon your observations and data. ● 2.P.3B.2 <u>Effects of Magnets of Various Objects Magnets & Springs</u> This resource called “Magnetic Challenges - Science Games & Activities for Kids” is a simulation where students learn about magnets and springs as they combine the two to complete various magnetic challenges. This resource can be found at: http://www.sciencekids.co.nz/gamesactivities/magnetsprings.html ● 2.P.3B.3 <u>Uses of Magnets in Daily Life</u> Go on a magnet scavenger hunt around the classroom. Use clues to find examples of magnets “hidden in plain sight” in the classroom (ex: cabinets, refrigerator/board magnets, etc.). Next, have students “partner share” for how they use magnets at home. Students will use the magnets at home data to create an anchor chart.
Resources
<ul style="list-style-type: none"> ● <u>Magnetism for Kids</u> This is a video about magnetism and an introduction to magnets. This resource can be found at: https://www.youtube.com/watch?v=DR9w4koW2EA ● <u>DK Find Out!</u> Here are fun facts, visuals and videos on magnets. This resource can be found at: http://www.dkfindout.com/us/science/magnets/

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)

- Show examples of magnets (with poles aligned and not aligned). Predict the effects on the magnets.
- Show examples of objects (photos or actual objects). Predict the effect of a magnet on each object.
- Create a mini-book showing how magnets impact your daily life.

References

Changing States of Matter (2011). Retrieved September 5, 2016, from <https://www.pdesas.org/ContentWeb/Content/Content/16155/Lesson%20Plan>

DK Find Out! | Fun Facts for Kids on Animals, Earth, History and more! (n.d.). Retrieved August 24, 2016, from <http://www.dkfindout.com/us/science/magnets/>

Ice Cream in a Bag. (2015). Retrieved from <http://www.stevespanglerscience.com/lab/experiments/homemade-ice-cream-sick-science/>

Magnets & Springs - Magnetic Challenges - Science Games & Activities for Kids. (n.d.). Retrieved August 24, 2016, from <http://www.sciencekids.co.nz/gamesactivities/magnetssprings.html>

Melting candle wax to explore states of matter - Gift of Curiosity. (2014). Retrieved August 24, 2016, from: http://www.giftofcuriosity.com/melting-candle-wax-to-explore-states-of-matter/#_a5y_p=1984626

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.

Properties of Solids Lesson Plan. Retrieved Sept. 4, 2016, from http://rpsec.usca.edu/Workshops/SISSI/LessonPlans/PropertiesSolids_LessonPlan.pdf

S. (2015). Magnetism for Kids. Retrieved August 24, 2016, from <https://www.youtube.com/watch?v=DR9w4koW2EA>

Smart Learning for All (2015). States of Matter. Retrieved August 24, 2016, from <https://www.youtube.com/watch?v=jmm1J2yI9tk>

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States of Matter Interactive Game. (n.d). Retrieved August 24, 2016, from <http://www.sciencekids.co.nz/gamesactivities/gases.html>

TurtleDiary (2016).What is Matter. Retrieved August 24, 2016, from <https://www.youtube.com/watch?v=68QDZAI29oE>

What's in the Mix? Retrieved August 30, 2016 from: <http://fc2.galenaparkisd.com/~kwwashington/?OpenItemURL=S03026DC5>