Unit 2: Solids and Liquids

Content Area: **Science**
Course(s):
Time Period: **Trimester 2**
Length: **10-12 Weeks**
Status: **Published**

Summary

In this unit, students will observe, describe, and compare properties of solids and liquids. They conduct investigations to find out what happens when solids and water are mixed and when liquids and water are mixed. They use their knowledge of solids and liquids to conduct investigations on unknown materials. They gain firsthand experience with reversible changes caused by heating or cooling, and read about changes caused by heating that are irreversible.Throughout the Solids and Liquids Module, students engage in science and engineering practices to collect data to answer questions, and to define problems in order to develop solutions. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems system and models; energy and matter; structure and function; and stability and change.

Revision Date: July 2020

Standards

9.1.2.CAP	Career Awareness and Planning
9.4.2.CI	Creativity and Innovation
2-PS1	Matter and Its Interactions
LA.RL.2	Reading Literature Text
	Key Ideas and Details
2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
LA.RL.2.1	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
9.4.2.CT	Critical Thinking and Problem-solving
	Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
PS1.A	Structure and Properties of Matter
9.4.2.DC	Digital Citizenship
2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
	Range of Reading and Level of Text Complexity
LA.RL.2.10	Read and comprehend literature, including stories and poetry, at grade level text complexity or above with scaffolding as needed.

LA.RI.2	Reading Informational Text
	Key Ideas and Details
PS1.A	Structure and Properties of Matter
LA.RI.2.1	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
LA.RI.2.2	Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.
LA.RI.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
2-PS1-3	Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
9.4.2.GCA	Global and Cultural Awareness
PS1.A	Structure and Properties of Matter
LA.RI.2.7	Explain how specific illustrations and images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
9.4.2.IML	Information and Media Literacy
LA.RI.2.8	Describe and identify the logical connections of how reasons support specific points the author makes in a text.
LA.RI.2.9	Compare and contrast the most important points presented by two texts on the same topic.
	Range of Reading and Level of Text Complexity
LA.RI.2.10	Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.
2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
9.4.2.TL	Technology Literacy
PS1.B	Chemical Reactions
LA.W.2	Writing
	Text Types and Purposes
LA.W.2.1	Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a conclusion.
	Range of Writing
LA.W.2.10	(Begins in grade 3)
LA.SL.2	Speaking and Listening
	Comprehension and Collaboration
LA.SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
LA.SL.2.1.A	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
LA.SL.2.1.B	Build on others' talk in conversations by linking their explicit comments to the remarks of others.
LA.SL.2.1.C	Ask for clarification and further explanation as needed about the topics and texts under discussion.

LA.L.2	Language
	Conventions of Standard English
2-ESS2-2	Develop a model to represent the shapes and kinds of land and bodies of water in an area.
CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
SCI.2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.
SCI.2-ESS2-1	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
SCI.2-ESS1-1	Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
SCI.K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
SCI.K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
SCI.K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
TECH.8.1.2	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.2.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations
TECH.8.1.2.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.2.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.2.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.2.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Essential Questions/Enduring Understandings

- How can changes caused by heating and cooling be reversed?
- How do the properties of matter influence its function?
- How do the properties of solid and liquid materials relate to how they can be used?
- What is matter and how can it change states?

Objectives

Students will know…..

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature.
- Matter can be described and classified by its observable properties.
- Different properties are suited for different purposes.
- A great variety of objects can be built up from a small set of pieces.
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.
- When ice melts it state of matter changes (effect of sunlight)
- The durability of different types of matter that is used to build things around them such as homes, playgrounds, roads,etc.

Students will be skilled at…..

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating and communicating information

Learning Plan

- Preview the essential questions and connect learning throughout the unit.
- Gain students understanding and prior knowledge of solids, liquids, and matter
- Read literature on types of matter
- Sort pictures of different solids, liquids, and gases
- Create charts on solids, liquids, and gases
- Utilize FOSS kit with materials: Solids and Liquids
- Experiment with items (ice cubes)
- Students care for and compare/contrast different types of matter
- Students observe, describe, and sort solid objects according to their properties
- Students discover solid objects in the schoolyard environment, and sort the found objects into natural and human-made.
- Introduce vocabulary pertinent to matter
- Students use representational materials to enhance their understanding of the unique behaviors of liquids.
- Students explore the properties of water puddles in the schoolyard
- Students work with beans, rice, and cornmeal to find out how solids behave when the pieces are small. Students shake, rattle, roll, and pour the materials and separate them by using screens.
- Students investigate interactions between solids and water and liquids and water. They observe, describe, record, and organize the results.

- Students test toothpaste to determine if it is a solid or a liquid.
- Students investigate melting and freezing of familiar liquids.
- Students collect solid materials outdoors and mix them with water.
- Students look for changes in the color and clarity of the water as evidence that something mixed with the water.
- Maintain observational journals with student note taking and drawings of experiments and activities
- Incorporate literature on solids and liquids through shared reading, big books, and nonfiction books from classroom libraries

Assessment

Science courses are designed to promote skill attainment. Student progression and pace through which they proceed through the performance tasks is based on their affinity for and ability to reach skill attainment. The teacher will determine formative and summative skill attainment; alternative assessments will be incorporated for each student based on their strengths and challenges.

Formative Assessments: Teacher observation, student responses during lessons

Summative Assessments: Foss investigation checklists, science notebook

Benchmark Assessments: Investigation IChecks, science notebook

- Investigation 1.1:FQ- How can solid objects be described?
- Investigation 1.2 Icheck and FQ- What are solid objects made of?
- Investigation 1.3: Icheck and FQ- Can two or more objects have the same property?
- Investigation 1.4: Icheck and FQ- What are the properties of successful towers?
- Investigation 2.1: Icheck and FQ- How are liquids different from each other?
- Investigation 2.2: Icheck and FQ- How can liquids be described?
- Investigation 2.3: Icheck and FQ- How do liquids change in containers?
- Investigation 3.1: FQ- Are these materials solid or liquid?
- Investigation 3.2: Icheck and FQ- How can mixtures of particles be separated?
- Investigation 3.3: FQ- How do particles of solids move in bottles?
- Investigation 4.1: Icheck and FQ- What happens when solids are mixed with water?
- Investigation 4.2: Icheck and FQ- What happens when liquids are mixed with water?
- Investigation 4.3: Icheck and FQ- Is toothpaste solid or liquid?
- Investigation 4.4: FQ- How do properties of materials change when they are heated or cooled?

Alternative Assessments: Oral presentations, student produced projects

Materials

Core Book List

FOSS Kit: Solids and Liquids and materials for experimentation and exploration

BrainPop Junior

Discovery Education

Mystery Doug

PebbleGo

Science notebook for assessment and journaling

Science spin, weekly reader magazine if applicable