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| **Grade 2: Matter and Its Interactions** | | |
| **Content Area:** Physical Science | | |
| **Unit Title:** Solids and Liquids | | |
| **Target Course/Grade Level:** Second Grade | | |
| **Unit Summary:**  This module provides grade 2 students with physical sciences core ideas dealing with matter and its interactions and engineering design. | | |
| **Primary interdisciplinary connections:**  Common Core State Standards Connections:  RI 1: Ask and answer questions to demonstrate understanding.  RI 2: Identify main topic of text.  RI 3: Describe the connection between scientific ideas or concepts.  RI 5: Know and use text features.  RI 7: Explain how images contribute to and clarify text.  RI 8: Describe how reasons support points the author makes in the text.  RI 9: Compare and contrast two texts on the same topic.  W 5: Strengthen writing by revising and editing.  W 8: Gather information from provided sources to answer a question.   SL 1: Participate in collaborative conversations.  SL 2: Recount or describe key ideas.  SL 3: Ask and answer questions.  SL 4: Recount an experience with appropriate facts and relevant descriptive details.   L 1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.  L 4: Determine or clarify the meaning of unknown or multiple-meaning words and phrases.  L 5: Demonstrate understanding of word relationships and nuances in word meanings.  L 6: Use acquired words and phrases.  MP.2 Reason abstractly and quantitatively. (2-PS1-2)  MP.4 Model with mathematics. (2-PS1-1),(2-PS1-2)  MP.5 Use appropriate tools strategically. (2-PS1-2)  2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare  problems using information presented in a bar graph. (2-PS1-1),(2-PS1-2) | | |
| **21st Century Themes:**  Digital media will be used incorporated in project presentations. This module will develop students’ abilities to do and understand scientific inquiry. Students will identify questions, design and conduct scientific investigations to answer those questions, employ tools to gather, analyze, and interpret data. They will use data to construct reasonable explanations, develop and communicate investigations and evidence and understand that scientists use different kinds of investigations and tools to develop explanations using evidence and knowledge. This module will develop and extend students’ understandings about science and technology. Students will work collaboratively in teams and use tools and scientific techniques to make better observations. | | |
| **Unit Rationale:**  This module provides grade 2 students with physical sciences core ideas dealing with matter and its interactions and engineering design. The anchor phenomenon for this module is matter in two of its phases—solid and liquid. The guiding questions for the module are how are solid and liquid materials similar and different? and how do the properties of solid and liquid materials relate to how they can be used and how they can change?  Students build on the science concepts of matter and its interactions developed in kindergarten using new tools to enrich observations. Students 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 an investigation on an unknown material (toothpaste). They gain firsthand experience with reversible changes caused by heating or cooling, and read about changes caused by heating that are irreversible. | | |
| **Learning Targets** | | |
| **Disciplinary Core Ideas**  **PS1.A: Structure and properties of matter**   * 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 to different purposes. * A great variety of objects can be built up from a small set of pieces.   **PS1.B: Chemical reactions**   * Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.   **ETS1.A: Defining and delimiting engineering problems**   * Before beginning to design a solution, it is important to clearly understand the problem.   **ETS1.B: Developing possible solutions**   * Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.   **ETS1.C: Optimizing the design solution**   * Because there is always more than one possible solution to a problem, it is useful to compare and test designs. | | |
| **Cross-Cutting Concepts**  **Patterns •** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.  **Cause and effect** • Events have causes that generate observable patterns. Scale, proportion, and quantity • Relative scales allow objects and events to be compared and Described.  **Energy and matter •** Objects may break into smaller pieces, be put together into larger pieces, or change shapes. Structure and function • The shape and stability of structures of natural and designed objects are related to their function(s).  **Stability and change •** Some things stay the same while other things change. • Things may change slowly or rapidly | | |
| **PE #** | **Performance Expectations** | |
| **2-PS1-1.** | Plan and conduct an investigation to describe and classify different kinds of materials by their observable  properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that  different materials share.] | |
| **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.\* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and  absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.] | |
| **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. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted  small objects.] | |
| **2-PS1-4.** | Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some  cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of  irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.] | |
| **ETS1.A** | Defining and delimiting an engineering problem | |
| **ETS1.B** | Developing possible solutions | |
| **ETS1.C** | Optimizing the design solution | |
| **Unit Essential Questions**  What are some observable properties of solid materials? How can we use those properties to make useful objects?  What are some observable properties of liquids?  How are solid particles and liquids the same and different?  What can happen when solids and liquids are mixed with water? What is the effect of heating or cooling materials? | | **Unit Enduring Understandings**   * Solid is one state or phase of matter. ● Objects are described and identified by their properties. ● Objects are made of one or more materials. ● Natural and human-made objects occur outdoors. * Liquid is one common state of matter.   ● Liquids move freely in containers.  ● Liquids have many properties that help identify them.  ● Liquids take the shape of their containers.  ● The surfaces of liquids are flat and level.  ● Liquids pour and flow.  ● Solid materials can occur as masses of small particles.  ● A mass of particulate matter can form piles and support a more dense object on its surface.  ● Particulate solids can be separated by size (with screens).  ● Masses of particulate matter can pour.  ● The surface of a mass of particles is not flat and level.  ● Particulate matter occurs naturally in the outdoors.  ● Some solids change when mixed with water. ● Some solids dissolve in water.  ● Water can be separated from a mixture through evaporation; evaporation leaves the solid behind.  ● Some liquids mix with water; others form layers.  ● Some materials have properties of both solids and liquids.  ● Melting is the change from solid to liquid.  ● Freezing is the change from liquid to solid.  ● Heat causes materials to melt; cold causes them to freeze; changes can be reversible or irreversible. |
| **Unit Learning Targets -**  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. | | |
| **Evidence of Learning** | | |
| **Embedded Assessments:**   * Response Sheets * Performance Assessments * Science Notebook Entries   **Benchmark Assessments:**   * Investigation I-Checks * Surveys | | |
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