

Phoenixville Area School District Understanding by Design (UbD) Science

Grade Level 2

Unit Name: Solids and Liquids

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Stage 1 Desired Results		
<p>Overarching NGSS & PA Standards:</p> <p>Physical Science:</p> <p>3.2.2.A Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</p> <p>3.2.2.B Analyze data obtained from testing different materials to determine which materials have</p>	Transfer	
	<p><i>Students will be able to independently use their learning to...</i></p> <ol style="list-style-type: none"> 1. Ask questions and/or define problems 2. Develop and/or use models 3. Plan and/or carry out investigations 4. Obtain, evaluate, and communicate information (supported by evidence) 5. Construct explanations and design solutions 	
	Meaning-Making	
	<p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> • Different kinds of matter exist. • Matter can be found in various forms- for example: solid, liquid and/or gas, 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. • Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. 	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <p>What are some observable properties of solid materials?</p> <p>How can we use those properties to make useful objects?)</p> <p>What are some observable properties of liquids?</p> <p>How are solid particles and liquids the same and different?</p>

<p>the properties that are best suited for an intended purpose.</p>		<p>What can happen when solids and liquids are mixed with water?</p> <p>What is the effect of heating or cooling materials?</p>
<p>3.2.2.C 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.</p>		
Knowledge and Skills Acquisition		
<p>3.2.2.D Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.</p>	<p style="text-align: center;">UNDERSTANDINGS</p> <p><i>Students will know...</i></p> <p>Solids:</p> <ul style="list-style-type: none"> • 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. <p>Liquids:</p> <ul style="list-style-type: none"> • Liquid is one common state of matter. • Liquids move freely and take the shape of their containers. • Liquids have many properties that help identify them. • The surfaces of liquids are flat and level. Liquids pour and flow. <p>States of Matter:</p> <ul style="list-style-type: none"> • 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. • 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 materials have properties of both solids and liquids. • Melting is the change from solid to liquid. • Freezing is the change from liquid to solid. 	<p><i>Students will be skilled at...</i></p> <p>Planning and conducting an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.</p> <p>Analyzing data from tests of an object or tool to determine if it works as intended.</p> <p>Constructing explanations and designing solutions Making observations to construct an evidence-based account for natural phenomena</p>

	<ul style="list-style-type: none"> Heat causes materials to melt; cold causes them to freeze; changes can be reversible or irreversible. 		
KEY VOCABULARY			
	<p>Investigation 1: Solids:</p> <ul style="list-style-type: none"> curved flexible gas liquid matter properties rigid rough straight <p>Investigation 2: Liquids</p> <ul style="list-style-type: none"> flow gravity surface translucent transparent viscous 	<p>Investigation 3: Bits and Pieces</p> <ul style="list-style-type: none"> mixture particle separate <p>Investigation 4: Solids, Liquids, and Water</p> <ul style="list-style-type: none"> change crystal disappear dissolve evaporate freeze heat irreversible melt reversible 	
Stage 2 – Evidence			
Evaluative Criteria	Assessment Evidence		
Teacher observations	PERFORMANCE TASK(S): 1. Investigations:	Differentiation Considerations: <ul style="list-style-type: none"> Read tasks and all questions aloud. 	

<p>notes and rubrics</p>	<p>I. Performance Task(s): Students will explore solid objects, such as pieces of wood, plastic, and metal. Students observe, describe, and sort the objects according to their properties. They construct towers (and other structures), using the properties inherent in the materials to accomplish the task. Students discover solid objects in the schoolyard environment and sort the found objects into natural and human-made.</p> <p>Assessment: Investigation 1 I-Check</p> <p>II. Performance Task(s): Students will investigate liquids in a variety of settings to become familiar with their properties. They learn precise liquids vocabulary, using liquid properties cards. Students use representational materials to enhance their understanding of the unique behaviors of liquids. Students explore the properties of water puddles in the schoolyard.</p> <p>Assessment: Investigation 2 I-Check</p> <p>III. Performance Task(s): Students work with some substances such as: beans, rice, and cornmeal to find out how solids behave when the pieces are small. Students shake, rattle, and roll the materials in bottles, pour them from container to container, and separate them by using screens. Students go outdoors to find particulate solid materials. Students observe the particles when poured on a flat surface and compare the particles to water on the same surface.</p> <p>Assessment: Investigation 3 I-Check</p> <p>IV. Performance Task(s): Students investigate interactions between solids and water and liquids and water. They observe, describe, record, and organize the results. Students test substances to determine if it is a solid or a liquid. They investigate melting and freezing of familiar liquids.</p>	<ul style="list-style-type: none"> • Provide embedded notes when possible (via FOSS) • Accept verbal responses in lieu of written responses. • When grouping students consider matching different skills sets • When asking students to describe a model, give them the opportunity to draw or write it, as well. • Teacher can scribe written responses for students <p>For labs, consider that some students may wish to:</p> <ul style="list-style-type: none"> • explain verbally instead of in a written format • draw their responses
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	<p>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.</p> <p>Assessment: Investigation 4 I-Check</p> <p>2. Unit Activity: Students demonstrate knowledge of the states of matter. Students discover that matter can be mixed to create something new. They combine solids and liquids to make creamy ice cream as a whole group exploration.</p> <p>Tasks: Students will make ice cream.</p> <p>Assessment: Students will complete a lab sheet that demonstrates their knowledge of solids and liquids.</p>	<ul style="list-style-type: none"> • write in their first language <p>If challenges arise with complexity of the task(s):</p> <ul style="list-style-type: none"> • smaller steps and/or • alternative activities will be provided.
<p>What criteria will be used in each assessment to evaluate attainment of the desired results?</p>	<p style="text-align: center;">OTHER EVIDENCE:</p> <ul style="list-style-type: none"> • Checklists of collaborative behaviors in labs and activities • Checklists of collaborative behaviors in class discussions • Journal entries <p style="text-align: center;">(What evidence will be collected to determine whether Stage 1 goals were achieved?)</p>	<p style="text-align: center;">Differentiation Considerations:</p> <p>For journal entries, consider that some students may wish to:</p> <ul style="list-style-type: none"> • draw instead of write entries • write in their first language <p>If challenges arise with complexity of the task(s):</p> <ul style="list-style-type: none"> • smaller steps and/or

		<ul style="list-style-type: none">• alternative activities will be provided.
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