



Unit 2: Matter and Energy

This curriculum document was created to ensure that all students develop a deep understanding of their grade-level science TEKS. Each concept is built using hands-on science and literacy within the inquiry-based, 5E Model of Teaching.

Inquiry-based learning is a complex process where students ask and formulate questions, perform experiments or investigate to find answers. Students build new understandings and knowledge through listening, speaking, reading and writing, and then communicate their learning to others. Each concept within the unit has essential questions to help teachers guide their students as they develop scientific thinking and reasoning.

It is a district expectation that Alief classrooms will **implement with fidelity** the use of:

- inquiry-based approach to hands on science and literacy
- quality questioning grounded on [Webb's Depth of Knowledge \(DOK\)](#)
- [formative assessments](#) to monitor understanding and ensure students are on-track to master grade-level TEKS
- language objectives and ELPS strategies that are aligned to science TEKS
- collaborative strategies to promote structured student conversations and [scientific argumentation](#)
- [academic vocabulary development strategies](#) such as Thinking Maps, vocabulary games, and interactive science word walls
- [technology integration](#) to prepare 21st century students for a global society

Campus Common Assessments (CCA) will serve as summative assessments to evaluate student learning at key intervals and/or the end of an instructional unit. District Common Assessments (DCA) will be administered at the end of each semester. DCAs are cumulative. Students will be tested on concepts that have been covered as outlined on the curriculum guide throughout the semester to determine the extent at which students have mastered grade-level science TEKS.

Grade 5 Science Curriculum Guide

Integrated Process Skills: Scientific Investigation & Reasoning		TEKS
<p>Science process skills will be integrated throughout all units and concepts in 5th Grade Science.</p> <p>At least 40% of assessments will be dual-coded to assess Science concepts as well as Science process skills.</p>		
Integrated into All Matter & Energy Concepts	↗ Safety	<ul style="list-style-type: none"> ↗ 5.1A demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations ↗ 5.4B use safety equipment, including safety goggles and gloves
	↗ Conservation	<ul style="list-style-type: none"> ↗ 5.1B make informed choices in the conservation, disposal, and recycling of materials
	↗ Scientific Tools	<ul style="list-style-type: none"> ↗ 5.2C collect information by detailed observations and accurate measuring ↗ 5.4A collect, record, and analyze information using tools, including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, prisms, mirrors, pan balances, triple beam balances, spring scales, graduated cylinders, beakers, hot plates, meter sticks, magnets, collecting nets, and notebooks; timing devices, including clocks and stopwatches; and materials to support observations of habitats or organisms such as terrariums and aquariums ↗ 5.4B use safety equipment, including safety goggles and gloves
	↗ Models & Representations	<ul style="list-style-type: none"> ↗ 5.3C draw or develop a model that represents how something works or looks that cannot be seen such as how a soda dispensing machine works
	↗ Scientific Inquiry & Reasoning / Critical Thinking	<ul style="list-style-type: none"> ↗ 5.2A describe, plan, and implement simple experimental investigations testing one variable ↗ 5.2B ask well-defined questions, formulate testable hypotheses, and select and use appropriate equipment and technology ↗ 5.2C collect information by detailed observations and accurate measuring ↗ 5.2D analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence ↗ 5.2E demonstrate that repeated investigations may increase the reliability of results ↗ 5.2F communicate valid conclusions in [both] written [and verbal] form[s] ↗ 5.2G construct appropriate simple graphs, tables, maps, and charts using technology, including computers, to organize, examine, and evaluate information ↗ 5.3A in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student ↗ 5.3B evaluate the accuracy of the information related to promotional materials for products and services such as nutritional labels ↗ 5.3D connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists

Grade 5 Science Curriculum Guide

Unit 2		Classifying Matter (2 Weeks)					
TEKS Statement	The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. The student is expected to:						
TEKS / Student Expectation	↗ Scientific Investigation & Reasoning TEKS integration (see page 2) ★ 5.5A classify matter based on physical properties, including mass, magnetism, physical state (solid, liquid, and gas), relative density (sinking and floating), solubility in water, and the ability to conduct or insulate thermal energy or electric energy						
Previous Grades SE (Tested on STAAR)							
Assessment	Grade 5 STAAR Science Reporting Category 1, Student Expectation 5.5A						
Released Test Item(s)	Grade 5 STAAR Science Released Test Item TEKS 5.5A Grade 5 STAAR Science Released Item 2013 – TEKS 5.5A-5.2A			Grade 5 STAAR Science Released Item 2013 – TEKS 5.5A Grade 5 STAAR Science Released Item 2013 – TEKS 5.5A-5.2A Grade 5 STAAR Science Released Item 2013 – TEKS 5.5A-5.2D			
Notes to Teacher	*Give students opportunities to examine many different objects in order to reflect on different observable properties. *Students need to see and understand that density does not determine ability to float or sink-relative density (ex. heavy oil tankers that float in the Gulf) *Students might think that all metals are magnetic, but have metallic examples such as aluminum that does not attract a magnet						
Key Academic Vocabulary - STEMscopes/Matter and Energy/Classifying Matter/ Essentials>Standards Unwrapped							
matter	mass	properties	magnetism	physical state	relative density	solubility	thermal energy
electric energy	conductor	insulator	classify				
Vertical Alignment:							
4th Grade			← Before After →	6th Grade			
4.5A measure, compare, and contrast physical properties of matter, including size, mass, volume, states (solid, liquid, gas), temperature, magnetism, and the ability to sink or float				6.6C test the physical properties of minerals, including hardness, color, luster, and streak 6.6A compare metals, nonmetals, and metalloids using physical properties such as luster, conductivity, or malleability			

Grade 5 Science Curriculum Guide

Classifying Matter (2 weeks)

Science Background Information

Matter can be classified by its physical properties, such as its color, appearance, melting point, boiling point or electrical conductivity. A physical property is a property that can be observed, measured and changes without changing the substance itself.

Property	What It Means	Example
Mass	Amount of matter in an object or substance; measured in kilograms (kg), grams (g), and milligrams (mg).	The mass of a tennis ball is 57g.
Magnetic	Is attracted to magnet	Iron is magnetic. Aluminum is not.
Physical State	Whether an object is solid, liquid, or gas at room temperature	Wooden block is solid. Water is liquid. Oxygen is gas.
Relative Density- floats or sinks in water	Is more dense or less dense than an equal volume of water	Lead sinks in water. Oil floats in water.
Solubility	The ability to dissolve in another substance	Sugar dissolves in water. Sand does not.
Conducts heat	How easily heat moves through a substance	Metal conducts heat well. Plastics do not conduct heat
Conducts electricity	How easily electricity moves through a substance	Copper is a good conductor of electricity. Rubber is not.
Boiling Point	The temperature at which a substance begins to turn from a liquid to a gas	The boiling point of water is 100°C.
Melting Point	The temperature at which a substance begins to turn from a solid to a liquid	The melting point of water is 0°C.

The classification process is important because we can choose materials for various tasks depending on their physical properties or classification. For example, if we need a material that conducts electricity, we know that the materials classified as metals are good conductors of electricity.

Essential Questions

- What is matter? What are some physical properties of matter that we can observe?
- How does matter behave when placed in water? What if it is stirred into water? How does matter react to a magnet?
- How is matter classified? What tools or tests can you use to measure or observe matter?

Key Science Concepts

- Matter has physical properties that can be observed.
- Matter can be classified based on its physical properties using tools such as balances, magnets, and electric circuits.
- Matter can be classified based on its behavior such as ability to float or sink, attraction to a magnet, solubility in water, and ability to conduct heat or electricity.

Grade 5 Science Curriculum Guide

Engage	Explore	Explain	Elaborate	Evaluate	
Classifying Matter (2 Weeks)					
<ul style="list-style-type: none"> Uncovering Student Ideas in Science Vol. 1 “Ice Cubes in a Bag” pgs. 49-50 <i>This formative assessment is designed to find out whether students believe there will be a change in mass when ice changes to liquid water and what their reasoning is to support their prediction.</i> Mystery Balloons Day 1: Teacher presents 6 numbered balloons filled with unknown substances (ex: corn starch, air, water, paper clips, marbles, cotton balls, modeling clay, etc.). Students will use their science notebooks to: *record observations: the properties of each balloon *analyze their observations to make predictions about what the material is inside. Set up three stations –one with a magnet, one with a triple beam balance, and one with a tub of water to help them gather information about the materials inside the balloons. 	<p>Focus Question: What physical properties can be used to classify matter?</p> <p>STEMscopes/ Matter and Energy/ 5.5A Classifying Matter/ Explore/ Teacher Guide, Set-Up Video, and Student Materials. <i>In this investigation, students will use a variety of items to examine the physical properties of matter. This activity may take a couple of days to complete.</i></p> <p>Explain:</p> <ul style="list-style-type: none"> Edusmart / Physical Properties of Matter/ Physical Properties of Matter (view the following 6 segments) <ul style="list-style-type: none"> *Classification of Matter (Physical State: Solid, Liquid, Gas) * Mass *Density, Solubility, and Magnetism *Heat Conductors & Insulators *Conductors & Insulators of Electricity *Melting, Freezing, and Boiling Points <i>Help students connect the explore activity with the Edusmart video they just watched--determine the main idea and supporting details and then consolidate them to summarize the science key concepts.</i> STEMscopes/ Matter and Energy/ 5.5A Classifying Matter/Explain/Stemscopedia National Geographic Physical Science book pgs. 10-17 <i>Students find out what scientists use to describe, classify, and compare matter.</i> 		<ul style="list-style-type: none"> STEMscopes/ Matter and Energy/ 5.5A Classifying Matter/ Engage/ Starters/ Boat Builders. <i>Using only tape and paper, students create two boats: one that floats and one that doesn't float (on purpose!). Students can work in pairs. Reflect on the design of each one as to why it does or does not float, and compare these designs to existing boats.</i> <p>Reading Connections:</p> <ul style="list-style-type: none"> NG/Physical Science/Ladders/The Sinking of the Titanic <i>Students read the article, “The Night the Titanic Sank” pgs. 10-19 and discuss how the physical characteristics of the Titanic changed after it hit the iceberg.</i> STEMscopes/ Matter and Energy/ 5.5A Classifying Matter/ Elaborate/ Reading Science <i>“An Unusual Material”: Students read a short passage about glass, how it's made, and its properties.</i> 		<p>STEMscopes/ Matter and Energy/ 5.5A Classifying Energy/ Evaluate/ Open Ended Response and Post Assessment.</p> <p>Technology Connection: STEMscopes/ Matter and Energy/ 5.5A Classifying Matter/ Evaluate/ Scope Review Game and Active Assessment</p> <p>Writing Connection: STEMscopes/ Matter and Energy/ 5.5A Classifying Matter/ Evaluate/ Writing Science <i>Students are asked to write about an apple and its observable properties.</i></p>

Grade 5 Science Curriculum Guide

<p>Day 2: The class will develop a chart of their observations. Guide students to discover that all the observations are actually physical properties of matter. Communicate to the students that we will study each of these physical properties in depth in the weeks ahead.</p>	<ul style="list-style-type: none"> • STEMscopes/ Matter and Energy/ 5.5A Classifying Matter/Explain/Content Connections <i>Students investigate and discuss how the physical properties of a ball affect the height of its bounce.</i> • STEMscopes/ Matter and Energy/5.5A Classifying Matter/ Explain/ Scope Vocabulary Game 	<ul style="list-style-type: none"> • STEMscopes/ Matter and Energy/ 5.5A Classifying Matter/ Elaborate/ Next Step Inquiry <i>This activity allows students to further explore a concept in-depth and helps the student organize their thinking in order to carry out an investigation to help answer their question.</i> 	
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Grade 5 Science Curriculum Guide

Unit 2		Properties of Water (1 week)					
TEKS Statement		The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. The student is expected to:					
TEKS / Student Expectation		↗ Scientific Investigation & Reasoning TEKS integration (see page 2) ✓5.5B identify the boiling and freezing/melting points of water on the Celsius scale					
Previous Grades SE (Tested on STAAR)		✓3.5C predict, observe, and record changes in the state of matter caused by heating or cooling					
Assessment:		Grade 5 STAAR Science Reporting Category 1, Student Expectation 5.5B					
Released Test Items		Grade 5 STAAR Science Released Test Item TEKS 5.5B			Grade 5 STAAR Science Released Item 2013 – TEKS 3.5C-5.2D Grade 5 STAAR Science Released Item 2013 – TEKS 5.5B		
Notes to Teacher		*Give students opportunities to practice reading temperature on a thermometer. *Students need to see that when a substance cools off, it loses heat (it doesn't gain cold). *Students might think that a thermometer is measuring something static or unmoving, but temperature actually measures the average energy of the particles in the substance.					
Key Academic Vocabulary - STEMscopes/Matter and Energy/Properties of Water/ Essentials/Standards Unwrapped							
constant	boiling point	melting point	freezing point	condensation	evaporation	physical state	Celsius scale
Vertical Alignment:							
4th Grade			← Before After →	6th Grade			
4.5B predict the changes caused by heating and cooling such as ice becoming liquid water and condensation forming on the outside of a glass of ice water				©6.5D identify the formation of a new substance by using the evidence of a possible chemical change such as production of a gas, change in temperature, production of a precipitate, or color change			

Grade 5 Science Curriculum Guide

Properties of Water (1 week)

Science Background Information

The boiling/condensing and freezing/melting points are constant for any given material at standard atmospheric pressure. The most common material used to demonstrate the three states of matter is water.

Water freezes and melts at zero degrees Celsius if it is pure. Because water in its ice (solid) form has a melting temperature of zero degrees Celsius, the transition from solid to liquid is easily demonstrable, and by adding heat until water reaches its boiling point (100° degrees Celsius), the transition from liquid to gas becomes apparent.

In nature we see examples of water changing state by observing snow melting or by water evaporating from the warmth of the sun's rays. We can identify the boiling and freezing/melting points of water using a thermometer.

Essential Questions

- How does matter change state?
- Which tool is best for measuring the boiling point of water?
- In what states of matter have you observed water? What does it look like at each stage?
- If a substance such as salt is added to water, how will that change the boiling point?
- Do all substances have the same melting point?
- What is temperature actually measuring when you place it in a cup of water?

Key Science Concepts

- Water freezes and ice melts at 0° degrees Celsius.
- Water boils at 100° degrees Celsius.
- We can identify the boiling and freezing/melting points of water using a thermometer.
- The boiling and freezing/melting points of a material are specific to that material, and can change only when the physical properties of the material changes (like water versus salt water).

Grade 5 Science Curriculum Guide

Engage	Explore	Explain	Elaborate	Evaluate
Properties of Water (1 week)				
<ul style="list-style-type: none"> • Uncovering Student Ideas in Science Vol. 4 “Ice Water” pgs. 45-46 <i>This formative assessment is designed to find out if students recognize that the temperature of a substance does not change when two phases are present.</i> • STEMscopes/ Matter and Energy/ 5.5B Properties of Water/ Engage/ Teacher Instructions. <i>Students will investigate unique properties that help us to identify substances. This can be a teacher demo activity.</i> • Using a Circle Map, brainstorm what students know about properties of water. 	<p>Focus Question: Can the boiling, melting and freezing points of water be changed? If so, how?</p> <p>STEMscopes/ Matter and Energy/ 5.5B Properties of Water/ Explore/ Teacher Guide, Set-Up Video, and Student Materials <i>In this activity, students will explore properties of water by testing and observing various solutions.</i></p> <p>Explain:</p> <ul style="list-style-type: none"> • Show Edusmart / Physical Properties of Matter/ Melting, Freezing, and Boiling Points • STEMscopes/ Matter and Energy/ 5.5B Properties of Water/ Explain/ Stemscoopedia • National Geographic Physical Science book, pgs. 63-65 • STEMscopes/ Matter and Energy/ 5.5B Properties of Water/ Explain/ Content Connections <i>Students will watch video about properties of water and identify the boiling, melting, and freezing points of water.</i> • STEMscopes/ Matter and Energy/5.5B Properties of Water /Explain/ Scope Vocabulary Game • SciPads/ Physical Science/ GW Temp <i>Students use Go Wireless Temp app with a Go Wireless Temp probe to explore temperature with iPad.</i> 		<ul style="list-style-type: none"> • Using a Flow Map Thinking Map show what happens to water when you add heat and when you remove heat. Adding heat causes water to _____. Removing heat causes water to _____. • Students will record their responses in their Science Notebook to the following two scenarios: <ol style="list-style-type: none"> 1. A student placed an ice tray filled with cold water and an ice tray filled with warm water in the freezer. At what temperature will each tray of water freeze? Explain. 2. Imagine a trip to a tropical rainforest and then a trip to the North Pole. Describe the types of water you would see in each location and describe why. <p>Reading Connection: STEMscopes/ Matter and Energy/ 5.5B Properties of Water/ Elaborate/ Reading Science <i>“It is Hot But Not that Hot”:</i> Students will learn about the Celsius and Fahrenheit scales.</p>	<p>STEMscopes/ Matter and Energy/ 5.5B Properties of Water/ Evaluate/ Open Ended Response and Post Assessment.</p> <p>Technology Connection: STEMscopes/ Matter and Energy/ 5.5B Properties of Water/ Evaluate/ Scope Review Game and Active Assessment</p> <p>Writing Connections: STEMscopes/ Matter and Energy/ 5.5B Properties of Water / Evaluate/ Writing Science <i>Students will write about how water changes its state and how this can affect their lives.</i></p> <p>Revisit your class’ Circle Map and make notes on the ideas that were confirmed; address and correct misconceptions.</p>

Grade 5 Science Curriculum Guide

Unit 2		Mixtures (2 weeks)					
TEKS Statement	The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. The student is expected to:						
TEKS / Student Expectation:	<p>➤ Scientific Investigation & Reasoning TEKS integration (see page 2)</p> <p>✓5.5C demonstrate that some mixtures maintain physical properties of their ingredients such as iron filings and sand</p> <p>✓5.5D Identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving salt in water or adding lemon juice to water.</p>						
Previous Grades SE (Tested on STAAR)	✓3.5C predict, observe, and record changes in the state of matter caused by heating or cooling						
Assessment	Grade 5 STAAR Science Reporting Category 1, Student Expectation 5.5C Grade 5 STAAR Science Reporting Category 1, Student Expectation 5.5D Grade 5 STAAR Science Reporting Category 1, Student Expectation 3.5C						
Released Test Item(s)	Grade 5 STAAR Science Released Test Item TEKS 5.5C			Grade 5 STAAR Science Released Item 2013 – TEKS 5.5C Grade 5 STAAR Science Released Item 2013 – TEKS 5.5D-5.2D			
Notes to Teacher:	<p>*Give students opportunities to observe different ingredients that retain the physical properties when mixed and compare those mixtures to solutions.</p> <p>*Students need to see that substances do not disappear when dissolving.</p> <p>*Students might think that solutions are impossible to separate but there are different methods such as distillation or evaporation that will work to separate solutions.</p>						
Key Academic Vocabulary - STEMscopes/Matter and Energy/Mixtures/ Essentials/Standards Unwrapped							
ingredient	mixture	physical change	solution	dissolve	property	solubility	
Vertical Alignment:							
4th Grade				← Before After →	6th Grade		
4.5C compare and contrast a variety of mixtures and solutions such as rocks in sand, sand in water, or sugar in water					6.5A know that an element is a pure substance represented by chemical symbols 6.5C differentiate between elements and compounds on the most basic level		

Grade 5 Science Curriculum Guide

Mixtures (2 weeks)

Science Background Information

A mixture is a combination of two or more substance that does not form a new substance. For example, oatmeal, milk, and sugar form a mixture. The substances in a mixture can be separated from each other easily. For example, it's easy to separate the ingredients from a salad because the physical properties of their ingredients, such as color, shape, and size do not change. A mixture of made up of oatmeal, milk and sugar can be separated by passing all three through a strainer. The oatmeal would get trapped in the strainer but the milk and sugar would pass through it. Sand and paper clips can be separated by hand. Marbles and paperclips can be separated using a magnet since paper clips attract to magnets. Sand and iron filings can also be separated using a magnet since iron is attracted to a magnet. In the case of water and sand, they can be separated by allowing some time to let the sand settle in the bottom of a container. Sand and water can be separated through filtration, pouring through a filter.

Essential Questions

- What is a mixture?
- What is a solution?
- How do some mixtures differ from solutions?
- Where have you seen mixtures at home?
- Where have you seen solutions at home?
- Are all mixtures tough to separate, or are some easier than others?

Key Science Concepts

- Some materials, when mixed together, maintain their physical properties such as iron filings and sand.
- Some materials, when mixed together, undergo changes in their physical properties such as salt dissolving in water.
- Solutions are mixtures in which the materials have mixed (but do not combine) at the atomic level and must therefore be separated using different methods (like evaporation) than other types of mixtures

Grade 5 Science Curriculum Guide

Engage	Explore	Explain	Elaborate	Evaluate
Mixtures (2 weeks)				
<ul style="list-style-type: none"> ● Uncovering Student Ideas in Science Vol. 1 “Lemonade” pgs. 55-56 <i>This formative assessment is designed to find out what students think about the total weight or mass of a solution when a solute, such as sugar, seemingly “disappears” in a solvent.</i> ● Investigating Mixtures Guide students in making mixtures Solid-Solid *rocks in sand *rice in marbles *paper clips in pennies ● Investigating Solutions Guide students in making solutions by mixing the following ingredients: Sugar, Kool Aid powder mix and water according to package directions <i>Observe and record the properties of the ingredients before mixing. Allow the students to predict if they think any changes will occur after mixing. Mix the ingredients and observe and record the physical properties of the ingredients.</i> 	<p>Focus Question: How can different types of mixtures be separated and what tools could be used based on their physical properties?</p> <p>STEMscopes/ Matter and Energy/ 5.5CD Mixtures/ Explore/ Teacher Guide, Set-Up Video, and Student Materials. <i>In this activity, students will be observing the physical properties of various items when mixed together. Students will observe that their physical properties DO NOT change as they are mixed or separated from a mixture. Students will also identify when a solution is created. This activity will take 2-3 days to complete.</i></p> <p>Explain:</p> <ul style="list-style-type: none"> ● Edusmart / Mixtures and Solutions (view the following 4 segments) *What is a Mixture? *Properties of Mixtures *Solution *Separating Mixtures <i>Students will take notes in their science notebook from the Edusmart videos and discuss their understandings.</i> ● STEMscopes/ Matter and Energy/ 5.5C Mixtures/ Explain/Stemscopedia ● National Geographic Physical Science book, pgs. 26-31. <i>Students describe the properties of mixtures and solutions.</i> ● STEMscopes/ Matter and Energy/ 5.5CD Mixtures / Explain/ Scope Vocabulary Game 	<p>STEMscopes/ Matter and Energy/ 5.5CD Mixtures/ Elaborate/ Next Step Inquiry <i>This activity allows students to further explore a concept in- depth and helps the student organize their thinking in order to carry out an investigation to help answer their question.</i></p> <p>Reading Connections:</p> <ul style="list-style-type: none"> ● NG/Physical Science/Ladders/The World’s Ocean <i>Students read the article, “The Ocean’s Rainbow Beaches” pgs. 26-31. and discuss why beaches are different colors.</i> ● STEMscopes/ Matter and Energy/ 5.5CD Mixture/ Elaborate/ Reading Science <i>“Blood”: Students will learn about how and why blood is separated.</i> 	<p>STEMscopes/ Matter and Energy/ 5.5CD Mixtures/ Evaluate/ Open Ended Response and Post Assessment.</p> <p>Technology Connection: STEMscopes/ Matter and Energy/ 5.5CD Mixture/ Evaluate/ Scope Review Game and Active Assessment</p> <p>Writing Connection: STEMscopes/ Matter and Energy/ 5.5CD Mixtures / Evaluate/ Writing Science <i>Students are asked to write about why some parts of a beach can be classified as mixtures and others are classified as solutions.</i></p>	

Grade 5 Science Curriculum Guide

<p>Discuss:</p> <p>*What happened to the materials when mixed together?</p> <p>*Which mixtures retained their physical properties?</p> <p>*Which mixtures undergo changes in their physical properties?</p>	<ul style="list-style-type: none"> • STEMscopes/ Matter and Energy/ 5.5CD Mixtures/ Explain/ Content Connections <p><i>Students demonstrate that some mixtures maintain physical properties of their ingredients such as iron filings and sand. I can also identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving salt in water or adding lemon juice to water.</i></p>		
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Grade 5 Science Curriculum Guide

STEM and PBL Connections for Matter and Energy

Grade level teams will choose from the following activities to implement throughout the unit.

STEM (Science, Technology, Engineering, and Mathematics)

As problems are identified and solutions are needed, often times the solution is developed through the engineering design process (EDP). Engineers, like scientists, utilize a series of standard practices as they design solutions to solve meaningful problems.

For detailed information go to [STEMscopes/STEMcoach/STEMcoach In Action/Grades 3-5/National: Engineering Solutions](#)

- STEMscopes/Classifying Matter/Elaborate/Engineering Connections
Build a Barge Challenge: Using only the supplies listed, design and build a device that will float while holding as many pennies as possible.
- STEMscopes/Mixtures /Elaborate/Engineering Connections
Muddy Waters Challenge: Design, construct, and test a filter system to remove impurities from dirty water.

PBL (Project and Problem Based Learning)

Project Based Learning is the process of involving students in an inquiry based approach to solving an authentic, real-world problem in a way that is age appropriate, tied to the curriculum standards and allow students voice and choice in the way they select and develop the solution to the problem. When students are given the autonomy to solve problems that are of interest to them, high levels of engagement lead to high levels of learning.

For detailed information go to [STEMscopes/STEMcoach/STEMcoach In Action/Grades 3-5/National: Project Based Learning](#)

- STEMscopes/Classifying Matter /Accelerate/Project-Based Learning Science
Keep Your Cool: Students determine which materials in the class can be used to keep popsicles frozen.
- STEMscopes/Properties of Water/Accelerate/Project-Based Learning Science
Boiling Over: Students create a proposal with two ways to make water reach its freezing point and boiling point faster.
- STEMscopes/Mixtures/Accelerate/Project-Based Learning Science
When Life Gives You Lemons, Make Lemonade: Students write two recipes for a class cook book of mixtures and solutions.