



5th Grade - Elementary Science Bundle 6

Title			Suggested Dates
Properties of Matter / Mixtures and Solutions (These concepts span Bundles 5 & 6)			Dec 6 – Dec 17 (9.5 days)
Link to Integrated Process Skills Link to Assessment Link to Related Assurance Words Link to Related Literature Link to Universal Design Link to Science Project / Science Fair Information			

Big Idea/Enduring Understanding	Guiding Questions
<p>Matter has measurable physical properties and those properties determine how matter is classified, changed, and used.</p> <p>Freezing / melting and boiling points are unique properties for each type of matter.</p>	<p>What is the freezing / melting and boiling points of water?</p> <p>What is the relationship between the physical properties of an object, such as mass, and its relative density?</p> <p>How are physical properties used to identify and classify matter?</p> <p>How do the concepts and ideas in this bundle connect / relate the concepts / ideas in previous bundle(s)?</p>

The resources included here provide teaching examples and/or meaningful learning experiences to address the District Curriculum. In order to address the TEKS to the proper depth and complexity, teachers are encouraged to use resources to the degree that they are congruent with the TEKS and research-based best practices. Teaching using only the suggested resources does not guarantee student mastery of all standards. Teachers must use professional judgment to select among these and/or other resources to teach the district curriculum.

Knowledge & Skills with Student Expectations	District Specificity/Examples	Suggested Resources (See note above)
<p>5.5 Matter and Energy. 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:</p> <p>5.5a classify matter based on physical properties, including mass, magnetism, physical state (solid, liquid, gas), relative density (sinking and floating), solubility in water, and the ability to conduct or insulate thermal energy or electric energy (electrical conduction and insulation will be focused on in Bundle 8)</p>	<p>Including:</p> <ul style="list-style-type: none"> • Mass (grams) <ul style="list-style-type: none"> ○ Review mass vs weight • Magnetism <ul style="list-style-type: none"> ○ Attraction / repulsion to magnets • State of matter <ul style="list-style-type: none"> ○ Solid ○ Liquid ○ Gas • Solubility in water (ability to dissolve) <ul style="list-style-type: none"> ○ Water soluble: it can be dissolved in water ○ Low solubility: substance does not easily dissolve in water (such as sand) ○ High solubility: easily dissolves in water (such as sugar) • Ability to conduct or insulate thermal(heat) energy • Relative density <ul style="list-style-type: none"> ○ Not formula based; not absolute density 	<p>TAKScopes 5.5a Classifying Matter TAKScopes 5.5b Properties of Water</p> <p><u>AIMS 4th Grade Physical Science Texas Core Curriculum</u> “Matter Jeopardy”, page 87 “What’s the Matter”, page 79 “Cups N’ Stuff”, page 143 “Life’s Ups and Downs”, page 148 “Some Like it Salty”, page 154 “Clay Boats”, page 161 “Oh Dear, What Can This Matter Be”, page 10 “A Matter of States”, page 19 “Metal Matters!”, page 26</p> <p>States of Matter animation</p> <p><u>AIMS 5th Grade Physical Science Texas Core Curriculum</u> “In the Mix of Things”, page 34</p>

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	<ul style="list-style-type: none"> ○ Build upon previous grades exploration of “sinking and floating”; the properties of an object, such as mass, can then be connected to the ability to sink or float, and compared using relative density 	<p>“Messing with Mixtures”, page 37 “Chromatographic Circles”, page 47 “Involve Dissolving”, page 54</p> <p><u>Gateway, 5th Grade</u> 1.1 Classifying Matter: Elaborate, page 15 1.3 Measuring Mass, page 12 1.4 States of Matter, page 25 1.5 Volume, page 31 1.6 Volume 2, page 37</p> <p><u>Gateway, 5th Grade</u> 1.9 Density, page 52</p> <p><u>Gateway, 4th Grade</u> 1.5 Density, page 33</p>
<p>5.5 Matter and Energy. 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:</p> <p>5.5b identify the boiling and freezing / melting points of water on the Celsius scale</p>	<p>Freezing / melting point of water: 0°C Boiling point of water: 100°C</p> <p>NOTE: Boiling and freezing / melting points of matter remain constant for that type of matter. Example: Water boils at 100°C and freezes / melts at 0°C. This will remain the same for water. However, it may not be the same temperature for another substance, such as milk. Yet, each substance has its own boiling and freezing / melting points that remain constant for that substance.</p> <p>What is the Difference Between Melting Point and Freezing Point? (teacher background)</p>	<p><u>AIMS 5th Grade Physical Science Texas Core Curriculum</u> “Reaching a Point”, page 61 “Heat Energy Moves”, page 95 “Hot Chocolate” (use small cubes of cheese instead of chocolate), page 99</p> <p><u>Gateway, 5th Grade</u> 1.7 Boiling Points and Melting Points, page 40</p> <p>Heating Water / Freezing Point / Melting Point animation</p> <p><u>BIITAKS – Matter Binder</u> “All Mixed Up” <i>Engage</i> (Note: need to purchase wax beads, metal bbs and plastic “airgun” bbs (beads) ahead of time. Metal (steel) and airgun beads (yellow and white provide different densities) are available at Academy) <i>Explore</i>: all stations in Part A; Part B: delete stations 1 & 3 (Station 2 – can use light density airgun beads here with sugar water) * Can do three different salt water density containers as engage* <i>Explain</i>: sections are divided into Part A and B; will need to delete questions for skipped parts <i>Elaborate</i>: begins melt / boil points of metals – make comparative graph</p>
<p>5.5 Matter and Energy. The student knows that matter has measurable physical properties and those properties determine</p>	<p>Including:</p> <ul style="list-style-type: none"> ● Mixture <ul style="list-style-type: none"> ○ The physical combination of two or more substances; each 	<p><u>Gateways, 5th Grade</u> 1.8 Mixture and Solution, page 45</p> <p><u>FOSS Kit: Mixtures and Solutions</u></p>

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<p>how matter is classified, changed, and used. The student is expected to:</p> <p>5.5c demonstrate that some mixtures maintain physical properties of their ingredients such as iron filings and sand</p> <p>5.5 Matter and Energy. 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:</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>	<p style="color: red;">retaining its properties</p> <ul style="list-style-type: none"> ○ Can be separated into its original components ○ EX: salt water, tossed salad ○ Solutions and Suspensions are types of mixtures <p>Including:</p> <ul style="list-style-type: none"> ● Solutions <ul style="list-style-type: none"> ○ Type of a mixture ○ One substance dissolved in another (even concentration) ○ Solute: substance being dissolved ○ Solvent: part of the solution that does the dissolving ○ Solids dissolved in liquids, gases dissolved in liquids, gases dissolved in other gases, and liquids in other liquids ○ Saturation: the point at which a solution of a substance can dissolve no more of that substance <p>Background Information / Extensions:</p> <ul style="list-style-type: none"> ● Homogeneous Mixture – solutions <ul style="list-style-type: none"> ○ Same throughout and evenly mixed ○ Components are not individually able to be seen ○ Examples: milk, salt water, brewed tea or coffee, soapy water ○ Very difficult to separate ● Heterogeneous Mixture <ul style="list-style-type: none"> ○ The individual components can be seen ○ Examples: cookie dough, sandy water, orange juice with pulp, water with ice cubes, chicken noodle soup, water and oil, Chex Mix, Raisin Bran cereal ○ Includes suspensions, such as mud, muddy water where soil, clay, or silt is suspended in water, chalk powder suspended in water, paint, flour suspended in water, tomato juice, oil and vinegar salad dressing ○ More easily separated while not all are easy to separate 	<p>Investigations 1 and 2</p> <p>FOSSWEB Mixtures and Solutions</p> <p>Activity: Junkyard Analysis</p> <p>Module Summary, Investigation 1, 2, and 3 Student Pages (page 2-14)</p> <p>Chem4Kids: Mixtures</p> <p>Mixture Examples</p> <p>Chem4Kids: Solutions and Mixtures</p> <p>What is a Solution?</p> <p>Properties of Mixtures and Solutions Investigation</p>
<p>Scientific Investigation and Reasoning The Process TEKS are integrated with and taught THROUGH the content TEKS. Back to Top</p>		
<p>5.1 Scientific investigations and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to:</p> <p>5.1a demonstrate safe practices and the use of safety equipment as described in the Texas</p>	<p style="color: red;">Do not mix unknown substances together, such as household cleaners. Stress this safety message to students. You are working with mixtures and solutions with known objects in a controlled classroom setting and they should not randomly experiment with mixing chemicals.</p> <p>Including:</p> <ul style="list-style-type: none"> ● No tasting unless instructed 	<p>PISD Science Safety Page</p> <p>Texas Science Safety Standards</p> <p>DuPont Science Safety Zone</p>

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<p>Safety Standards during classroom and outdoor investigations</p> <p>5.1b make informed choices in the conservation, disposal, and recycling of materials</p>	<ul style="list-style-type: none"> • Safe smelling – wafting • Eye and skin protection, as needed • Wait for teacher directions • Wash hands after science investigations • Directly pointing out / planning for safety risks • Proper use of all applicable safety equipment <p>Encourage students to identify safety precautions on their own throughout the year</p>	
<p>5.2 Scientific investigations and reasoning. The student uses scientific methods during laboratory and outdoor investigations. The student is expected to:</p> <p>5.2a describe, plan, and implement simple experimental investigations testing one variable</p> <p>5.2b ask well-defined questions, formulate testable hypothesis, and select and use appropriate equipment and technology</p> <p>5.2c collect information by detailed observation and accurate measuring</p> <p>5.2d analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence</p> <p>5.2e demonstrate that repeated investigations may increase the reliability of results</p> <p>5.2f communicate valid conclusions in both written and verbal forms</p> <p>5.2g construct appropriate simple graphs, tables, maps, and charts using technology, including computers, to organize, examine, and evaluate information</p>	<p>Investigations as they relate to matter / mixtures & solutions</p> <p>Experimental Investigations including:</p> <ul style="list-style-type: none"> • Whole group participation • Small group participation • Partner participation • Individual participation <p>Experimental Investigations including:</p> <ul style="list-style-type: none"> • Pre-determined inquiry (i.e. AIMS activities) • Guided inquiry • Full inquiry <p>Experimental Investigation (Scientific Method) steps including:</p> <ul style="list-style-type: none"> • Problem / Question • Hypothesis • Materials • Procedure • Data / Results • Conclusions <p>NOTE: Not all investigations / activities are experimental investigations</p>	<p>What are descriptive, comparative, and experimental investigations? 5th graders experience all three types.</p>
<p>5.3 Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:</p>	<p>Product labels / claims Such as: ingredient lists, nutrition labels</p>	<p>Using Socratic Seminars for higher-order thinking and discussion</p> <p>Multisensory Strategies for Science Vocabulary by Sandra Husty and Julie Jackson includes Bag & Tag</p>

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<p>5.3b evaluate the accuracy of the information related to promotional materials for products and services such as nutritional labels</p>		
<p>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</p>	<p>Including:: Different representations of mixtures / solutions including 2D and 3D (dot model, technical drawing, replica model, etc)</p> <p>Including:</p> <ul style="list-style-type: none"> • Student generated models • Minimum three models / representations per concept • Asking / considering the following questions: <ul style="list-style-type: none"> ○ What is the model for? ○ What do the parts of the model represent? ○ How is the model the same as the real thing? ○ How is the model different from the real thing? ○ How well does the model represent the real thing; what can't it show? 	
<p>5.4 Scientific investigation and reasoning. The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected to:</p> <p>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 the observation of habitats of organisms such as terrariums and aquariums</p> <p>5.4b use safety equipment including safety goggles and gloves</p>	<p>Including:</p> <ul style="list-style-type: none"> • Notebook • Camera • Hand len • Metric ruler • Celsius Thermometer • Pan balance • Triple beam balance • Spring scale (mass) • Graduated cylinders • Beakers • Meter sticks • Magnets • Iron filings <p>Such as:</p> <ul style="list-style-type: none"> • Calculators • Microscopes • Computers <p>NOTE: Scaffolding for introducing new tools:</p> <ol style="list-style-type: none"> 1. Tools are modeled 2. Students are exposed and gain experience through group interaction 	<p>How to Use a Graduated Cylinder animation</p> <p>How to Use a Microscope animation</p> <p>How to Use a Metric Ruler animation</p> <p>How to Use a Triple Beam Balance animation</p> <p>How to Use a Double Pan Balance animation</p> <p>Tools of the Science Classroom animation</p> <p>How to Use a Metric Ruler animation</p>

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	3. Individuals develop skills through multiple opportunities for practice throughout year	
Related Assurance Words		Back to Top
density (relative), differentiate, experiment, hypothesis, interact (interaction), interpret, relationship, reliability, saturation, significance, solubility (solute), solution		
Related Literature		Back to Top
<u>Solids, Liquids, and Gases</u> by Angela Royston <u>Solids, Liquids and Gases</u> by Darlene Stille <u>Solids, Liquids and Gases: from ice cubes to bubbles</u> by Carol Ballard <u>Mixing and Separating</u> by Chris Oxlade <u>Mixtures and Solutions</u> by Louise Spilsbury <u>Water</u> by Christin Ditchfield <u>Freezing and Melting</u> by Robin Nelson	<u>La materia : mira, toca, prueba, huele</u> by Darlene Stille <u>Calentar</u> by Patricia Whitehouse <u>Solidos</u> by Jim Mezzanotte <u>Se congela y se derrite</u> by Robin Nelson	
Assessment Support	Region XIII Science TAKS Resources	www.tmsds.org
		Back to Top
Assessment Probes	Performance Assessment	
<u>Uncovering Student Ideas in Science (Page Keeley), Volume 1</u> “Ice Cubes in a Bag”, page 49 “Lemonade”, page 55 “Cookie Crumbles”, page 61 “Seedlings in a Jar”, page 67 “Is it Melting?”, page 73 “Is it Matter?”, Page 79 “Is it Made of Molecules”, page 85 “Objects and Temperature”, page 109 <u>Uncovering Student Ideas in Science (Page Keeley), Volume 2</u> “Comparing Cubes”, page 19 “Floating Logs”, page 27 “Floating High and Low”, page 33 “Solids and Holes”, page 41 “Turning the Dial”, page 47 “Boiling Time and Temperature”, page 53 “Freezing Ice”, page 59 “What’s in the Bubbles”, page 65 “Ice-Cold Lemonade”, page 77 “Mixing Water”, page 83 <u>Uncovering Student Ideas in Science (Page Keeley), Volume 3</u> “Is it a Solid?”, page 25 “Thermometer”, page 33	Bridging to TAKS Matter: 5 th Grade, page 22 Student uses a triple beam balance (this is appropriate for any of the lab equipment) to determine accurate mass, including balance calibration	

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<p>“Floating Balloon”, page 39 “Hot and Cold Balloons”, page 45</p> <p><u>Uncovering Student Ideas in Science (Page Keeley), Volume 4</u> “Sugar Water”, page 11 “Ice Water”, page 45 “Warming Water”, page 53</p>	
Scenario / Open Ended	Multiple Choice
<p><u>Gateway, 5th Grade:</u> 1.3 student page 27 (need rubric) <u>Gateway, 5th Grade:</u> 1.8 student page 55 <u>Gateway, 5th Grade:</u> 1.9 student page 62 <u>Gateway, 5th Grade:</u> 2.2 student page 77</p>	<p><u>Gateway, 5th Grade:</u> 1.1 student page 16 <u>Gateway, 5th Grade:</u> 1.2 student page 21 <u>Gateway, 5th Grade:</u> 1.4 student pages 32 and 33 <u>Gateway, 5th Grade:</u> 1.5 student page 38 <u>Gateway, 5th Grade:</u> 1.6 student page 43 <u>Gateway, 5th Grade:</u> 1.7 student pages 50 and 51 <u>Gateway, 5th Grade:</u> 2.1 student pages 71 and 72</p>

5th Grade Science Project / Fair Information <i>*See Campus Science Fair Contact for complete information*</i> Back to Top		
<p style="color: red;">Instructional Points for Bundles 5 and 6: Experimental Materials, Experimental Procedure</p> <p><i>Science Project / Testable Question Support: Campus share folder > Sci Curriculum Info > Science Fair (Can complete Bundle 7 Instructional Points)</i></p>	<p>*Each campus has its own timeline based upon when the campus science fair event is scheduled to occur.</p> <p>Individual or team EXPERIMENT <u>required</u> for all 5th graders</p>	
	<table border="1" style="width: 100%;"> <tr> <td style="width: 70%; padding: 5px;"> <p><u>Experiment Components:</u> Title, Question (testable), Definitions, Hypothesis, Background Information, Materials, Procedure, Results, Conclusion</p> </td> <td style="width: 30%; text-align: center; vertical-align: middle;"> <p>Experimental Investigation Rubric</p> </td> </tr> </table>	<p><u>Experiment Components:</u> Title, Question (testable), Definitions, Hypothesis, Background Information, Materials, Procedure, Results, Conclusion</p>
<p><u>Experiment Components:</u> Title, Question (testable), Definitions, Hypothesis, Background Information, Materials, Procedure, Results, Conclusion</p>	<p>Experimental Investigation Rubric</p>	
<p><u>Participation</u> in campus Science Fair <u>required</u> for all 5th graders; Students <u>wishing</u> to be considered for the Austin Energy Regional Science Festival complete and submit an “AERSF Intent Form” prior to the campus science fair event.</p>	<p>Austin Energy Science Festival Website</p>	

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Differentiation / Universal Design Consideration Points	<u>Universal Design: Link to Barriers and Solutions Tool</u>		<u>Back to Top</u>
Current Methods and Materials	Possible Challenges	Possible Solutions	
Printed Text: properties of matter mixtures and solutions	<ul style="list-style-type: none"> • Difficulty accessing information for comprehension • Difficulty decoding text 	<ul style="list-style-type: none"> • Use SOLO Read Outloud or Natural Reader • Use partner reading 	
Visuals – alternative ways of accessing concepts of properties, mixtures and solutions	<ul style="list-style-type: none"> • difficulty in accessing concept through text • student disengagement 	<p>Testing properties of materials - animated game</p> <p>Observing adding and removing heat and change of state animation</p> <p>ABPI Resources for Schools: Changing solids to liquids: Animations (by titles listed numerically) 2. Solids, 3. Liquids, 4. Changing Solids to Liquids, 5. Dissolving, 6. Gases, 7. Solid Liquid Gas Shape, 8. Models of Changing States: Solid to Liquid, 9. Models of Changing States: Liquid to Gas, 10. Mixtures and solutions, 11. Reversible and non-reversible changes to matter, 12. Glossary of terms used in these videos</p>	
Kinesthetic/manipulating instructional materials		Zoom video: how to do a density column	
Open-Ended Response		For open ended response to assessments on SE's consider alternative response methods including: Solo/Writing Out loud, manipulatives, pictorial representations, models, selection of a given set of pictures, digital recorded voice response, graphic displays	