

5th Grade - Elementary Science Bundle #6

Title	Suggested Dates
Mixtures and Solutions	12/7/09 – 12/18/09 (10 days)

Big Idea/Enduring Understanding	Guiding Questions
Matter can be combined and separated for different purposes.	<p>How do mixtures maintain their physical properties?</p> <p>How can changes occur in physical properties resulting in solutions?</p> <p>What are the similarities and differences between mixture and solutions?</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>CURRENT TEKS 5.7 Science concepts. The student knows that matter has physical properties.</p> <p>5.7b demonstrate that some mixtures maintain the physical properties of their ingredients</p> <p>NEW TEKS 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.</p> <p>5.5c demonstrate that some mixtures maintain physical properties of their ingredients such as iron fillings and sand</p>	<p style="color: red;">Bundle 6 is a natural continuation and building from Bundle 5. Bundle 5 concepts (properties) can and should continue to be used as part of this and other bundles.</p> <p style="color: red;">The new TEKS are exactly the same as the current TEKS with the addition of an example. Classrooms should use more than the provided example in order to assure exposure to many different kinds of mixtures.</p> <p style="color: red;">Students should work with pre-made mixtures as well as create their own mixtures. Only by creating and separating their own, combined with identifying the properties before, during, and after, can students truly demonstrate this concept.</p> <p>What is a mixture? A mixture is a substance made by combining two or more different materials in such a way that no chemical reaction is occurring (elementary does not begin chemical concepts). A mixture can usually be separated back into its original components. Some examples are: tossed salad, salt water, mixed back of M&Ms candy. Students can gather materials from the playground near the swings and identify it as a mixture by identifying the separate pieces of the mixture as well as the properties of the pieces before, during, and after the mixture occurred (such as pebbles, mulch, dirt)</p> <p style="color: red;">Connection: previous bundles learning points, Have we explored or</p>	<p>The following resources apply throughout each bundle:</p> <p>Science Notebooks</p> <p>IF I TRY: intranet and Sci Curr Info folder in each campus share folder</p> <p>KLEW/ Claims & Evidence</p> <p>PISD Elem Science Homepage</p> <p>PISD K-5 Equipment Alignment – part of the Vertical Alignment Document on the curriculum page</p> <p style="background-color: yellow;">Grade Level Required Lesson * one of these hands-on components (BIITAKS, FOSS, AIMS, etc) must be included in order to assure experiential learning for students. Some campuses do not have FOSS and other resources, but all campuses currently have the Bridging to TAKS lessons.</p> <p>Lessons should complete the inquiry</p>

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	<p>used any mixtures? Let's time travel to then...what do we know now about that...can we add anything to our thinking / science notebook entries based on our continuing learning? (example: soil samples)</p>	<p>cycle of engaging students, exploring [including investigation and data gathering], and sense-making</p> <p>Bridging to TAKS – Matter [master copies can be found in the campus library as well as in the Sci Curr Folder within each campus share folder]</p> <p>FOSS Kit: Mixtures and solutions</p> <p>www.fossweb.com Teacher guides are included online and materials can be gathered on campus should the kit itself not be there. Also, there are interactive student support pages that go with each FOSS kit</p> <p>TAKScopes Classifying Matter (5.7a) Mixtures and Solutions (5.7cd) Boiling point Melting point Freezing point (5.7d)</p>
<p>CURRENT TEKS 5.7 Science concepts. The student knows that matter has physical properties.</p> <p>5.7c identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving sugar in water</p> <p>NEW TEKS 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.</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>What is a solution? “Solutions are groups of molecules that are mixed up in a completely even distribution. Solutions have an even concentration throughout. Example: food coloring in water, cleaner such as Windex, Vinegar and oil salad dressings</p> <p>TEACHER NOTE: This is an introduction to solutions. This does not get into the the chemical conversation, but remains a base level understanding of what a mixture and what a solution are and how they are similar and how they are different.</p>	<p>Chem 4 kids website (mixtures page) http://www.chem4kids.com/files/matter_mixture.html http://www.chem4kids.com/files/matter_mixtureex.html (mixture examples) http://www.chem4kids.com/files/matter_solution.html (solutions)</p> <p>AIMS (Tx Core Curriculum Physical Science Book) -Messing with Mixtures (also in AIMS Chemistry Matters and available as an AIMS E-Activity) -In the Mix of Things (focus is NOT elements and/or the periodic table) -Chromatographic Circles (also in AIMS Chemistry Matters and available as an AIMS E-Activity)</p> <p>Using items in the classroom, school, outside, and from home</p>

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		<p>If well documented and no FMNV food are used, students can create a tossed salad as well as creating their own salad dressing. This can be used as a snack (portions 3 oz or less) or each student can take their small portion home. The directions and reasoning can also be sent home should families wish to continue the conversation on their own.</p> <p>http://www.workitmom.com/bloggers/problemsolved/?p=143 (one example of a recipe for salad dressing: use basic vinaigrette for solution conversation, adding in other items such as olives for mixture conversation)</p>
<p>CURRENT TEKS 5.1 Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.</p> <p>5.1a demonstrate safe practices during field and laboratory investigations</p> <p>5.1b make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> <p>NEW TEKS 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.</p> <p>5.1a demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations</p> <p>5.1b make informed choices in the conservation, disposal, and recycling of materials</p> <p>Health5.5 Health behaviors. The student comprehends behaviors that reduce health risks throughout the life span.</p>	<p>No tasting or touching unless instructed Safe smelling – wafting Goggles Wait for teacher directions Wash hands after science activities</p> <p>Review investigation safety procedures for both indoor and outdoor activities, as applicable:</p> <ul style="list-style-type: none"> • Directly point out possible safety risks • Discuss precautions • Share specific guidelines for the lesson <ul style="list-style-type: none"> ○ Use of equipment and materials ○ Respect for environment <p>Encourage students to identify these on their own throughout the year [document in science notebooks via words and/or pictures]</p> <p>Make note of and teach use of district-wide recycling resource.</p> <p>Health: - preventing injuries in both indoor and outdoor investigations - responses including communication from science lab and outdoor investigations to the front office and nurse</p>	<p>PISD Safety Website -Safety Contracts, games, etc -Science Safety is Elementary (for teachers) -Safety in the Elementary Classroom (for teachers)</p> <p>DuPont Science Safety Zone website</p> <p>Texas Science Safety Standards</p> <p>District Recycling Program: http://www.paperretriever.com/default.asp?id=226</p>

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<p>Health5.5e demonstrate strategies for preventing and responding to deliberate and accidental injuries</p> <p>Health5.5g describe response procedures for emergency situations</p> <p>Health5.5h describe the value of seeking advice from parents and educational personnel about unsafe behaviors</p> <p>Health5.8 Influencing factors. The student knows how various factors influence individual, family, and community health throughout the life span.</p> <p>Health5.8d identify environmental protection programs that promote community health such as recycling, waste disposal, or safe food packaging</p>		
<p>CURRENT TEKS</p> <p>5.2 Scientific processes. The student uses scientific methods during field and laboratory investigations.</p> <p>5.2a plan and implement descriptive and simple experimental investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology</p> <p>5.2b collect information by observing and measuring</p> <p>5.2c analyze and interpret information to construct reasonable explanations from direct and indirect evidence</p> <p>5.2d communicate valid conclusions</p> <p>5.2e construct simple graphs, tables, maps, and charts using tools including computers to organize, examine, and evaluate information</p> <p>NEW TEKS</p> <p>5.2 Scientific investigations and reasoning. The student uses scientific methods during laboratory and outdoor investigations.</p> <p>5.2a describe, plan, and implement simple experimental investigations testing one variable</p> <p>5.2b ask well-defined questions, formulate testable</p>	<p>Classes and students should be working on their own or in groups to plan an experimental investigation. Asking an appropriate question needs to be modeled and taught. Testing one variable is not a new idea for 5th grade, but the language is new. This is not innate and must be modeled and taught.</p> <p>Teacher continues to model the investigative / decision making process using the Think-Aloud technique</p> <p>Formal and informal terms in all areas of science should be used interchangeably for exposure.</p> <p>The emphasis in all types of investigations is the <u>systematic approach</u> used: students form questions or define a problem and develop a plan to answer their question or solve the problem using appropriate tools to implement the plan.</p> <p>Develop questions using resources such as Science Notebooks, KLEW charts and students sharing with one another</p> <p>Class discussion is a critical element to allow students to elaborate and build understanding</p> <p>Record their ideas, the process and discussion points in Science Notebooks. Initial support for recording collected information should be more guided in the beginning of the year and move toward students making independent decisions on which type of graphic organizer to use as the year progresses. Use Science Notebook to</p>	

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<p>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>build the skill of constructing ways to record data.</p> <p>Also include the following measurements to the nearest number (following Math TEKS for fractional amounts): Mass (g) using double pan balance with gram masses, comparing mass, and using triple beam balance (including calibration)</p> <p>Explanations:</p> <ul style="list-style-type: none"> • Student generated explanations with justifications of reasoning. • This can be whole group, small group, partners or individuals • Both verbal and written in Science Notebook <p>The KLEW format is a graphic organizer that allows students to record learning pieces and show the connection to evidence.</p> <p>Repeated trials will not need to be done on every hands-on/ minds-on investigation during the year, but need to be incorporated and connected to the concept of “practice” and how doing things more than one time allows patterns and other recognizable data to emerge.</p> <p>There should be an opportunity to discuss or have a mini-lesson on the reason for repeating investigations during each bundle.</p> <p>It is good to remember that many demonstrations and investigations in science do not work in the classroom on a particular day – however, that is a great time to discuss repeating a test to get a more valid result – even if there is no time to actually try the demonstration or investigation again that day.</p> <p>Labeling of technical drawings, diagrams and pictures is a huge support for vocabulary development so that students will have a model to connect to the text</p>	
<p>CURRENT TEKS</p> <p>5.3 Scientific Processes. The student uses critical thinking and scientific problem solving to make informed decisions.</p> <p>5.3a analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information</p> <p>5.3b draw inferences based on information related to promotional materials for products and services</p> <p>5.3c represent the natural world using models and identify</p>	<p>Continue to support building understanding of using a <u>systematic approach</u> to solve a problem or answer a question</p> <p>5.3a</p> <p>The key here is to support students as they observe the world and the results of their investigations and build their critical thinking by looking at those results as evidence that supports a concept.</p> <p>Use reflective discussions to develop and answer questions about the scientific concepts studied. This is an opportunity to integrate with point of view in ELA and SS. Student should use and reference their Science Notebooks and one another</p>	<p><u>Using Science Notebooks in Elementary Classrooms</u> by Michael Klentschy – excellent resource on developing literacy and critical thinking skills through science</p>

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<p>their limitations</p> <p>5.3d evaluate the impact of research on scientific thought, society, and the environment</p> <p>5.3e connect Grade 5 science concepts with the history of science and contributions of scientists</p> <p>NEW TEKS 5.3 Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions.</p> <p>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</p> <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>5.3d connect grade level appropriate science concepts with the history of science, science careers, and contributions of scientists</p>	<p>5.3b</p> <p>For every model used during the year, ask the following questions:</p> <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 its target – the real thing? • How is the model different from its target – the real thing? • How well does the model represent its target? What can it not show? (limitations) <p>Use different models of each concept target where each different model is designed to highlight a different important part of the overall concept. The questions allow you to focus on each part of each model so that when all those parts combine, a better mental model is created for students</p>	
<p>CURRENT TEKS 5.4 Scientific Processes. The student knows how to use a variety of tools and methods to conduct science inquiry.</p> <p>5.4a collect and analyze information using tools including calculators, microscopes, cameras, sound recorders, computers, and lenses, rulers, thermometers, compasses, balances, hot plates, meter sticks, timing devices, magnets, collecting nets, and safety goggles</p> <p>5.4b demonstrate that repeated investigations may increase the reliability of results</p> <p>NEW TEKS 5.4 Scientific investigation and reasoning. The student</p>	<p>Metric units of measurement only</p> <p>TEACHER NOTE: Initial teaching the proper use of tools should be scaffolded</p> <ol style="list-style-type: none"> 1. Tools are modeled 2. Students are exposed through group interaction and then, 3. Individuals develop skills through multiple opportunities for practice during the year. <p>Tools and equipment, including senses, should be used in authentic learning settings including during an outside field investigation</p> <p>*Important to plan for the use of goggles and other safety equipment as needed. Be aware of chemical and other safety hazards and take proper precautions*</p>	

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knows how to use a variety of tools and methods to conduct science inquiry.

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

5.4b use safety equipment including safety goggles and gloves