


4th Grade - Elementary Science Bundle #6

Title		Suggested Dates
Scientific Investigation and Reasoning		12/7/09 – 12/18/09 (10 days)

Big Idea/Enduring Understanding	Guiding Questions
Science is an ongoing cycle of questioning and problem solving. We ask certain questions to find out certain information.	<p>How can I learn new things on my own?</p> <p>How can I use my senses and other tools to help me learn things?</p> <p>How can I gather information and organize it?</p> <p>How can asking questions and finding the answers look differently depending on what I want to know?</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>Bundle 6 is only 10 days long and falls directly before the holidays with many conflicting events. Feedback from last year indicated a desire to have a point near the middle to touch base and more directly revisit process skills as well. The process skills should be and are built into every bundle, but Bundle 6 does allow time for additional focus,.</p> <p>4th grade should be completing class projects ahead of the students' timeline to be certain to model and practice experimental steps and procedures, just as you would with concepts such as division. This bundle allows for SOME of this process...the part that falls within your campus time-line. This is not meant to be "the bundle to do your project" as that does not provide the scaffolded learning points for students.</p> <p>Bundle 6 does provide an excellent opportunity to focus on questioning and critical thinking skills as a means of finding information and developing literacy and communication skills. Questioning skills are not limited to "testable questions" used in full investigations and science fair projects. It is a time to purposely connect thinking and learning.</p>		
<p>NEW TEKS 4.1 Scientific investigation and reasoning The student conducts classroom and outdoor investigations following home and school safety procedures and environmentally appropriate and ethical practices.</p> <p>4.1a demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigation</p> <p>4.1b make informed choices in the use and conservation of natural resources and reusing and recycling of materials such as paper, aluminum, glass, cans, and plastic</p> <p>CURRENT TEKS 4.1 Scientific processes. The student conducts field and</p>	<p style="color: red;">No tasting or touching unless instructed</p> <p style="color: red;">Safe smelling – wafting</p> <p style="color: red;">Goggles</p> <p style="color: red;">Wait for teacher directions</p> <p style="color: red;">No glassware</p> <p style="color: red;">Students do not handle hot water, hot plates or burners.</p> <p style="color: red;">Wash hands after science activities</p> <p style="color: red;">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>Resources listed here apply to the entire bundle.</p> <p>Science Notebooks</p> <p>IF I TRY (Intranet)</p> <p>KLEW/ Claims & Evidence</p> <p>PISD Elem Science Homepage</p> <p>PISD K-5 Equipment Alignment</p> <p>PISD Safety Website</p> <p>-Safety Contracts, games, etc</p> <p>-Science Safety is Elementary (for</p>

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<p>laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.</p> <p>4.1a demonstrate safe practices during field and laboratory investigations</p> <p>4.1b make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> <p>Health 4.4 Health behaviors. The student understands and engages in behaviors that reduce health risks throughout the life span.</p> <p>Health4.4f identify strategies for avoiding deliberate and accidental injuries such as gang violence and accidents at school and home</p> <p>Health4.9 Personal/Intrapersonal Skills. The student uses social skills for building and maintaining healthy relationships throughout the life span.</p> <p>Health4.9h demonstrate refusal skills</p>	<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>teachers)</p> <p>-Safety in the Elementary Classroom (for teachers)</p> <p>DuPont Science Safety Zone website</p> <p>Texas Science Safety Standards</p> <p>PISD Science Project / Science Fair Guide: 2009-2010 (Science Curriculum Information folder inside of the campus share folder or see your Campus Science Fair Contact)</p> <p>Investigations / concepts previously conducted can be expanded here; students can design a new investigation by altering the question to a previous investigation.</p> <p>Investigations setting the stage for upcoming expansion and ideas can be conducted here.</p>
<p>NEW TEKS</p> <p>4.2 Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and outdoor investigations.</p> <p>4.2a plan and implement descriptive investigations including asking well-defined questions, making inferences, and selecting and using appropriate equipment or technology to answer his/her questions</p> <p>4.2b collect and record data by observing and measuring, using the metric system, and using descriptive words and numerals such as labeled drawings, writing, and concept maps</p> <p>4.2c construct simple tables, charts, bar graphs, and maps using tools and current technology to organize, examine, and evaluate data</p> <p>4.2d analyze data and interpret patterns to construct reasonable explanations from data that can be observed and measured</p> <p>4.2e perform repeated investigations to increase the reliability of results</p>	<p>New 4.2a:</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>New 4.2b:</p> <p>Use Science Notebook to build the skill of constructing ways to record data.</p> <p>Record their ideas, the process and discussion points</p> <p>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.</p> <p>New 4.2c: Math connections:</p> <p>Math TEK 4.11a: Estimate and use measurement tools to</p>	<p>AIMS – Texas Core Curriculum Nature of Science (4th) or other related AIMS resources including AIMS E-Activities such as: “Inquiring Minds”</p> <p>Vernier Probeware / Logger Lite for data collection. Probeware can be found on each laptop cart (Go Temp!). Logger Lite software allows real time data collection. Elementary computer images already have this software loaded. Lessons are in the campus library as well as in the Sci Curriculum Info folder in each campus share folder.</p>

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<p>4.2f communicate valid, oral, and written results supported by data</p> <p>CURRENT TEKS</p> <p>4.2 Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations.</p> <p>4.2a plan and implement descriptive investigations including asking well defined</p> <p>4.2b collect information by observing and measuring</p> <p>4.2e construct simple graphs, tables, maps, and charts to organize, examine, and evaluate information</p> <p>4.2c analyze and interpret information to construct reasonable explanations from direct and indirect evidence</p> <p>4.4 Scientific Processes. The student knows how to use a variety of tools and methods to conduct science inquiry.</p> <p>4.4b demonstrate that repeated investigations may increase the reliability of results</p> <p>4.2d communicate valid conclusions</p>	<p>determine length (including perimeter), area, capacity and weight/mass using standard units, SI (metric) and customary .Math TEK 4.12a Use a thermometer to measure temperature and changes in temperature (Celsius)</p> <p>New 4.2d and e: Claims and Evidence:</p> <ul style="list-style-type: none"> • Student generated explanations: always justify reasoning with evidence <ul style="list-style-type: none"> ○ The KLEW format is a graphic organizer: students record learning and show the connection to evidence (the L and E section) • This can be whole group, small group, partners or individuals <ul style="list-style-type: none"> ○ Discussion is important – students compare results and make specific connections between the investigation – the concepts – and the supporting vocabulary • Construct explanations verbally and in Science Notebook (write and draw) <ul style="list-style-type: none"> ○ Labeling technical drawings, diagrams and pictures is a huge support for vocabulary development – creates a model to connect to the text <p>Related Math TEKS: TEKS 4.15a: Explain and record observations using objects, words, pictures, numbers, and technology.</p> <p>New 4.2e: Repeated trials will not need to be done on every hands-on/ minds-on investigation during the year.</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>NEW TEKS</p> <p>4.3 Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions.</p>	<p>Continue to support building understanding of using a <u>systematic approach</u> to solve a problem or answer a question</p> <p>The key here is to support students as they observe the world and</p>	<p><u>Using Science Notebooks in Elementary Classrooms</u> by Michael Klentschy (Chapter: Questioning). This book can be found in your campus professional</p>

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<p>4.3a 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>4.3b draw inferences and evaluate accuracy of services and product claims found in advertisements and labels such as toys, food, and sunscreen</p> <p>4.3c represent the natural world using models such as rivers, stream tables, or fossils, and identify their limitations, including accuracy and size</p> <p>4.3d connected grade level appropriate concepts with the history of science, science careers, and contributions of science</p> <p>CURRENT TEKS 4.3 Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions 4.3a analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information 4.3b draw inferences based on information related to promotional materials for products and services 4.3c represent the natural world using models and identify their limitations 4.3d evaluate the impact of research on scientific thought, society, and the environment 4.3e connect Grade 4 science concepts with the history of science and contributions of scientists</p> <p>Health4.9 Personal/Intrapersonal Skills. The student uses social skills for building and maintaining healthy relationships throughout the life span.</p> <p>Health4.9f analyze strengths and weaknesses in personal communication skills</p>	<p>the results of their investigations and build their critical thinking by looking at those results as evidence that supports a concept.</p> <p>Use the KLEW graphic organizer to support this process. Use reflective discussions to review learning and the evidence for it. Look for connections in results to develop and answer questions about the scientific concepts studied.</p> <p>Student should use and reference their Science Notebooks and one another</p> <p>New 4.3c: For every model used during the year, ask the following questions:</p> <ol style="list-style-type: none"> 1. What is the model for? 2. What do the parts of the model represent? 3. How is the model the same as its target – the real thing? 4. How is the model different from its target – the real thing? 5. How well does the model represent its target? 6. 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>development collection (library).</p> <p><u>Using Science Notebooks in Elementary Classrooms</u> by Michael Klentschy (Chapter: Conclusions). This book can be found in your campus professional development collection (library).</p>
<p>NEW TEKS 4.4 Scientific investigation and reasoning. The student knows how to use a variety of tools, materials, equipment, and models to conduct science inquiry.</p>	<p>Metric units of measurement only</p> <p>Can include microscopes for further study.</p> <p>TEACHER NOTE: Teaching the proper use of tools should be</p>	

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<p>4.4a collect, record, and analyze information using tools including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, mirrors, spring scales, pan balances, triple beam balances, graduated cylinders, beakers, hot plates, meter sticks, compasses, magnets, collecting nets, and notebooks; timing devices including clocks and stopwatches and materials to support the observation of habitats such as terrariums and aquariums</p> <p>4.4b use safety equipment as appropriate, including goggles and gloves</p> <p>CURRENT TEKS 4.4 Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry. 4.4a collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, meter sticks, timing devices, balances, and compasses 4.4(B) is with New 4.2(E)</p>	<p>scaffolded:</p> <ol style="list-style-type: none">1. Tools are modeled2. Students are exposed through group interaction and then,3. Individuals develop skills through multiple opportunities for4. 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>TEACHER NOTE: In linear measurement, one area of difficulty for students is the point of origin.</p>	
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