


## 5<sup>th</sup> Grade - Elementary Science Bundle # 1

<b>Title</b>		<b>Suggested Dates</b>
Science Investigation and Reasoning (1 week) / Sun, Earth, and Moon (2 weeks)		8/25/09 – 9/11/09 (13 days)

<b>Big Idea/Enduring Understanding</b>	<b>Guiding Questions</b>
<p>Students record, develop and share learning, using their science notebook as a storehouse for experiences, ideas and questions.</p> <p>Making responsible choices in the use of tools and materials and attending to possible hazards in all indoor and outdoor environments can ensure safe learning and conservation of resources in the natural world.</p> <p>Science is an ongoing cycle of questioning and problem solving.</p> <p>There are recognizable patterns among the Sun, Moon and Earth.</p>	<p>What evidence can you list to support similar characteristics of the sun, moon, and earth?</p> <p>What can you infer about gravity in relation to the earth, moon, and sun?</p> <p>How would you describe some of the basic changes/ patterns that occur on a regular basis with the sun, moon, and earth?</p> <p>How does a science notebook support science literacy and lifelong learning?</p> <p>What important practices help ensure safe field investigations?</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)
<b>Science Investigation and Reasoning / Notebooks (1<sup>st</sup> Week)</b>		
Science Notebooks: As part of Bundle 1, students should be setting up their science notebook. This includes adding all of the components and making an initial entry. Initial entries should be made outside of a regular investigation and should be a lesson itself. Throughout the year, notebooks should be used as a teaching tool for various ELA skills and should be done through teacher modeling and group entries as well as individual entries.		
<p><b>CURRENT TEKS</b></p> <p><b>5.1 Scientific Processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.</b></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 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;">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"> <li>• Directly point out possible safety risks</li> <li>• Discuss precautions</li> <li>• Share specific guidelines for the lesson</li> </ul>	<p>Resources listed here apply to the entire bundle.</p> <p><a href="#">Science Notebooks</a></p> <p>IF I TRY (Intranet)</p> <p><a href="#">KLEW/ Claims &amp; Evidence</a></p> <p><a href="#">PISD Elem Science Homepage</a></p>

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<p><b>NEW TEKS</b>  <b>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.</b></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>	<ul style="list-style-type: none"> <li>○ Use of equipment and materials</li> <li>○ Respect for environment</li> </ul> <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><a href="#">PISD Safety Website</a>          -Safety Contracts, games, etc          -Science Safety is Elementary (for teachers)          -Safety in the Elementary Classroom (for teachers)</p> <p><a href="#">DuPont Science Safety Zone website</a></p> <p><a href="#">Texas Science Safety Standards</a></p> <p>PISD K-5 Equipment Alignment</p> <p>Resources for Sun, Earth, and Moon are in the second section of the bundle.</p>
<p><b>CURRENT TEKS</b>  <b>5.2 Scientific processes. The student uses scientific methods during field and laboratory investigations.</b></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><b>NEW TEKS</b>  <b>5.2 Scientific investigations and reasoning. The student uses scientific methods during laboratory and outdoor investigations.</b></p> <p>5.2a describe, plan, and implement simple experimental investigations testing one variable</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>Use Science Notebook to build the skill of constructing ways to record data. 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>Claims and Evidence:</p> <ul style="list-style-type: none"> <li>● Student generated explanations: always justify reasoning with evidence             <ul style="list-style-type: none"> <li>○ The KLEW format is a graphic organizer: students record learning and show the connection to evidence (the <b>L</b> and <b>E</b> section)</li> </ul> </li> </ul>	

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<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>	<ul style="list-style-type: none"> <li>• This can be whole group, small group, partners or individuals             <ul style="list-style-type: none"> <li>○ Discussion is important – students compare results and make specific connections between the investigation – the concepts – and the supporting vocabulary</li> </ul> </li> <li>• Construct explanations verbally and in Science Notebook (write and draw)             <ul style="list-style-type: none"> <li>○ Labeling technical drawings, diagrams and pictures is a huge support for vocabulary development – creates a model to connect to the text</li> </ul> </li> </ul> <p>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>CURRENT TEKS</p> <p><b>5.3 Scientific Processes. The student uses critical thinking and scientific problem solving to make informed decisions.</b></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 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>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 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>Example of Critical Questioning:</p> <p>What would have to change in the Moon’s orbit of Earth to change the pattern of the phases? OR What causes temperatures to be higher in Texas in the Summer?</p>	

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<p><b>NEW TEKS</b>  <b>5.3 Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions.</b></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>Student should use and reference their Science Notebooks and one another</p> <p>For every model used during the year, ask the following questions:</p> <ul style="list-style-type: none"> <li>• What is the model for?</li> <li>• What do the parts of the model represent?</li> <li>• How is the model the same as its target – the real thing?</li> <li>• How is the model different from its target – the real thing?</li> <li>• How well does the model represent its target? What can it not show? (limitations)</li> </ul> <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><b>CURRENT TEKS</b>  <b>5.4 Scientific Processes. The student knows how to use a variety of tools and methods to conduct science inquiry.</b></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><b>NEW TEKS</b>  <b>5.4 Scientific investigation and reasoning. The student knows how to use a variety of tools and methods to conduct science inquiry.</b></p> <p>5.4a collect, record, and analyze information using tools including calculators, microscopes, cameras, computers,</p>	<p>Metric units of measurement only</p> <p><b>TEACHER NOTE:</b> Teaching the proper use of tools should be scaffolded:</p> <ol style="list-style-type: none"> <li>1. Tools are modeled</li> <li>2. Students are exposed through group interaction and then,</li> <li>3. Individuals develop skills through multiple opportunities for practice during the year.</li> </ol> <p>Tools and equipment, including senses, should be used in authentic learning settings including during an outside field investigation</p> <p><b>TEACHER NOTE:</b>          In linear measurement, one area of difficulty for students is the point of origin. As you measure distances in solar system models – emphasize that in that model – the point of origin (your zero) is the Sun</p>	

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<p>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>		
<b>Sun, Earth, and Moon (Weeks 2 &amp; 3)</b>		
<p>CURRENT TEKS  <b>5.12 Science concepts. The student knows that the natural world includes earth materials and objects in the sky.</b></p> <p>5.12C identify the physical characteristics of the Earth and compare them to the physical characteristics of the moon</p> <p>NEW TEKS  <b>5.8 Earth and Space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system.</b></p> <p>5.8d identify and compare the physical characteristics of the Sun, Earth, and Moon</p>	<ul style="list-style-type: none"> <li>• The Sun as the major source of energy for the Earth</li> <li>• Features of the sun include mass. Everything that has mass has gravitational pull. The sun’s enormous mass = enormous gravitational pull – this idea can be incorporated when discussing the sun’s characteristics rather than separated out.</li> <li>• The planets have elliptical orbits.</li> <li>• Size (relative)</li> <li>• Movement / orbit</li> <li>• Rotation/revolution</li> <li>• Location-in reference to solar system and to each other</li> <li>• “Light from the moon” is actually reflection of light from the Sun</li> <li>• Emphasize that the earth has craters like the moon, but the craters may not be as visible or noticeable.</li> <li>• Moon has no weather, no atmosphere, no wind, and no water.</li> <li>• Extremely important to model Earth, Moon, and Sun in relation to one another, but also discuss model limitations</li> <li>• Students need to physically act out rotation and revolution. Use the “/” symbol when indicating rotation to represent an axis and circle the word revolution to symbolize orbiting and emphasize that the word  “Revolution” is a longer word than “rotate”, just like the process, which take a year.</li> </ul>	<p><a href="#">Science Notebooks</a></p> <p>IF I TRY (Intranet)</p> <p><a href="#">KLEW/ Claims &amp; Evidence</a></p> <p><a href="#">PISD Elem Science Homepage</a></p> <p><a href="#">TAKScopes</a>  Earth and Moon 5.12c</p> <p><a href="#">BrainPop</a>  Sun  Moon  Earth</p> <p><a href="#">United Streaming</a>  “The Reasons for the Seasons” (26:05)  “A Spin Around the Solar System: Moon Dance “ (15:00)</p> <p>AIMS 5<sup>TH</sup> Grade Texas Core Curriculum Earth Science Book  “Physical Features of the Earth and Moon (landforms)”  AIMS 5<sup>TH</sup> Grade Texas Core Curriculum Earth Science Book  “Facing up to the Moon”  (variation could be classroom size model using larger moveable moon models ie...8 foam balls colored half blk /half white)</p>
<p>CURRENT TEKS  <b>5.12 Science concepts. The student knows that the</b></p>	<p>Revolution of the Earth around the Sun-this along with tilt are the “reasons for the seasons”</p>	

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<p><b>natural world includes earth materials and objects in the sky.</b></p> <p>5.12d identify gravity as the force that keeps planets in orbit around the Sun and the moon in orbit around the Earth.</p>	<p>Tilt of the Earth's axis Length of day / year Weather/climate</p>	<p><a href="#">TAKScopes</a> Lunar Cycles 5.6a</p>
<p>CURRENT TEKS <b>5.6 Science concepts. The student knows that some change occurs in cycles.</b></p> <p>5.6a identify events and describe changes that occur on a regular basis such as in daily, weekly, lunar, and seasonal cycles</p> <p>NEW TEKS <b>5.8 Earth and Space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system.</b></p> <p>5.8c demonstrate that Earth rotates on its axis once every 24 hours causing the day / night cycle and the apparent movement of the Sun across the sky</p>	<p>Seasonal cycles</p> <ul style="list-style-type: none"> <li>• Cycles             <ul style="list-style-type: none"> <li>○ <u>Lunar Cycles (main points and overall pattern only)</u></li> <li>○ Weather (on sun and lack of on moon)</li> </ul> </li> </ul> <p>Focus on causes</p>	<p>Elementary Science with Vernier- Computer 33 Summer and Winter: <a href="http://k8.vernier.com/resources/standards/TX/Essential_Knowledge_and_Skills/EWV/">http://k8.vernier.com/resources/standards/TX/Essential_Knowledge_and_Skills/EWV/</a></p> <p>Kamico Activity: (Developmental Series) From the Earth to the Sun pg. 151-152 *This needs to be modified : give students a copy of the answer grid with Earth and moon answers missing. Place Earth and moon answers on cards and have students sort cards to complete the chart.</p>
<p>CURRENT TEKS <b>5.8 Science concepts. The student knows that energy occurs in many forms.</b></p> <p>5.8a differentiate among forms of energy including light, heat, electrical, and solar energy</p> <p>NEW TEKS <b>5.7 Earth and Space. The student knows Earth's surface is constantly changing and consists of useful resources.</b></p> <p>5.7c identify alternative energy resources such as wind, solar, hydroelectric, geothermal, and bio-fuels</p>	<p>This is a connecting TEKS. At this point in time you are using it to identify the Sun as providing energy. Light Heat (thermal) (solar)</p> <p>You will actually TEACH and explore energy in more depth later as well. This provides connection opportunities to solar energy as an alternative energy source, etc.</p>	