


4th Grade - Elementary Science Bundle # 4

Title		Suggested Dates
Weathering & Erosion Processes		10/26/09 – 11/13/09 (14 days)

Big Idea/Enduring Understanding	Guiding Questions
The surface of the Earth is slowly and constantly changing. Many forces are involved in the process of changing the Earth's surface.	How do the forces of water, wind, and ice change Earth's surface? How do Earth's landforms show evidence of past weathering, erosion, and deposition? How does the ocean affect the surface of the Earth? What impact does weather have on changing the surface of the earth?

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>NEW TEKS 4.7 Earth and space. The student knows that Earth consists of useful resources and its surface is constantly changing.</p> <p>4.7b observe and identify slow changes to Earth's surface caused by weathering, erosion, and deposition from water, wind, and ice</p> <p>CURRENT TEKS 4.10 Science concepts. The student knows that certain past events affect present and future events.</p> <p>4.10a identify and observe effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering, and flow</p>	<p>Basic concepts of weathering, erosion, and deposition are taught in 4th; 5th grade then looks at how weathering, erosion, and deposition change and create new landforms</p> <p>Discuss different forces of weathering: water (rivers, precipitation), wind, ice (glaciers, snow, ice storms)</p> <p>Connection: specific geographic areas experience recurring weather conditions that determine the force that most frequently causes weathering and erosion: Deserts – force of wind Mountains – forces of water, ice and wind Plains – forces of wind and water</p> <p>Include evidence of gradual reshaping of Earth's surface:</p> <ul style="list-style-type: none"> • Weathering by waves beating and breaking rock from a cliff or ice in a rock crevice expanding and breaking a rock apart • Erosion by carrying away of materials in a flood, or windstorm • Deposition of lava increasing height of mountain 	<p>Resources applied to entire bundle: Science Notebooks</p> <p>IF I TRY: intranet and Sci Curr 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 Vertical Alignment Document on curriculum page</p> <p style="text-align: center;">REQUIRED LESSON</p> <p>GeoScience – “Change Over Time” Lesson - “Break it Up” Explore: three activities that specifically model weathering, erosion and deposition: Activity 1: Maraca Rocks Activity 2: Moving Downhill Activity 3: Soil Hierarchy</p>

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	<ul style="list-style-type: none"> • Dissolving <ul style="list-style-type: none"> ○ Water as an agent (minerals in water dissolve limestone forming caverns) ○ Such as dissolving salt in water, sugar in water, or kool-aid in water; elements found within sediment • Flow <ul style="list-style-type: none"> ○ Water ○ Sediment (mud)*see Geosciences Soil Hierarchy Activity ○ Lava <p>Include methods to control change. Ex: controlling erosion by using different methods of planting like strip cropping, terracing, and plowing</p>	<p>Explain: mini-field trips to find examples of weathering, erosion, deposition</p> <p>Elaborate: see choice A and B</p> <p>Master copies of lesson can be found in each campus library and in Sci Curr Info folder in each campus share folder</p> <p>TAKScopes Changes to Land (4.10A) Oceans and Land (4.11B)</p> <p>United Streaming “Junior Geologist: How Does Land Wear Down?” - Segment: “Examples of Water Erosion” - Segment: “Wind Erosion in the Desert”</p>
<p>CURRENT TEKS</p> <p>4.11 Science concepts. The student knows that the natural world includes earth materials and objects in the sky.</p> <p>4.11b summarize the effects of the oceans on land</p>	<p>Including</p> <ul style="list-style-type: none"> • Coastal weathering and erosion and deposition (Including the source of dissolved solids in ocean water) • Redistribution and changes to coastal landforms <ul style="list-style-type: none"> ○ Formation of caves and arches ○ Deposition of sediment – forming deltas and beaches • Tides: as a force of weathering/erosion <ul style="list-style-type: none"> ○ Bundle 2 covered causes (gravitational pull of the moon) and basic patterns (high and low) 	<p>BrainPop - Erosion - Weathering - Glaciers</p>
<p>NEW TEKS</p> <p>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</p> <p>4.1 Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and</p>	<p>No tasting or touching unless instructed Safe smelling – wafting Goggles Wait for teacher directions No glassware Students do not handle hot water, hot plates or burners. 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</p>	<p>PISD Safety Website</p> <p>DuPont Science Safety Zone website</p> <p>Texas Science Safety Standards</p>

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<p>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>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: -4.4f as it applies to indoor and outdoor science investigations; safety precautions -refusal skills: following peers misbehaving</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>New 4.2a: 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>Question Example: How do water, wind and ice weather Earth's surface? OR How are the forces of weathering and erosion related to weather conditions in a certain geographic area?</p> <p>Class discussion is a critical element to allow students to elaborate and build understanding</p> <p>New 4.2b: Use Science Notebook to build the skill of constructing ways to record data. Record their ideas, the process and discussion points</p>	

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<p>4.2e perform repeated investigations to increase the reliability of results</p> <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>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: Math TEK 4.11a: Estimate and use measurement tools to 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</p>	
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	<p>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 4.3 Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions.</p> <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.</p> <p>4.3a analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information</p> <p>4.3b draw inferences based on information related to promotional materials for</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 are the major causes of weathering and erosion at our school and our neighborhood? OR How can weathering and erosion be prevented at our school and neighborhood?</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> <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 	

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<p>products and services</p> <p>4.3c represent the natural world using models and identify their limitations</p> <p>4.3e connect Grade 4 science concepts with the history of science and contributions of scientists</p>	<p style="text-align: center;">can it not show? (limitations)</p> <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</p> <p>4.3 Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.</p> <p>4.3d evaluate the impact of research on scientific thought, society, and the Environment</p>	<p>What ideas has research provided to help in solving problems of erosion?</p>	
<p>NEW TEKS</p> <p>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>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</p> <p>4.4 Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.</p> <p>4.4a 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</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 scaffolded:</p> <ol style="list-style-type: none"> a) Tools are modeled b) Students are exposed through group interaction and then, c) 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>TEACHER NOTE: In linear measurement, one area of difficulty for students is the point of origin.</p> <p>Health: -personal communication via science notebooks</p>	

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4.4(B) is with New 4.2(E)

Health4.9 Personal/Intrapersonal Skills. The student uses social skills for building and maintaining healthy relationships throughout the life span.

Health4.9f analyze strengths and weaknesses in personal communication skills