



4th Grade - Elementary Science Bundle 2

Title	 	Suggested Dates
Patterns of Change within the Sun, Earth, and Moon Systems		Sept 13 – Oct 1 (14.5 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
The Sun, Moon, and Earth systems interact to create predictable and recognizable patterns of change.	How do the Sun, Moon, and Earth systems interact to create predictable patterns, such as seasonal change, shadows, and tidal movement? What are the basic phases of the Moon?

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>4.8 Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:</p> <p>4.8c collect and analyze data to identify sequences and predict patterns of change in shadows, tides, seasons, and the observable appearance of the Moon over time</p>	<p>Including:</p> <ul style="list-style-type: none"> • Shadows (light interaction between Sun and Earth / Moon) • Moon Phases- new moon, first quarter, half, third quarter, whole, crescent • Tides – high tide, low tide (and relate it to the time of day / positions) • Season – axis / revolution 	<p>TAKScopes 4.8c Patterns on Earth</p> <p>AIMS 4th Grade Texas Core Curriculum Earth Science Sunny Side Up, page 242 Lunar Looking, page 249</p> <p>Gateway – 5th Grade 3.2 “The Moon”, page TE97</p> <p>FOSS Sun, Moon, Stars Investigation 1 (Shadows) Investigation 2</p> <p>FOSSWEB: Sun, Moon, and Stars Activity: Lunar Calendar See MEDIA for images, movies, and audio stories</p> <p>BrainPop “Moon” video and Experiment “Tides” video</p> <p>United Streaming “Science Facts and Fun: What’s in a Shadow” (Shadows and Direction segment, Summary of What’s in a</p>

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		<p>Shadow segment) “A Closer Look at Space: the Moon” (Tides, Phases) “Phases of the Moon”</p> <p>La Luna Brain Pop Luna Brain Pop Mareas</p> <p>ELPS 1A, 1C, 1E, 1F, 2C, 2D, 2F, 4F, 4J</p> <p>Sun, Light and Shadows Interactive game, move objects, sun and move and observe changes in shadows Intro to shadows (short simple instructional animation)</p>
Scientific Investigation and Reasoning		Back to Top
<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. The student is expected to:</p> <p>4.1a demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations</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 style="color: red;">Do not look directly at the sun</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 the environment • Safety Rules, including but not limited to: <ul style="list-style-type: none"> ○ Goggles and gloves, as needed ○ No tasting or touching unless instructed ○ Safe smelling – wafting ○ Wait for teacher direction ○ No glassware ○ Student do not handle hot water; hot plates, or burners ○ Wash hands after science activities 	<p>PISD Science Safety Page</p> <p>Texas Science Safety Standards</p> <p>DuPont Science Safety Zone</p>
<p>4.2 Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and outdoor investigations. The student is expected to:</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</p>	<p style="color: red;">Examples: Will a shadow change positions based on the time of day? How long does it take the Moon to complete its phases?</p> <p style="color: red;">Refer to the Math TEKS for graph types</p> <p>Including:</p> <ul style="list-style-type: none"> • Asking questions • Making observations and collecting data • Analyzing data • Forming conclusions based on the data 	<p>What are descriptive, comparative, and experimental investigations?</p>

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<p>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>4.2f communicate valid, oral, and written results supported by data</p>		
<p>4.3 Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:</p> <p>4.3 represent the natural world using models such as rivers, stream tables, or fossils and identify their limitations, including accuracy and size</p>	<p>Including:</p> <ul style="list-style-type: none"> • Sun, Earth, and Moon Models • Earth and Moon / Tides • Phases of the Moon 	<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> <p>Science Vocabulary Hang-man</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. The student is expected to:</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 observation of habitats of organisms such as terrariums and aquariums</p> <p>4.4b use safety equipment as appropriate, including safety goggles and gloves</p>	<p>Including:</p> <ul style="list-style-type: none"> • Notebooks • Computers • Metric Rulers • Clocks <p>Such as:</p> <ul style="list-style-type: none"> • Cameras • Meter Sticks 	<p>Tools of the Science Classroom animation</p> <p>How to Use a Metric Ruler animation</p>
<p>Related Assurance Words</p>		<p>Back to Top</p>
<p>lunar / lunar phases, conservation, design, examine, source, system</p>		

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Related Literature Back to Top	
<p>The Moon Seems to Change by Franklin Branley So That's How the Moon Changes Shape! By Allan Fowler The Moon Book by Gail Gibbons Night Light: A Book About the Moon by Dana Meachen Rau The Moon by Elaine Landau The Moon and You by E.C. Krupp What's That Shadow? A Photo Riddle Book by Christopher Harbo Shadows: Here, There, and Everywhere by Ron Goor Fun With the Sun by Melissa Stewart Why to the Oceans Have Tides? By Marian B Jacobs Sunshine Makes the Seasons by Franklyn Branley Earth Cycles by Michael Elsohn Ross Changing Seasons by Bobbie Kalman</p>	
Assessment Support Back to Top	
Region XIII Science TAKS Resources www.tmsds.org	
Assessment Probes	Performance Assessment
<p>Uncovering Students' Ideas in Science, Vol. 1 (Page Keeley) "Gazing at the Moon", page 177 "Going Through a Phase", page 183</p> <p>Uncovering Students' Ideas in Science, Vol. 2 (Page Keeley) "Darkness at Night", page 171 "Emmy's Moon and Stars", page 177 "Objects in the Sky", page 185</p> <p>Uncovering Students' Ideas in Science, Vol. 4 (Page Keeley) "Moonlight", page 161 "Lunar Eclipse", page 167</p>	
Scenario / Open Ended	Multiple Choice
	Gateway – 5 th Grade: "The Moon" Assessment – page TE100

4th Grade Science Project / Fair Information Back to Top	
<i>*See Campus Science Fair Contact for complete information*</i>	
<p>Introduce the Science Project during this Bundle (suggest toward the end of the Bundle) Science Projects are part of the TEKS; components are instructional and taught through content in the classroom. (Can begin Bundle 3 Instructional Points)</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 Comparative Investigation <u>required</u> for all 4th graders (student may choose to do an Experimental Investigation instead)</p>

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Experiment / Comparative Investigation Components:	Experimental Investigation Rubric	Comparative Investigation Rubric
Title Problem/Question Definitions Hypothesis Background Information Materials Procedure Results Conclusion		
<p><u>Participation in campus Science Fair is highly encouraged, but not required, for all 4th graders; Students wishing to be considered for the Austin Energy Regional Science Festival complete and submit an “AERSF Intent Form” prior to the campus science fair event.</u></p> <p><i>NOTE: PISD Experiment and PISD Comparative Investigation projects would both be entered as AERSF “Experiment” projects.</i></p>		
<p>Austin Energy Science Festival Website</p>		

PISD Universal Design Consideration Points	Universal Design: Link to Barriers and Solutions Tool	What is This?	Back to Top
Current Methods and Materials	Possible Challenges	Possible Solutions	
Understanding patterns of change	Non linear thinking Visual impairments Poor background knowledge (vocabulary) Textbook Lecture comprehension	Experiential learning thru being outside, acting out/role play Student generated “drawing/model” Digital camera, drawing tools of Word, Photostory, Promethean software tools	
Making models (physical manipulation)	Fine motor skills	Models: e-models, print, kinesthetic (act it out), animated videos	
Sequencing		Lunar Cycle cards moonphases.doc (Focus on sequencing not the phase names. Label sequence order on the backside of cards for self-checking) Moon Phases Explanation (informative animation) Promethean “Moon Phases” (instructional with some interaction) Science Up Close. Grade 4 “Full Moon to New Moon” http://www.harcourtschool.com/menus/science/up_close_index.html (instructional animation)	
Hands-on modeling / assessment	Transfer of knowledge to 2 D form	Every 3 D activity you present 2 D and vice versa	