



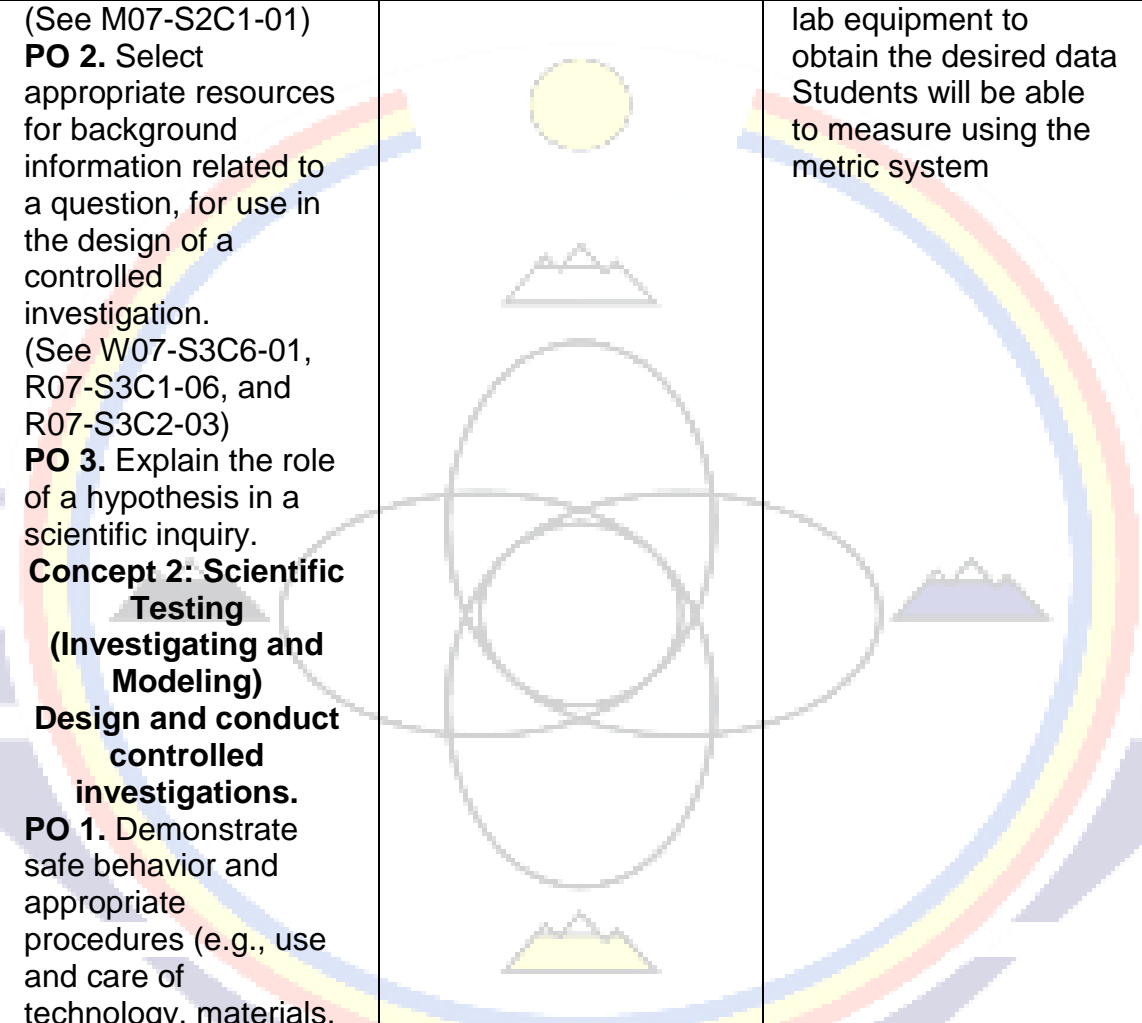
**GANADO MIDDLE SCHOOL**  
 (Ganado Unified School District No.20)  
 Navajo Route 1, Highway 264, Ganado, AZ 86505

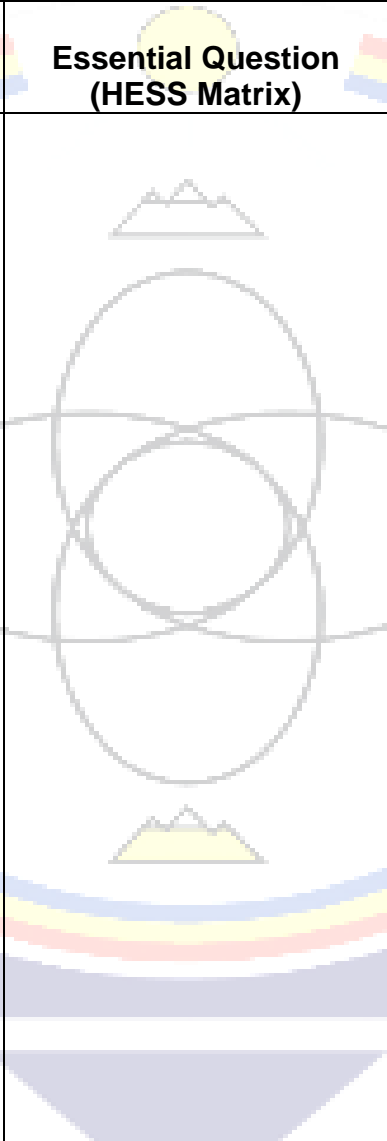
## PACING GUIDE FOR SCIENCE 7

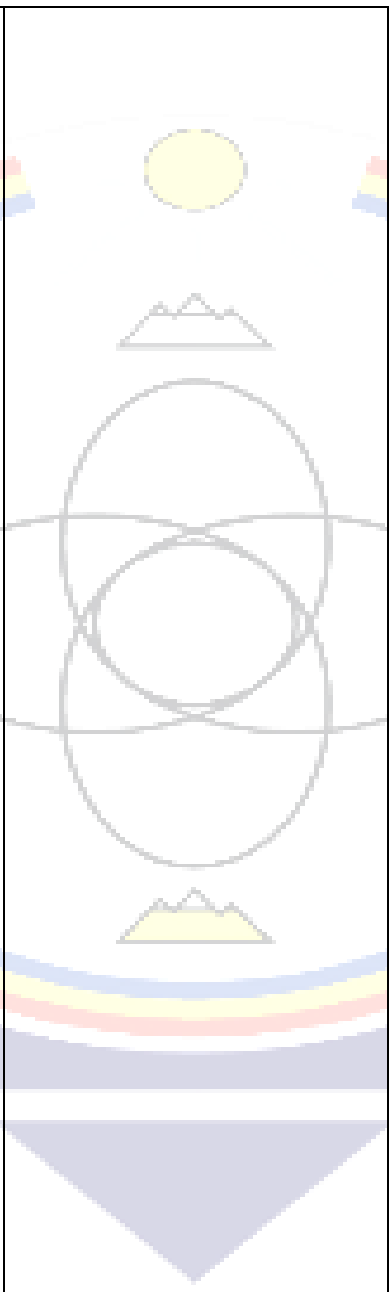
S.Y. 2018-2019

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 Science 7 Teacher

Resources	AZ College and Career Readiness Standards	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
<b>First Quarter</b>				
<b>7th Grade Science Textbook</b> Projector Laptops Various Lab Equipment Butcher Paper Poster Board Color Pencils	<b>Strand 1: Inquiry Process</b> <b>Concept 1: Observations, Questions, and Hypotheses</b> <b>Formulate predictions, questions, or hypotheses based on observations.</b> <b>Locate appropriate resources.</b> <b>PO 1.</b> Formulate questions based on observations that lead to the development of a hypothesis.	What is science? How is an experiment constructed? How can science be used to solve problems? How do we collect and analyze data? How do we communicate and present the results of scientific investigations?	Students will be able to design, conduct, and present a controlled investigation. Students will be able to identify the control part of an experiment. Students will be able to identify the independent and dependent variable in an experiment. Students will be able to use the appropriate	Observation Question Hypothesis Controlled investigation Control Independent variable Dependent variable Triple beam balance Electronic balance Graduated cylinder Metric system Line graph Double bar graph Stem and leaf plot Histogram Procedure Qualitative

	<p>(See M07-S2C1-01)  <b>PO 2.</b> Select appropriate resources for background information related to a question, for use in the design of a controlled investigation.  (See W07-S3C6-01, R07-S3C1-06, and R07-S3C2-03)  <b>PO 3.</b> Explain the role of a hypothesis in a scientific inquiry.  <b>Concept 2: Scientific Testing (Investigating and Modeling)</b>  <b>Design and conduct controlled investigations.</b>  <b>PO 1.</b> Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials,</p>		<p>lab equipment to obtain the desired data  Students will be able to measure using the metric system</p>	<p>Quantitative</p>
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Resources	AZ College and Career Readiness Standards	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
	<p>organisms) in all science inquiry.</p> <p><b>PO 2.</b> Design an investigation to test individual variables using scientific processes.</p> <p><b>PO 3.</b> Conduct a controlled investigation, utilizing multiple trials, to test a hypothesis using scientific processes.</p> <p><b>PO 4.</b> Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers).</p> <p><b>PO 5.</b> Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs. (See W07-S3C2-01 and W07-S3C3-01)</p> <p><b>Concept 3: Analysis and Conclusions</b></p>		<p>Students will be able to distinguish and give examples of quantitative data and qualitative data.</p> <p>Students will be able to described the role of the hypothesis in the scientific process.</p> <p>Students will be able to write clear, step by step instructions without using personal pronouns.</p> <p>Students will be able to communicate the results of an experiment using the appropriate graph and visual display of data.</p>	

	<p><b>Analyze and interpret data to explain correlations and results; formulate new questions.</b></p> <p><b>PO 1.</b> Analyze data obtained in a scientific investigation to identify trends. (See M07-S2C1-07 and M07-S2C1-08)</p> <p><b>PO 2.</b> Form a logical argument about a correlation between variables or sequence of events (e.g., construct a cause-and-effect chain that explains a sequence of events).</p> <p><b>PO 3.</b> Analyze results of data collection in order to accept or reject the hypothesis.</p> <p><b>PO 4.</b> Determine validity and reliability of results of an investigation.</p> <p><b>PO 5.</b> Formulate a conclusion based on data analysis.</p> <p><b>PO 6.</b> Refine hypotheses based on results from investigations.</p> <p><b>PO 7.</b> Formulate new questions based on the</p>			
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	<p>results of a previous investigation.</p> <p><b>Concept 4:</b>  <b>Communication</b>  <b>Communicate results of investigations.</b></p> <p><b>PO 1.</b> Choose an appropriate graphic representation for collected data:</p> <ul style="list-style-type: none"> <li>• line graph</li> <li>• double bar graph</li> <li>• stem and leaf plot</li> <li>• histogram</li> </ul> <p>(See M07-S2C1-03)</p> <p><b>PO 2.</b> Display data collected from a controlled investigation.  (See M07-S2C1-03)</p> <p><b>PO 3.</b> Communicate the results of an investigation with appropriate use of qualitative and quantitative information.  (See W07-S3C2-01)</p> <p><b>PO 4.</b> Write clear, step-by-step instructions for following procedures (without the use of personal pronouns).  (See W07-S3C3-01)</p> <p><b>PO 5.</b> Communicate the results and conclusion of the investigation.</p>			
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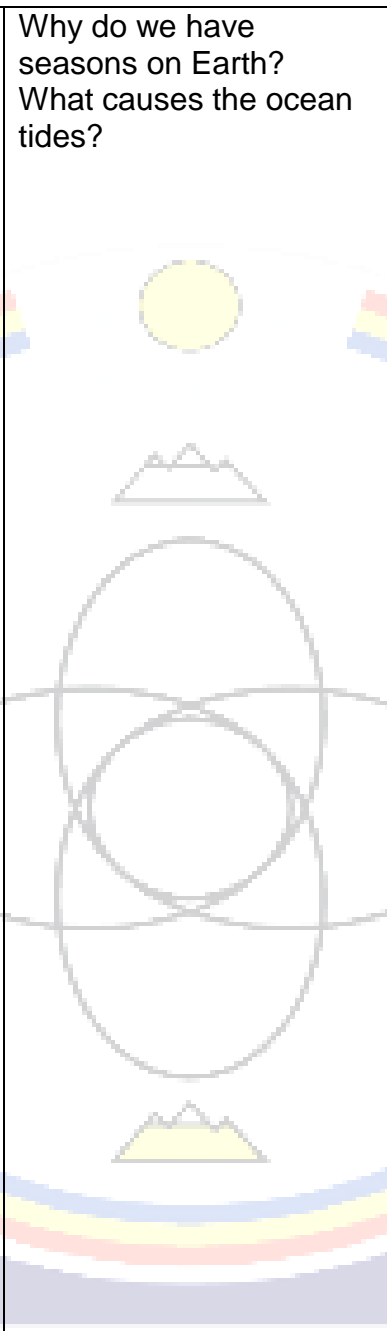
Resources	AZ College and Career Readiness Standards	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
<b>Second Quarter</b>				
<p>7th Grade Science Textbook Projector Laptops Various Lab Equipment Butcher Paper Poster Board Color Pencils</p>	<p><b>Strand 4: Life Science</b> <b>Concept 3: Populations of Organisms in an Ecosystem</b> <b>Analyze the relationships among various organisms and their environment.</b> <b>PO 1.</b> Compare food chains in a specified ecosystem and their corresponding food web. <b>PO 2.</b> Explain how organisms obtain and use resources to develop and thrive in:</p> <ul style="list-style-type: none"> <li>• niches</li> <li>• predator/prey relationships</li> </ul> <p><b>PO 3.</b> Analyze the interactions of living organisms with their ecosystems:</p>	<p>How do organisms interact in an environment?</p> <p>How do organisms use and obtain energy?</p> <p>How do organisms survive in their specific environment?</p> <p>How do living and non-living factors affect populations?</p>	<p>Students will be able to describe a food chain for specific ecosystems.</p> <p>Students will be able to explain how organisms use and obtain resources in their environment.</p> <p>Students will be able to describe the limiting factors in an ecosystem.</p> <p>Students will be able to describe the carrying capacity of an environment.</p> <p>Students will be able to analyze problems caused by population and growth and propose various solutions.</p>	<p>Ecosystem Food web Food chains Niches Predator Prey Population Limiting factors Carrying capacity Overgrazing Forest management Invasive species Non-native species Environmental factors Survival rates Floods Droughts</p>

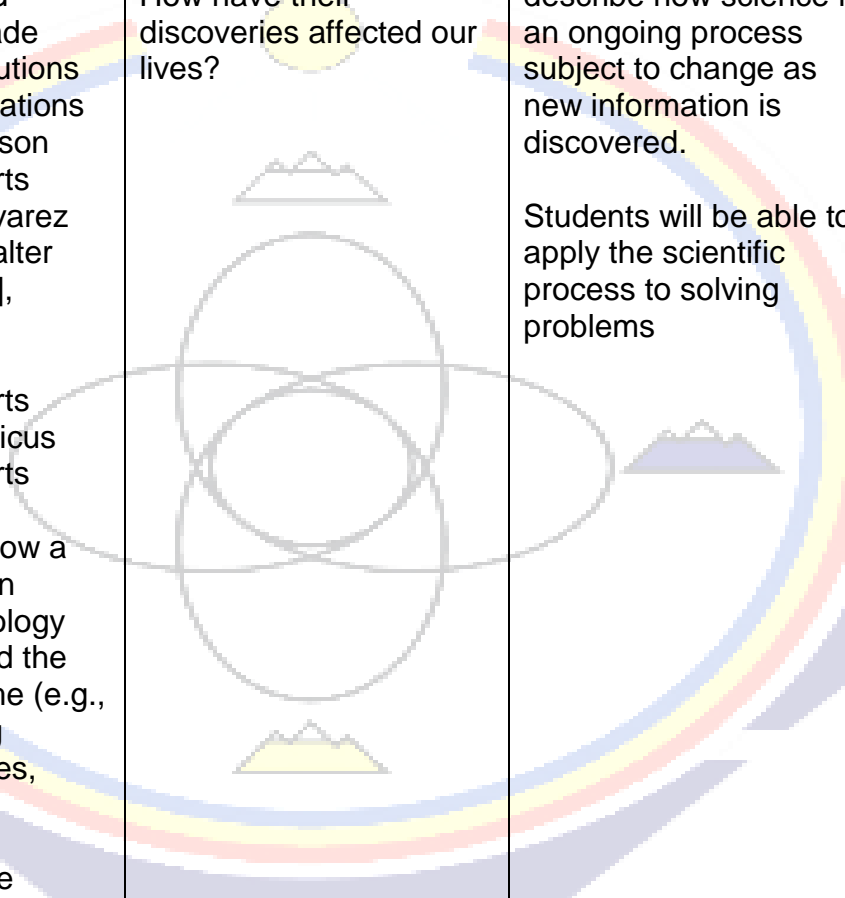
• limiting factors  
• carrying capacity  
**PO 4.** Evaluate data related to problems associated with population growth (e.g., overgrazing, forest management, invasion of non-native species) and the possible solutions.  
**PO 5.** Predict how environmental factors (e.g., floods, droughts, temperature changes) affect survival rates in living organisms.  
**PO 6.** Create a model of the interactions of living organisms within an ecosystem.

Students will be able to predict how different environmental factors affect populations.

Resources	AZ College and Career Readiness Standards	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
<b>Third Quarter</b>				
7th Grade Science Textbook Projector Laptops Various Lab Equipment Butcher Paper Poster Board Color Pencils	<b>Strand 3: Science in Personal and Social Perspectives</b> <b>Concept 1: Changes in Environments</b> <b>Describe the interactions between human populations, natural hazards, and the environment.</b> <b>PO 1.</b> Analyze environmental risks (e.g., pollution, destruction of habitat) caused by human interaction with biological or geological systems. <b>PO 2.</b> Analyze environmental benefits of the following human	How do humans interact with the environment? How do we impact the environment? What are the good things we do for the environment? How do these affect us? What are the bad things we do to the environment? How do these affect us? How can we use science to solve the problems we cause for the environment?	Students will be able to analyze the environmental risks of human activity. Students will be able to describe the environmental benefits of human activity. Students will be able to propose possible solutions to environmental problems.	Natural hazard Environmental risk Pollution Habitat destruction Environmental benefits Reforestation Habitat restoration Dams



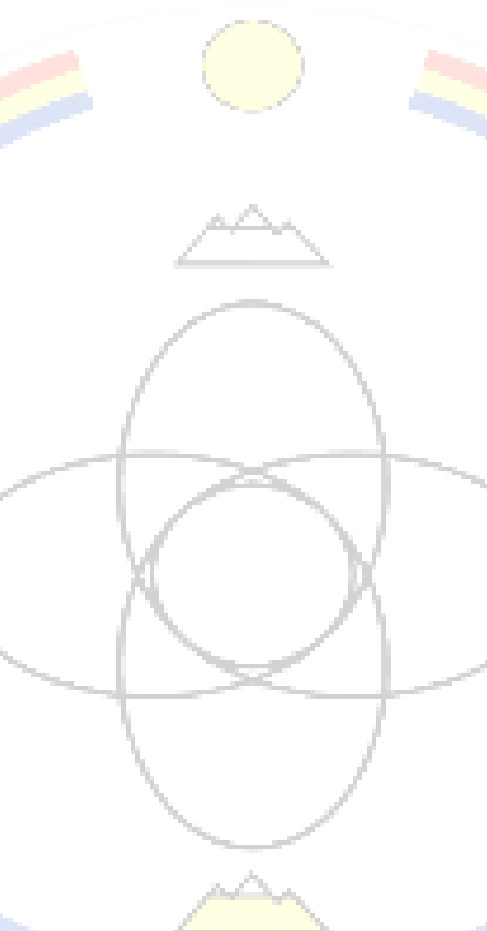
	<p>interactions with biological or geological systems:</p> <ul style="list-style-type: none"> <li>• reforestation</li> <li>• habitat restoration</li> <li>• construction of dams</li> </ul> <p><b>PO 3.</b> Propose possible solutions to address the environmental risks in biological or geological systems.</p> <p><b>Concept 2: Science and Technology in Society</b></p> <p><b>Develop viable solutions to a need or problem.</b></p> <p><b>PO 1.</b> Propose viable methods of responding to an identified need or problem.</p> <p><b>PO 2.</b> Compare solutions to best address an identified need or problem.</p> <p><b>PO 3.</b> Design and construct a solution to an identified need or problem using simple classroom materials.</p> <p><b>PO 4.</b> Describe a scientific discovery that influences technology.</p> <p><b>Strand 2: History and Nature of Science</b></p>	<p>Why do we have seasons on Earth? What causes the ocean tides?</p> 	<p>Students will be able list people who have contributed to scientific knowledge.</p>	<p>observing questioning communicating comparing measuring</p>
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	<p><b>Concept 1: History of Science as a Human Endeavor</b>  <b>Identify individual, cultural, and technological contributions to scientific knowledge.</b></p> <p><b>PO 1.</b> Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Rachel Carson [scientist], supports Strand 4; Luis Alvarez [scientist] and Walter Alvarez [scientist], support Strand 6; Percival Lowell [scientist], supports Strand 6; Copernicus [scientist], supports Strand 6).</p> <p><b>PO 2.</b> Describe how a major milestone in science or technology has revolutionized the thinking of the time (e.g., global positioning system, telescopes, seismographs, photography).</p> <p><b>PO 3.</b> Analyze the impact of a major</p>	<p>Who are the individual that have contributed to our scientific knowledge?</p> <p>What are the contributions of these individuals to our collective knowledge of how the world works? How have their discoveries affected our lives?</p> 	<p>Students will be able to describe major milestones in scientific knowledge.</p> <p>Students will be able to analyze the effect of new scientific discoveries.</p> <p>Students will be able to describe how science is an ongoing process subject to change as new information is discovered.</p> <p>Students will be able to apply the scientific process to solving problems</p>	<p>classifying  predicting  data  inferring  hypotheses  variables</p>
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	<p>scientific development occurring within the past decade.</p> <p><b>PO 4.</b> Analyze the use of technology in science-related careers.</p> <p><b>Concept 2: Nature of Scientific Knowledge</b>  <b>Understand how science is a process for generating knowledge.</b></p> <p><b>PO 1.</b> Describe how science is an ongoing process that changes in response to new information and discoveries.</p> <p><b>PO 2.</b> Describe how scientific knowledge is subject to change as new information and/or technology challenges prevailing theories.</p> <p><b>PO 3.</b> Apply the following scientific processes to other problem solving or decision making situations:</p> <ul style="list-style-type: none"> <li>• observing</li> <li>• questioning</li> <li>• communicating</li> <li>• comparing</li> <li>• measuring</li> <li>• classifying</li> </ul>			
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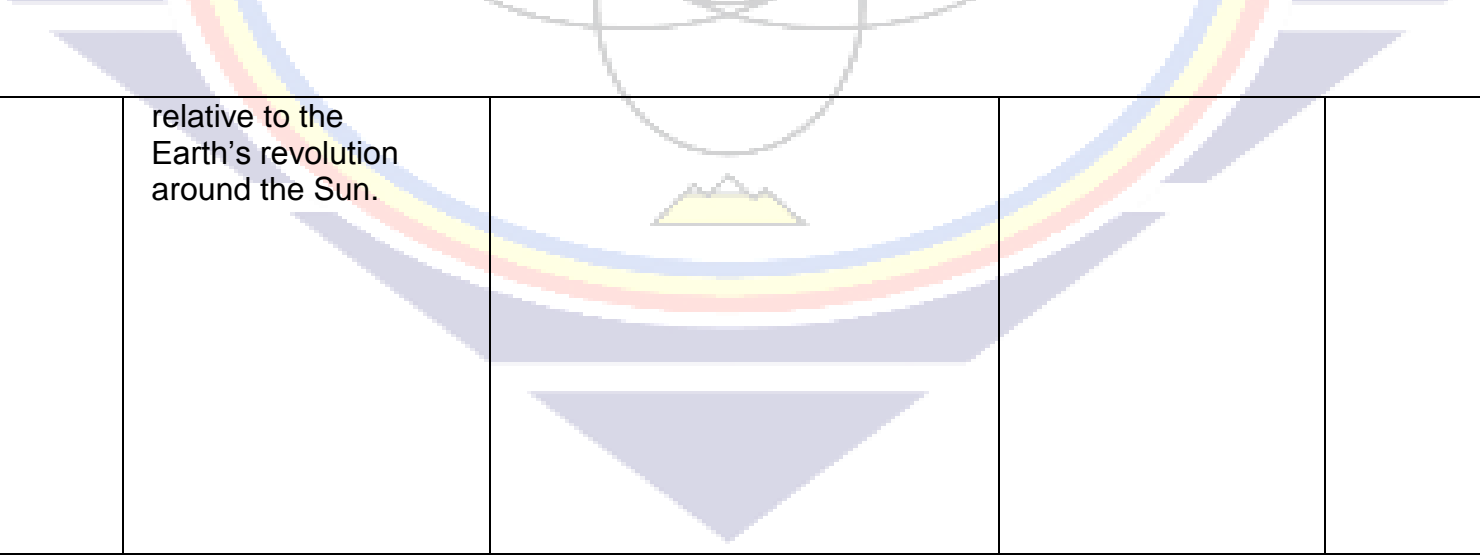
	<ul style="list-style-type: none"> <li>• predicting</li> <li>• organizing data</li> <li>• inferring</li> <li>• generating hypotheses</li> <li>• identifying variables</li> </ul>			
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Resources	AZ College and Career Readiness Standards	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
<b>Fourth Quarter</b>				
7th Grade Science Textbook Projector Laptops Various Lab Equipment Butcher Paper Poster Board Color Pencils	<b>Strand 5: Physical Science</b> <b>Concept 1: Structure of the Earth</b> <b>Describe the composition and interactions between the structure of the Earth and its atmosphere.</b> <b>PO 1.</b> Classify rocks and minerals by the following observable properties: <ul style="list-style-type: none"> <li>• grain</li> <li>• color</li> <li>• texture</li> <li>• hardness</li> </ul> <b>PO 2.</b> Describe the properties and the composition of the following major layers of the Earth:	What are the parts of the Earth? How do we classify rocks and minerals? Why does the Earth have the layers that it does? How does the Earth's surface change? How has the Earth changed over time and how do we know this? How are rocks formed? How are the landforms of the Earth formed? What is the solar system? Where is the Earth located in the solar system and how does that affect the Earth?	Students will be able to describe the composition of the Earth. Students will be able to describe rocks and minerals. Students will be able to classify rocks by different characteristics. Students will be able to list and describe the layers of the Earth. Students will be able to describe the basic Earth processes.	Atmosphere Grain Texture Hardness Geosphere Crust Mantle Core Erosion Deposition Plate tectonics Volcanism Rock cycle Igneous Metamorphic Sedimentary Lithosphere Convection Landforms Mountains Faults Rift valleys Trenches

	<ul style="list-style-type: none"> <li>• crust</li> <li>• mantle</li> <li>• core</li> </ul> <p><b>PO 3.</b> Explain the following processes involved in the formation of the Earth's structure:</p> <ul style="list-style-type: none"> <li>• erosion</li> <li>• deposition</li> <li>• plate tectonics</li> <li>• volcanism</li> </ul> <p><b>PO 4.</b> Describe how the rock and fossil record show that environmental conditions have changed over geologic and recent time.</p> <p><b>Concept 2: Earth's Processes and Systems</b>  <b>Understand the processes acting on the Earth and their interaction with the Earth systems.</b></p> <p><b>PO 1.</b> Explain the rock cycle.</p> <p><b>PO 2.</b> Distinguish the components and characteristics of the rock cycle for the following types of rocks:</p> <ul style="list-style-type: none"> <li>• igneous</li> </ul>	<p>Why do we see the moon phases the way we do?          What are the patterns seen in the stars?</p> 	<p>Students will be able to describe how the Earth has changed over time and the evidence for this.</p> <p>Students will be able to explain how the rock cycle works.</p> <p>Students will be able to distinguish between the three basic types of rocks (igneous, metamorphic, and sedimentary).</p> <p>Students will be able to explain how tectonic plates move and what are the consequences of this.</p> <p>Students will be able to describe how different landforms are made.</p> <p>Students will be able to describe how earthquakes are measured.</p>	<p>Volcanoes          Earthquakes          Moon phases          Tides          Seasons          Axis          Revolution          Rotation          Constellations          Solar system          Galaxy          Universe</p>
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	<ul style="list-style-type: none"> <li>• metamorphic</li> <li>• sedimentary</li> </ul>		Students will be able to describe the phases of the moon.	
Timeline & Resources	AZ Science Standards	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
	<p><b>PO 3.</b> Analyze the evidence that lithospheric plate movements occur.</p> <p><b>PO 4.</b> Explain lithospheric plate movement as a result of convection.</p> <p><b>PO 5.</b> Relate plate boundary movements to their resulting landforms, including:</p> <ul style="list-style-type: none"> <li>• mountains</li> <li>• faults</li> <li>• rift valleys</li> <li>• trenches</li> <li>• volcanoes</li> </ul> <p><b>PO 6.</b> Describe how earthquakes are measured.</p>	<p>Students will be able to make a model of the positions of the Earth, Sun, and Moon.</p> <p>Students will be able to explain how tides are affected by the moon.</p> <p>Students will be able to explain how the Earth's tilt causes the seasons.</p> <p>Students will be able to identify the major constellations visible in the Northern Hemisphere (Orion, Ursa Major, Cygnus, Scorpius, and Cassiopeia).</p>		

	<p><b>Concept 3: Earth in the Solar System</b> <b>Understand the relationships of the Earth and other objects in the solar system.</b></p> <p><b>PO 1.</b> Explain the phases of the Moon in terms of the relative positions of the Earth, Sun, and Moon.</p> <p><b>PO 2.</b> Construct a model for the relative positions of the Earth, Sun, and Moon as they relate to corresponding eclipses.</p> <p><b>PO 3.</b> Explain the interrelationship between the Earth's tides and the Moon.</p> <p><b>PO 4.</b> Explain the seasons in the Northern and Southern Hemispheres in terms of the tilt of the Earth's axis</p>			
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	relative to the Earth's revolution around the Sun.			
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