

Adair County Middle School

2019-2020

7th Grade Middle Science STANDARDS / PACING GUIDE

5 Key Skills

Clarification Statement for each standard, Science and Engineering Practices, Disciplinary Core Ideas, Crosscutting Concepts and KAS Connections can be viewed by clicking on the link of the title in each section.

Standard	Learning Target We are learning to.....	Window of Instruction (weeks)	Essential Vocabulary
Engineering Design Students who demonstrate understanding can:			
<p>MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <p>MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p> <p>MS-ETS1-3 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <p>MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.</p>	<p>...explain all safety precautions to follow while following routine lab experiments.</p> <p>...correctly measure the physical properties of substances using the metric system.</p> <p>...evaluate problems and develop solutions based on the given evidence.</p> <p>...use table, charts and graphs to display data findings from an investigation.</p> <p>...analyze data from data tables and graphs to determine the outcome of an investigation.</p> <p>...correctly use the process of the scientific method to develop the solution to a problem.</p>	<p>Embedded in all content. Wks 1-2</p>	<p>Accuracy</p> <p>Adapt</p> <p>Argument</p> <p>Causation</p> <p>Claim</p> <p>Constraints</p> <p>Control</p> <p>Constant</p> <p>Correlation</p> <p>Dependent Variable</p> <p>Design (v.)</p> <p>Evidence</p> <p>Independent Variable</p> <p>Inference</p> <p>Hypothesis</p> <p>Implication</p> <p>Observation</p> <p>Precision</p> <p>Qualitative</p> <p>Quantitative</p> <p>Reasoning</p> <p>Reliability</p>
Structure and Properties of Matter Students who demonstrate understanding can:			
<p>06-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.</p>	<p>...describe and classify matter.</p>	<p>Week 3 (1 day)</p>	<p>Matter</p> <p>Substance</p> <p>Physical property</p> <p>Chemical property</p> <p>Atom</p> <p>Element</p> <p>Molecule</p> <p>Compound</p> <p>Mixture</p> <p><i>Distill</i></p> <p>Law of Conservation of Mass</p> <p>Open System</p> <p>Closed System</p> <p><i>Decomposition</i></p>

<p>REVIEW 06-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.</p>	<p style="text-align: center;">Review</p> <p>...determine the differences between solids, liquids and gases.</p> <p>...explain the relationships between particle motion and states of matter.</p> <p>...describe the role thermal energy plays in particle motion and changes of state.</p>	<p style="text-align: center;">Week 3 (less than a week)</p>	
<p>07-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.</p>	<p>...measure matter. ...describe the changes in matter. ...identify the differences between mixtures and solutions. ...identify and describe chemical changes in substances.</p>	<p style="text-align: center;">Weeks 3-5 (9 days)</p>	
<p>07-PS1-5 Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.</p>	<p>...model the law of conservation of mass during chemical reactions.</p>	<p style="text-align: center;">Weeks 5-6 (5 days)</p>	

Energy
Students who demonstrate understanding can:

<p>08-PS3-1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.</p>	<p>...describe relationships between energy, motion, force and work.</p>	<p style="text-align: center;">Week 6 (1 Day)</p>	<p>Energy Motion Force Work Power Kinetic Energy Potential Energy</p>
<p>07-PS3-2 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.</p>	<p>...determine the difference between kinetic and potential energy.</p>	<p style="text-align: center;">Week 6-7 (3 Days)</p>	<p>Gravitational Potential Energy Elastic Potential Energy Mechanical Energy Nuclear Energy Thermal Energy Chemical Energy Electrical Energy Electromagnetic Energy</p>
<p>07-PS3-5 Construct, use and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p>	<p>...explain differences in forms of energy. ...model the law of conservation of energy.</p>	<p style="text-align: center;">Week 7-8 (8 days)</p>	<p>Law of Conservation of Energy</p>
<p>07-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.</p>	<p>...identify the difference between thermal energy and temperature.</p>	<p style="text-align: center;">Week 9 (2 days)</p>	<p>Thermal Energy Heat Temperature <i>Transfer</i> <i>Absolute</i></p>
<p>07-PS3-4 Plan an investigation to determine the relationships</p>	<p>...describe and model the</p>	<p style="text-align: center;">Week 9-10 (4 days)</p>	<p>Conduction Convection Convection Current</p>

among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	transfer of heat energy.		Radiation <i>Transform</i> Conductor Insulator Specific Heat Thermal Expansion <i>Contract</i>
07-PS3-5 Construct, use and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	...explain how and why different materials respond differently to heat.	Week 10-11 (6 days)	
Forces and Interactions Students who demonstrate understanding can:			
07-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	...describe how gravity and friction are related to energy.	Weeks 11-12 (5 days)	Weight <i>Associate</i>
Waves and Electromagnetic Radiation Students who demonstrate understanding can:			
07-PS4-1 Use mathematical representations to describe a single model for waves that includes how the amplitude of a wave is related to the energy in a wave.	...identify the properties of waves.	Week 12 (1 day)	Wave Mechanical Wave Medium Electromagnetic Radiation Transverse Wave Amplitude Longitudinal Wave Wavelength Frequency <i>Vacuum</i>
07-PS4-2 Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	...describe how waves interact with different materials. ...determine the factors that influence the behavior of sound waves. ...describe electromagnetic waves. ...determine the factors that influence the behavior of light waves.	Weeks 12, 13, 14, 15 (12 days)	Reflection Refraction Diffraction Absorption Interference Standing Wave Resonance <i>Transmitted</i> Loudness Intensity Decibel Pitch Doppler effect <i>Differentiate</i> Electromagnetic Wave Electromagnetic Spectrum Radio Waves Microwaves Visible light Ultraviolet Rays Infrared Rays X-Rays Gamma Rays <i>Transverse</i> Transparent Translucent Opaque Diffuse reflection Convex Focal point Concave <i>Compare</i>
07-PS4-3 Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable to encode and	...identify different circuits. ...model analog and digital signals.	Week 16 (5 days)	Electrical Circuit Voltage Resistance Ohm's Law Series Circuit

transmit information than analog signals.	...identify advantages of digital signals.		Parallel Circuit <i>Diameter</i> Wave pulse Electronic Signal Electromagnetic Signal Digital Signal Analog Signal Pixel <i>Transmission</i> Information Technology Software Noise Bandwidth
---	--	--	---

[History of Earth](#)

Students who demonstrate understanding can:

<p>REVIEW: 06-ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.</p> <p>REVIEW: 06-ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.</p>	<p>REVIEW: ...explain the landforms produced by plate tectonics. ...describe why tsunamis and earthquakes occur. ...determine volcanic activity. ...explain the differences between weathering and erosion. ...identify how water changes the shape of Earth's surface. ...identify continental drift. ...describe the role of the mid-ocean ridge. ...model plate tectonics ...describe the processes that change the surface of the Earth.</p>	<p>Week 17 (3 days)</p>	<p>REVIEW: Divergent boundary Convergent boundary Transform boundary</p> <p>Stress Tension Compression Shearing Fault Earthquake Magnitude Tsunami <i>Scale</i></p> <p>Volcano Magma Lava Hot spot Extinct Dormant <i>Active</i> <i>Composite</i></p> <p>Uniformitarianism Erosion Mechanical weathering Chemical weathering Soil Humus <i>Principle</i> <i>Component</i></p> <p>Runoff Stream Tributary Flood plain Delta Alluvial fan Groundwater <i>Develop</i> <i>Suggest</i></p> <p>Glacier Continental glacier Ice age Valley glacier Plucking Till Longshore drift <i>Interaction</i> <i>Impact</i> REVIEW: Mid-ocean ridge Sea-floor spreading Subduction Ocean trench <i>Hypothesis</i></p> <p>Sediment Deposition</p>
--	--	--	---

			Mass movement Deflation Sand dune Loess <i>Similar</i> <i>Significant</i>
<u>Earth's Systems</u> Students who demonstrate understanding can:			
06-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. 06-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	REVIEW: ...describe the components and processes of an Earth system. ...explain Earth's landforms and how they were developed. REVIEW: ...discuss the movement of water on earth.	Week 17-18 (3 days)	REVIEW: Atmosphere Geosphere Hydrosphere Cryosphere Biosphere Energy Topography Landform Mountain Coastline Dune River Delta Surveying <i>System</i> <i>Feedback</i> <i>model</i> REVIEW: Water Cycle Evaporation Transpiration Condensation Precipitation Watershed Aquifer Well <i>Process</i>
<u>Weather and Climate</u> Students who demonstrate understanding can:			
06-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. 06-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	REVIEW:	Week 18 (3 days)	
<u>Space Systems</u> Students who demonstrate understanding can:			
06-ESS1-1 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	...describe and model moon phases and eclipses. ...demonstrate the effect of the moon and sun on tides.	Week 19 (4 days)	phase eclipse umbra penumbra tide Spring tide neap tide <i>Significant</i>
06-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.	...define the properties of stars. ...explain the role of gravity in the formation of stars.	Weeks 19- 20 (2 days)	Nebula Protostar White dwarf Supernova Apparent brightness Absolute brightness <i>analyze</i>
06-ESS1-3 Analyze and interpret data to determine	...determine sizes and	Week 20 (4 days)	Galaxy Universe

scale properties of objects in the solar system.	distances between galaxies and stars. ...to describe the differences between galaxies and what makes these differences.		Light year Big Bang <i>determine</i>
--	--	--	--

Matter and Energy in Organisms and Ecosystems
Students who demonstrate understanding can:

06-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	...identify populations of organisms and what affects the populations.	Week 21 (2 days)	Organisms Habitat Biotic Factor Abiotic Factor Population Community Ecosystem Limiting Factor <i>Resources</i> <i>Density</i>
06-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	...describe the energy flow within an ecosystem. ...describe the law of conservation of mass and the law of conservation of energy.	Week 21-22 (5 days)	Producer Consumer Decomposer Food Chain Food Web Energy Pyramid <i>Role</i> Law of Conservation of Mass Law of Conservation of Energy Evaporation Condensation Precipitation <i>Systems</i> <i>Components</i>

Interdependent Relationships in Ecosystems
Students who demonstrate understanding can:

06-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	...model how resources availability affects organisms in an ecosystem. ...describe the symbiotic relationships within an ecosystem. ...find the similarities and differences between ecosystems. ...determine all of the factors (living and non-living) that can have an impact an ecosystem.	Weeks 22-23 (6 days)	Niche Competition Predation Commensalisms Mutualism Parasitism <i>Interactions</i> Succession Pioneer Species <i>Colonize</i> <i>Dominate</i>
08-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	...describe biodiversity and determine the factors that impact it.	Weeks 23-24 (6 days)	Biodiversity Keystone specimen Extinction Invasive species <i>Value</i> <i>Economic</i>

Structure, Function and Information Processing
Students who demonstrate understanding can:

07-LS1-2 Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	...determine how cells make up the structure of living things. ...identify the special structures (organelles) within cells. ...describe the function of cell organelles. ...model the similarities	Weeks 25, 26, 27, 28 (15 days)	Cell Microscope Cell Theory <i>distinguish</i> Organelle Cell Wall Cell membrane Cytoplasm Nucleus Mitochondria
---	--	---	--

	<p>between cells and other systems. ...describe the role of the cell membrane. ...model cell division.</p>		<p>Chloroplast Vacuole <i>Structure</i> <i>Function</i></p> <p>Selectively permeable Diffusion Osmosis Endocytosis Exocytosis <i>Maintain</i></p> <p>Cell cycle Interphase Replication Mitosis Cytokinesis <i>Sequence</i></p>
--	--	--	---

[Matter and Energy in Organisms and Ecosystems](#)

Students who demonstrate understanding can:

<p>07-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.</p>	<p>...identify the purpose of photosynthesis. ...describe the role of photosynthesis in the ecosystem.</p>	<p>Week 28 (4 days)</p>	<p>Photosynthesis Autotroph Heterotroph Chlorophyll <i>equation</i></p>
<p>07-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support and/or release energy as this matter moves through an organism.</p>	<p>... identify the process of cellular respiration. ...describe the conservation of matter during cellular respiration.</p>	<p>Week 29-30 (6 days)</p>	<p>Cellular Respiration Fermentation <i>Produce</i> <i>Source</i></p>

[Growth, Development, and Reproduction of Organisms](#)

Students who demonstrate understanding can:

<p>08-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.</p>	<p>...describe the difference in sexual and asexual reproduction. ...determine how parents and offspring compare in different types of reproduction.</p>	<p>Weeks 30-31 (5 days)</p>	<p>Asexual reproduction Sexual reproduction Fertilization Trait Gene Inheritance Allele <i>Dominant</i></p>
<p>07-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.</p>	<p>...identify the process of reproduction in plants. ...determine factors that influence behaviors in animals. ...describe how behaviors in animals can influence chances of reproduction in animals.</p>	<p>Weeks 31-32 (4 days)</p>	<p>Zygote Pollination Cones Ovule Fruit Germination <i>Disperse</i></p> <p>Behavior Instinct Pheromone Mating System Migration <i>typically</i></p>
<p>07-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</p>	<p>...determine the factors influencing an organisms growth.</p>	<p>Week 32 (4 days)</p>	<p>Hormone Auxin Tropism Photoperiodism Domancy Metamorphosis <i>Stimuli</i> <i>Essential</i></p>