

Correlations to Oklahoma Academic Standards for Science

Oklahoma Standard	Grade	Standard Description	DCI	SEP	CCC	Correlating Unit	Correlating Example Session
6.PS1.4	6	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.	Structure and Properties of Matter; Definitions of Energy	Developing and Using Models	Cause and Effect	States of Matter	3.4 Changing states and the particle model
6.PS3.3	6	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	Definitions of Energy; Conservation of Energy and Energy Transfer	Designing Solutions	Energy and Matter	Heat	2.5 Solar oven: Designing the solution (supported by 2.4 and 2.6)
6.PS3.4	6	Plan an investigation to determine the relationships 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.	Definitions of Energy; Conservation of Energy and Energy Transfer	Planning and Carrying Out Investigations	Scale Proportion and Quantity	Heat	1.3 How to keep pizzas hotter for longer – Part 1
6.PS4.2	6	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	Wave Properties; Electromagnetic Radiation	Developing and Using Models	Structure and Function	Energy	3.4 Light and sound
6.LS1.1	6	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	Structure and Function	Planning and Carrying Out Investigations	Scale Proportion and Quantity	Cells	3.6 Are all living things really made of cells?
6.LS1.2	6	Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	Structure and Function	Developing and Using Models	Structure and Function	Cells	3.5 Make a cell model
6.LS1.3	6	Use an argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	Structure and Function	Engaging in Argument from Evidence	Systems and System Models	Cells; Body Systems	6.2 Thermoregulation
6.LS1.8	6	Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	Information Processing	Obtaining Evaluating and Communicating Information	Cause and Effect	Body Systems	5.2 The nervous system

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6.ESS1.4	6	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's geologic history.	The History of Planet Earth	Constructing Explanations	Scale Proportion and Quantity	Active Earth	2.4 The fossil record
6.ESS2.1	6	Develop and revise a model to describe the cycling of Earth's materials and the flow of energy that drives these processes within and among Earth's systems.	Earth's Materials and Systems	Developing and Using Models	Stability and Change	Active Earth	2.3 Modeling the rock cycle
6.ESS2.2	6	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	Earth's Materials and Systems; The Roles of Water in Earth's Surface Processes	Constructing Explanations	Scale Proportion and Quantity	Active Earth	2.1 The rock cycle
6.ESS2.3	6	Analyze and interpret data on the patterns of distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	The History of Planet Earth; Plate Tectonics and Large-Scale System Interactions	Analyze and Interpret Data	Patterns	Active Earth	3.1 Continental drift - Part 1
6.ESS2.4	6	Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	The Roles of Water in Earth's Surface Processes	Developing and Using Models	Energy and Matter	Earth Systems	1.2 Modeling the water cycle - Part 1
6.ESS2.5	6	Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.	The Roles of Water in Earth's Surface Processes; Weather and Climate	Planning and Carrying Out Investigations	Cause and Effect	Earth Systems	2.1 Weather and climate
6.ESS2.6	6	Develop or modify a model to describe how unequal heating and rotation of the Earth causes patterns of atmospheric and oceanic circulation that determine regional climates.	The Roles of Water in Earth's Surface Processes; Weather and Climate	Developing and Using Models	Systems and System Models	Earth Systems	2.3 Ocean currents

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6.ESS3.2	6	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	Natural Hazards	Analyzing and Interpreting Data	Patterns	Active Earth	4.3 Building an earthquake-resistant building
7.PS1.1	7	Develop and use models to describe the atomic composition of simple molecules and extended structures.	Structure and Properties of Matter	Developing and Using Models	Scale Proportion and Quantity	Physical and Chemical Change	3.3 Modeling chemical reactions
7.PS1.2	7	Analyze and interpret patterns of data related to the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	Structure and Properties of Matter; Chemical Reactions	Analyzing and Interpreting Data	Patterns	Physical and Chemical Change	2.5 Identifying types of change - Part 1
7.PS1.3	7	Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	Structure and Properties of Matter; Chemical Reactions; Interdependence of Science Engineering and Technology; Influence of Science Engineering and Technology on Society	Obtaining, Evaluating, and Communicating Information	Structure and Function	Ecosystems	1.1 What are plastics?
7.PS1.5	7	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.	Chemical Reactions	Developing and Using Models	Energy and Matter	Physical and Chemical Change	3.3 Modeling chemical reactions
7.PS1.6	7	Construct, test, and modify a device that releases or absorbs thermal energy by chemical processes to solve a problem.	Chemical Reactions; Developing Possible Solutions; Optimizing the Design Solution	Designing Solutions	Energy and Matter	Physical and Chemical Change	3.1-3.2 Design a hand warmer

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7.PS3.1	7	Construct and interpret graphical displays of data to describe the proportional relationships of kinetic energy to the mass of an object and to the speed of an object.	Definitions of Energy	Analyze and Interpret Data	Scale Proportion and Quantity	Energy Conservation	2.2 Kinetic energy and speed: Fish cannons
7.PS3.2	7	Develop a model to describe that when objects interacting at a distance change their arrangement, different amounts of potential energy are stored in the system.	Definitions of Energy; Relationship Between Energy and Forces	Developing and Using Models	Systems and System Models	Energy Conservation	1.1 Modeling a hydroelectric dam
7.PS3.5	7	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.	Conservation of Energy and Energy Transfer	Engaging in Argument from Evidence	Energy and Matter	Energy Conservation	2.2 Kinetic energy and speed: Fish cannons
7.LS1.6	7	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.	Organization for Matter and Energy Flow in Organisms; Energy in Chemical Processes and Everyday Life	Constructing Explanations	Energy and Matter	Ecosystems	2.4 Photosynthesis
7.LS1.7	7	Develop a model to describe how food molecules in plants and animals are broken down and rearranged through chemical reactions to form new molecules that support growth and/or release energy as matter moves through an organism.	Organization for Matter and Energy Flow in Organisms; Energy in Chemical Processes and Everyday Life	Developing and Using Models	Energy and Matter	Ecosystems	2.2 Sources of energy
7.LS2.1	7	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	Interdependent Relationships in Ecosystems	Analyzing and Interpreting Data	Cause and Effect	Ecosystems	3.3 Population changes

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7.LS2.2	7	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	Interdependent Relationships in Ecosystems	Constructing Explanations	Patterns	Food Chains and Food Webs	2.4 Relationships in ecosystems
7.LS2.3	7	Develop or modify a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	Cycle of Matter and Energy Transfer in Ecosystems	Developing and Using Models	Energy and Matter	Food Chains and Food Webs	2.2 Make an ecosystem model
7.LS2.4	7	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	Ecosystem Dynamics Functioning and Resilience	Engaging in Argument from Evidence	Stability and Change	The Importance of Biodiversity	2.2 Making a claim using evidence
7.LS2.5	7	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	Ecosystem Dynamics Functioning and Resilience; Biodiversity and Humans; Influence of Science Engineering and Technology on Society	Engaging in Argument from Evidence	Stability and Change	The Importance of Biodiversity	3.6 Showcase
7.ESS3.1	7	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	Natural Resources	Constructing Explanations	Cause and Effect	Resources	2.1 Renewability
7.ESS3.3	7	Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.	Human Impacts on Earth Systems; Influence of Science Engineering and Technology on Society	Constructing Explanations	Cause and Effect	Climate Change	2.4 Strategies for saving corals

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7.ESS3.4	7	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	Human Impacts on Earth Systems; Influence of Science Engineering and Technology on Society	Engaging in Argument from Evidence	Cause and Effect	Climate Change	2.2 Effects of global warming
7.ESS3.5	7	Obtain, evaluate, and communicate evidence of the factors that have caused changes in global temperatures over the past century.	Global Climate Change	Obtaining Evaluating and Communicating Evidence	Stability and Change	Climate Change	2.1 Human activity and global warming
8.PS2.1	8	Apply Newton's Third Law to design a solution to a problem involving the motion of two objects in a system.	Forces and Motion; Influence of Science Engineering and Technology on Society	Designing Solutions	Systems and System Models	Newton's Laws of Motion	Science and Society: Speed limits in built-up areas
8.PS2.2	8	Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	Forces and Motion	Planning and Carrying Out Investigations	Stability and Change	Newton's Laws of Motion	3.1 Designing a balloon car
8.PS2.3	8	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	Types of Interactions	Asking Questions	Cause and Effect	Non-contact Forces	8 Electromagnets: How can we make an electromagnet?
8.PS2.4	8	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	Types of Interactions	Engaging in Argument from Evidence	Systems and System Models	Newton's Laws of Motion	2.4 Gravity and the third law

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8.PS2.5	8	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	Types of Interactions	Planning and Carrying Out Investigations	Cause and Effect	Non-contact Forces	6 Magnetic fields: How do magnets interact?
8.PS4.1	8	Use mathematical representations to describe patterns in a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.	Wave Properties	Using Mathematical and Computational Thinking	Patterns	Waves	1.2 Wave properties
8.PS4.3	8	Integrate qualitative scientific and technical information to support the claim that digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information.	Information Technologies and Instrumentation; Influence of Science Engineering and Technology on Society	Obtaining, Evaluating, and Communicating Evidence	Structure and Function	Waves	3.3 Digital signals
8.LS1.4	8	Use arguments 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.	Growth and Development of Organisms	Engaging in Argument from Evidence	Cause and Effect	Plants; The Survival of Species	2.2 Surviving extreme conditions
8.LS1.5	8	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Growth and Development of Organisms	Constructing Explanations	Cause and Effect	Plants	1.1 Investigating factors that affect plant growth

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8.LS3.1	8	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	Inheritance of Traits; Variation of Traits	Developing and Using Models	Structure and Function	Genetics; Plants	1.2 Mutations
8.LS3.2	8	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.	Growth and Development of Organisms; Inheritance of Traits; Variation of Traits	Developing and Using Models	Cause and Effect	Plants; The survival of Species	1.3 Sexual reproduction in plants
8.LS4.1	8	Analyze and interpret data to identify patterns within the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth.	Evidence of Common Ancestry and Diversity	Analyze and Interpret Data	Patterns	Change Over Time	2.5 Case study: A 66-million-year-old graveyard
8.LS4.2	8	Apply scientific ideas to construct an explanation for the patterns of anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer ancestral relationships.	Evidence of Common Ancestry and Diversity	Constructing Explanations	Patterns	Change Over Time	2.2 Are all animals related?
8.LS4.3	8	Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	Evidence of Common Ancestry and Diversity	Analyze and Interpret Data	Patterns	Change Over Time	2.2 Are all animals related?

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8.LS4.4	8	Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	Natural Selection	Constructing Explanations	Cause and Effect	Change Over Time	1.3 Natural selection
8.LS4.5	8	Gather and synthesize information about the practices that have changed the way humans influence the inheritance of desired traits in organisms.	Natural Selection; Interdependence of Science, Engineering, and Technology	Obtaining, Evaluating, and Communicating Information	Cause and Effect	Change Over Time; Genetics	1.7 Artificial selection
8.LS4.6	8	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	Adaptation	Using Mathematics and Computational Thinking	Cause and Effect	Change Over Time	2.3 Modeling the formation of species
8.ESS1.1	8	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.	The Universe and Its Stars; Earth and the Solar System	Developing and Using Models	Patterns	Our Place in Space	2.2 Modeling sunlight intensity
8.ESS1.2	8	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.	The Universe and Its Stars; Earth and the Solar System	Developing and Using Models	Systems and System Models	Our Place in Space	1.4-1.5 Modeling the Solar System
8.ESS1.3	8	Analyze and interpret data to determine scale properties of objects in the solar system.	Earth and the Solar System; Interdependence of Science, Engineering, and Technology	Analyzing and Interpreting Data	Scale, Proportion, and Quantity	Our Place in Space	3.5 Moons of Jupiter and Saturn

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MS.ETS1.4	n/a	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.	Developing Possible Solutions; Optimizing the Design Solution	Developing and Using Models	System and System Models	Energy	4.1 Water wheels: Designing a solution
MS.ETS1.1	n/a	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.	Defining and Delimiting Engineering Problems; Influence of Science, Engineering, and Technology on Society and the Natural World	Defining Problems	System and System Models	The Importance of Biodiversity	3.1 Defining the problem
MS.ETS1.2	n/a	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	Developing Possible Solutions	Engaging in Argument from Evidence	Structure and Function	The Importance of Biodiversity	3.4 Improving your solution
MS.ETS1.3	n/a	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.	Developing Possible Solutions; Optimizing the Design	Analyzing and Interpreting Data	Patterns	Non-contact Forces	10 Testing your prototype