MUSD Science Curriculum - Year at a Glance

Biology

Unit Name	AZ State Standards	Overview	Assessment Overview
Unit 1: Ecological Systems	HS.L2U3.18 HS.L2U1.19 HS.E1U1.12 HS.E1U3.14	Students deepen and expand prior knowledge of how the cycling of matter and flow of energy regulate ecosystems. Students apply proportional reasoning skills to examine data in order to analyze and make scientific claims about patterns, relationships, and changes in the structure and distribution of ecological populations and communities. Students build on and deepen their understanding of the living and nonliving components that regulate the structure and function of ecological systems. Students evaluate the intricate and often fragile interdependent relationships that ecological communities rely on. Students also explore how communities change over time, both through naturally occurring processes and through human activities.	• Develop a model to show relationships within systems • Obtain and communicate information to use evidence to support an argument
Unit 2: Evolution	HS.L4U1.27 HS.L4U1.28 HS+B.L4U1.13 HS+B.L4U1.14	Students explore the diverse types of data and multiple lines of evidence that have informed our understanding of the theory of evolution over time. This course is designed to build on that general understanding to provide a foundation in the mechanisms of evolution. This includes both small-scale evolution (changes in the relative frequency of a gene in a population from one generation to the next) and large-scale evolution (speciation events over many generations).	• Obtain, evaluate, and communicate information to use evidence to construct an explanation
Unit 3: Cellular Systems	HS.L1U1.20 HS.L1U1.22 HS.L1U3.23 HS.L2U1.21	Students will explore how cellular structures function together to support a cellular system that grows and develops, responds to a changing environment, and obtains and uses energy. Through concepts of homeostasis, students should gain an appreciation for how interdependent cellular structures are dependent on one another to maintain proper cellular functions. Students examine how specific structures participate in the process of capturing, storing, and using energy to drive cellular processes. They also connect their understanding of ecological roles of organisms to	• Ask questions and make predictions • Obtain, evaluate, and communicate information to use evidence to construct an explanation

		the various types of cellular energy processes. Concepts in the cellular systems unit may be difficult for some students due to the microscopic, seemingly intangible nature of these ideas and phenomena.	
Unit 4: Genetics	HS.L3U1.24 HS.L3U1.25 HS.L3U3.26	To better visualize genetic processes, such as DNA and protein synthesis, in this unit students engage with models, diagrams, and computer simulations. Students build a strong foundational understanding of molecular processes responsible for the passing of traits. They also use mathematics and pedigree models to analyze and predict inheritance patterns and explore current biotechnology associated with the study and manipulation of genes.	• Obtain, evaluate, and communicate information to use evidence to construct an explanation and engage in argument

Chemistry			
Unit Name	**AZ State Standards**	**Overview**	**Assessment Overview**
Unit 1: Physical Properties of Matter	HS.P1U1.1	Students will be learning the concepts of proportional reasoning in the respect of mass to volume relationship. I.e. density. Other concepts that are covered are the Law of Conservation of Mass, and measurement precision and accuracy.	• Develop a model to show relationships of structures
Unit 2: Energy and Particles In Motion	HS+C.P1U1.3 HS.E1U1.12	Students will discover the total amount of energy in any system determines what can occur. This energy is conserved and may transfer into, out of, or within the system, but the total amount always remains the same within the universe, being neither created or destroyed. Solids, liquids, and gases have different properties as a result of the motion of particles and the interaction among them. The properties that we can observe for gasses can be measured experimentally and explained using an understanding of particle motion. These properties can be further quantified using mathematical understanding.	• Develop a model to explain energy and matter • Analyze and interpret data
Unit 3: Energy and States of Matter	HS.P4U1.8 HS.E1U1.11 HS.E1U1.12	Students will learn about how energy is transferred and how energy is conserved through a phase change. Additional students learn the difference between heat and temperature.	• Develop and use models • Engage in argument from evidence • Analyze and interpret data
Unit 4: Describing Substances	HS.P1U1.1 HS C+.P1U1.1	Matter is made of tiny particles called atoms. The periodic table holds a lot of information and the structure and properties of matter arises from the periodic properties and bonding patterns of the constituting atom(s). The periodic table lists each known element which is identified by the number of	• Develop and use models to explain and demonstrate.

		protons the atom contains. The vertical columns on the periodic table identify elements with similar chemical and physical properties due to their shared electron configurations	
Unit 5: The Nucleus	HS.P1U1.1 HS+C.P1U1.1 HS+C.P1U1.2 HS.E1U1.12	Students will research the history of the atomic model in respect of the internal structure. Using the Bohr model students will analyze periodic table trends**.**	• Develop and use models to explain and demonstrate. • Obtain, evaluate, and communicate evidence
Unit 6: Particles with Internal Structure	HS.P1U1.2 HS C+.P1U1.1 HS + C.P1U1.4	Students will discover matter is made up of tiny particles, atoms, which are composed of three subatomic particles: protons, neutrons, and electrons. These particles can be found in the nucleus or orbitals of the atom. The periodic table lists each known element which is identified by the number of protons the atom contains. The vertical columns on the periodic table identify elements with similar chemical and physical properties due to their shared electron configurations. Properties of matter arise from the periodic properties and bonding patterns of the constituting atom(s).	• Develop and use models to demonstrate and predict
Unit 7: Counting Particles Too Small to See (Mole)	HS+C.P1U1.7 HS.P1U1.1	Students will explore how the mole concept is used to quantitatively relate the number of particles involved in a reaction to experimental data about that reaction.	• Use mathematical and computational thinking • Develop and use models to explain
Unit 8: Chemical Reactions: Particles and Energy	HS.P1U1.3 HS C+.P1U1.5	Students discover how matter changes form through chemical reactions based upon the interaction between outer electrons in atoms. This interaction always conserves mass and energy through the rearrangement of atoms and the absorption or release of energy.	• Ask questions to plan and carry out investigations
Unit 9: Stoichiometry	HS C+.P1U1.7	Using the prior skills of balancing and moles, students will use balanced equations to determine the amount of material produced or needed to complete a chemical reaction.	• Use mathematical and computational thinking

Environmental Chemistry

Unit Name	AZ State Standards	Overview	Assessment Overview
Unit 1:	H.S.P.1U1.1	Students will be learning the concepts of proportional reasoning in the	• Develop a model to show

Matter	H.S.P.1U3.4 + HS+C.P.1U1.3	respect of mass to volume relationship. I.e. density. Other concepts that are covered are the Law of Conservation of Mass, and measurement precision and accuracy.	relationships of structures • Obtain, evaluate, and communicate evidence • Analyze and interpret data
Unit 2: Interaction of Matter and Energy in the Lithosphere	H.S.P.1U1.1 HS.P1U1.2 HS.E2U1.15 HS.E1U1.12 HS.E1U1.13	Students will be learning the concepts of the lifecycle of a star and how elements are formed from nuclear fusion, how the formation of the geosphere affects the distribution of elements, and the properties of elements and their patterns and trends within the periodic table.	• Develop a model to construct and explanation • Evaluate explanations
Unit 3: Interaction of Matter and Energy in the Atmosphere and Hydrosphere	HS.E1U1.11 HS.E1U1.12 H.S.P.1U3.4 + HS+C.P.1U1.3 +HS+E.1U1.8	Students will be learning the concepts of heat transfer, chemical reactions, and the factors that create climate and weather in the atmosphere and hydrosphere.	• Analyze and interpret data • Develop a models • Obtain, evaluate, and communicate information
Unit 4: Energy and Sustainability	HS.P4U1.8 HS.P1U1.3 H.S.P.1U3.4	Students will be learning the concepts of anthropomorphic energy production and its effects on humans and the environment.	• Ask questions to plan and carry out investigations • Obtain, evaluate, and communicate information • Engage in argument

Physics

Unit Name	AZ State Standards	Overview	Assessment Overview
Unit 1: Introduction to Motion	HS.P3U1.6	Students are introduced to the concepts of position, velocity and acceleration through experimentation. Students learn how to create and use models of motion. They learn to interpret graphs and make predictions about the motion of objects.	• Analyze and interpret data
Unit 2: Newton's Laws	HS.P3U1.6 HS.P3U2.7	Students will be able to identify the forces being exerted on an object, as well as the causes of those forces. Students will understand that unbalanced force causes a change in the motion of an object. They will use Newton's Laws of motion to explain the motion of objects in the world.	• Analyze and interpret data • Use mathematical and computational thinking

Unit 3: Circular Motion & Gravity	HS+Phy.P3U1.3 HS.E2U1.16 HS+Phy.P3U1.2 HS.P2U1.5	Students will apply main ideas from the first two units to explain two dimensional motion. They will also apply those ideas to explain orbits and other forms of circular motion. Students will also examine gravity in more detail to determine the factors that affect the strength of the gravitational force.	• Develop mathematical models to construct explanations
Unit 4: Momentum	HS+Phy.P3U1.4 HS+Phy.P3U2.5	Students will apply concepts of forces and motion to define momentum and impulse. Using these new concepts, students will explain the motion of objects as they interact with each other. Students will learn about conservation laws and their application to collisions.	• Design, evaluate, and refine a device • Engage in argument
Unit 5: Energy	HS.P4U1.8 HS+Phy.P4U2.7	Students will learn about different types of energies and be able to describe the flow of energy over time. Using energy, students will be able to calculate different properties of the objects and their motion. Students will also learn how energy can be added or removed from objects and how this changes their motion.	• Design, evaluate, and refine a device • Engage in argument
Unit 6: Circuits	HS.P2U1.5 HS+Phy.P2U1.1 HS+Phy.P3U1.2 HS+Phy.P4U1.8 HS.P4U3.9	Students will learn about electric charge, circuits and their role in moving energy from one location to another. Using their knowledge of circuits, students will also learn about power generation and electric/magnetic fields.	• Plan and carry out investigations to design, build, and refine • Develop and use mathematical models to construct explanations • Engage in argument
Unit 7: Waves	HS.P4U1.10 HS.E2U1.17	Students will learn about different types of waves. They will investigate the relationship between wavelength, frequency and velocity. Students will learn about the Doppler Effect and how it is applied to astronomical data. Finally, students will learn about how waves can be used to transfer information using modern technologies.	• Construct and explanation

Physical Science

Unit Name	AZ State Standards	Overview	Assessment Overview
Unit 1: Motion	HS.P3U1.6	Students are introduced to the concepts of position, velocity and acceleration through experimentation. Students learn how to create and	• Collect, analyze, and interpret data

		use models of motion. They learn to introduce and interpret graphs about the motion of objects. Students will be able to predict the motion of an object under different conditions.	
Unit 2: Newton's Laws	HS.P3U1.6 HS.P3U2.7 .	Students will be able to identify the cause and effect of forces exerted on an object. Students will be able to understand the difference between balanced and unbalanced forces on an object. They will use Newton's Laws of motion to explain the motion of objects in the real world.	• Collect, analyze, and interpret data • Use mathematical and computational thinking
Unit 3: Momentum	HS.P3U1.6 HS+Phy.P3U2.5 HS+Phy.P3U1.4	Students will apply concepts of forces and motion to define momentum and impulse. Using these new concepts, students will explain the motion of objects as they interact with each other. Students will learn about conservation laws and their application to collisions.	• Collect, analyze, and interpret data • Design, evaluate, and refine a device
Unit 4: Energy	HS.P4U1.8 HS+Phy.P4U2.7	Students will learn about different types of energies and be able to describe the transfer of energy over time. Students will be able to calculate energy using different properties of the objects and their motion. Students will also learn how energy can be added or removed from objects and how this changes their motion.	• Design, evaluate, and refine a device • Engage in argument
Unit 5: Applications of Energy	HS.P2U1.5 HS.P4U3.9	Students will learn about different types of energies and be able to describe the transfer of energy over time. Students will be able design models of real world energy usage and transfer. Students will be able to construct an explanation of how energy is generated through electric and magnetic fields.	• Construct an explanation • Engage in argument
Unit 6: Waves	HS.P4U1.10	Students will learn about different types of waves. They will investigate the relationship between wavelength, frequency and velocity. Students will learn about how waves can be used to transfer information using modern technologies.	• Construct an explanation
Unit 7: Astronomy	HS.E2U1.16 HS.E2U1.17	Students will apply their previous learnings of energy, force and motion to construct an explanation of the structure and motion of objects in the solar system. Students will use astronomical evidence to explain the origin, expansion, and scale of the universe.	• Construct an explanation