



ARIZONA SCIENCE TEST

**Science High School
Standards**

Standard	Standard Description	SEP	Domain PLD Level 1	Domain PLD Level 2	Domain PLD Level 3	Domain PLD Level 4
<u>HS.P1U1.1</u>	Develop and use models to explain the relationship of the structure of atoms to patterns and properties observed within the Periodic Table and describe how these models are revised with new evidence.	MOD	identify subatomic particles of atoms	describe the electric charges of the subatomic particles in atoms	demonstrate the relationship of atomic structures to placement in the periodic table	evaluate or predict how changes to atomic structures alter properties
<u>HS.P1U1.2</u>	Develop and use models for the transfer or sharing of electrons to predict the formation of ions, molecules, and compounds in both natural and synthetic processes.	MOD	identify elements, ions, and molecules	describe how electrons can be shared or transferred	demonstrate the role of electrons in the formation of ions, molecules, and compounds	evaluate conditions regarding electron activity in the formation of molecules
<u>HS.P1U1.3</u>	Ask questions, plan, and carry out investigations to explore the cause and effect relationship between reaction rate factors.	Q/P; INV	Identify conservation of mass in reactions	identify factors that affect reaction rates	understand that reaction rates depend on molecular collisions	predict the outcomes of reactions based on factors that affect molecular collisions
<u>HS.P1U3.4</u>	Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications.	INFO	identify ethical, social, economic, or political effects of chemistry-related technologies	describe ethical, social, economic, and/or political implications of chemistry-related technologies	differentiate between positive and negative ethical, social, economic, and/or political effects of chemistry related technologies	critique or predict the effects of chemistry-related technologies

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<u>HS.P2U1.5</u>	Construct an explanation for a field's strength and influence on an object (electric, gravitational, magnetic).	E/S	identify fields (electric, gravitational, magnetic) and forces (electric, gravitational, magnetic)	distinguish the effects of distance, mass, or charge on the strength of fields (electric, gravitational, magnetic) and/or forces (electric, gravitational, magnetic)	demonstrate factors that influence the strength of fields (electric, gravitational, magnetic) and forces (electric, gravitational, magnetic)	predict how field strength (electric, gravitational, magnetic) and the magnitude of force (electric, gravitational, magnetic) are affected by distance, mass, or charge
<u>HS.P3U1.6</u>	Collect, analyze, and interpret data regarding the change in motion of an object or system in one dimension, to construct an explanation using Newton's Laws.	DATA	identify changes in an object's motion	distinguish between constant motion and acceleration	demonstrate the role of force in situations that lead to changes in motion using Newton's Laws	evaluate situations to predict the cause or result of an object's motion, using Newton's Laws
<u>HS.P3U2.7</u>	Use mathematics and computational thinking to explain how Newton's laws are used in engineering and technologies to create products to serve human ends.	MCT	identify products engineered to involve motion	select math concepts applied to objects in everyday situations	apply math concepts to explain how force is used in useful objects	predict the outcome when changes are made to forces acting on everyday objects
<u>HS.P4U1.8</u>	Engage in argument from evidence that the net change of energy in a system is always equal to the total energy exchanged between the system and the surroundings.	ARG	identify or define energy in different forms	distinguish different forms of energy	apply the conservation of energy principle to account for energy changes	evaluate or construct explanations to describe conservation of energy

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<u>HS.P4U3.9</u>	Engage in argument from evidence regarding the ethical, social, economic, and/or political benefits and liabilities of energy usage and transfer.	ARG	identify benefits of energy usage	differentiate effects of transfer of different energy resources in society	demonstrate effects of energy usage/transfer involving different energy resources on society	critique or revise explanations or predict outcome on society of energy usage/transfer involving different energy resources
<u>HS.P4U1.10</u>	Construct an explanation about the relationships among the frequency, wavelength, and speed of waves traveling in various media, and their applications to modern technology.	E/S	identify characteristics of waves	describe the relationship between frequency, wavelength, and speed of waves	understand the effects different media have on wave characteristics, including in technological applications	predict wave behavior in different media, including behavior in technological applications
<u>HS.E1U1.11</u>	Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate.	DATA	identify the sun as the source of both weather and climate	differentiate between weather and climate	demonstrate how energy from the sun affects weather patterns and climate	predict how changes in Earth's atmosphere affect weather and climate
<u>HS.E1U1.12</u>	Develop and use models of the Earth that explains the role of energy and matter in Earth's constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere).	MOD	identify changes in matter that occur in Earth's internal and external systems	describe the role of energy in changes that can occur in Earth's external and internal systems	demonstrate the role of energy and matter in changes in Earth's internal and external systems	evaluate or revise explanations of factors that cause changes in Earth's internal and external systems

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<u>HS.E1U1.13</u>	Evaluate explanations and theories about the role of energy and matter in geologic changes over time.	E/S	identify theories about the role of energy and matter in geologic changes over time	compare theories about the role of energy and matter in geologic changes over time	evaluate theories about the role of energy and matter in geologic changes over time	evaluate changes in Earth's surface based on theories about the role of energy and matter in geologic changes over time
<u>HS.E1U3.14</u>	Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other.	ARG	identify impact of human activity on natural resources	describe effects of human activity on climate, natural resources, and/or natural hazards	describe the interrelatedness of human activity, natural resources, natural hazards, and climate	evaluate or predict outcomes of human activity on natural resources, hazards, or climate
<u>HS.E2U1.15</u>	Construct an explanation based on evidence to illustrate the role of nuclear fusion in the life cycle of a star.	E/S; ARG	identify fuel source for stars	describe the life cycle of a star	demonstrate the role of nuclear fusion in a star's life cycle	predict energy and/or starlight changes based on nuclear changes
<u>HS.E2U1.16</u>	Construct an explanation of how gravitational forces impact the evolution of planetary motion, structure, surfaces, atmospheres, moons, and rings.	E/S	identify gravity as the relevant force in planetary motion	describe planetary orbital paths in terms of gravitational force	demonstrate how gravitational forces impact the evolution of planetary motion, structure, atmospheres, moons, and rings	predict effects of other bodies' gravitational force on planetary motion and features
<u>HS.E2U1.17</u>	Construct an explanation of the origin, expansion, and scale of the universe based on astronomical evidence.	E/S	identify the scale used for galactic distances describe the origin of the universe	describe methods for measuring the expansion of the universe	demonstrate the origin, expansion, and scale of the universe based on astronomical evidence	evaluate evidence for origin, expansion, and/or scale of the universe

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<u>HS.L2U3.18</u>	Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem.	INFO	identify stable ecosystems	describe human activities that can impact an ecosystem	demonstrate how humans impact the biodiversity of an ecosystem	predict or evaluate results of human activity on the biodiversity of an ecosystem
<u>HS.L2U1.19</u>	Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment.	MOD	identify sources of energy for ecosystems	distinguish energy sources available to different species in an ecosystem	understand how energy transfer involving different species occurs in an ecosystem	predict effects of changes in available energy to different species in an ecosystem
<u>HS.L1U1.20</u>	Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis.	Q/P	identify major cell structures	distinguish cell organelles and their functions	demonstrate cellular organization and processes to maintain homeostasis	predict how changes in external factors affect cellular activities
<u>HS.L2U1.21</u>	Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter.	INFO	differentiate photosynthesis from cellular respiration	identify inputs and outputs of photosynthesis and cellular respiration	show the flow of energy and matter between photosynthesis and cellular respiration	evaluate/contrast the conditions, inputs, and outputs for photosynthesis and cellular respiration
<u>HS.L1U1.22</u>	Construct an explanation for how cellular division (mitosis) is the process by which organisms grow and maintain complex, interconnected systems.	E/S	identify cell division as a cell activity	describe outcome of cell division	demonstrate that mitosis is a cellular process for growth and maintaining interconnected systems	demonstrate how disruptions in the cell-division process interfere with growth and maintaining interconnected systems

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<u>HS.L3U1.24</u>	Construct an explanation of how the process of sexual reproduction contributes to genetic variation.	E/S	identify DNA's role in sexual reproduction	describe how sex cells form	demonstrate how genetic variation is achieved by sexual reproduction	predict the outcome of situations involving sexual reproduction
<u>HS.L3U1.25</u>	Obtain, evaluate, and communicate information about the causes and implications of DNA mutation.	INFO	identify a DNA mutation	describe causes of DNA mutations	demonstrate causes and implications of DNA mutations	predict the effect of DNA mutations on the expression of traits
<u>HS.L3U3.26</u>	Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology.	ARG	identify genetic technology	describe effects of gene technology	describe ethical, social, economic, and/or political implications of the application of gene technology	evaluate the implications of employing gene technology
<u>HS.L4U1.27</u>	Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	INFO	identify genetic traits	describe trait variation frequencies in a population	demonstrate how biodiversity is affected by the frequency of inherited traits in a population	predict how variation of traits in a population can lead to biological diversity over multiple generations
<u>HS.L4U1.28</u>	Gather, evaluate, and communicate multiple lines of empirical evidence to explain the mechanisms of biological evolution.	INFO	identify evidence of evolution	describe the process of natural selection	demonstrate multiple mechanisms of evolution	evaluate evidence that explains the mechanisms of evolution