TASC Science Blueprint Overview

Domain/ Reporting Category	Subdomain/Core Idea	Subdomain %	Domain %
Earth and Space Sciences	ESS1 Earth's Place in the Universe	10%	25%
	ESS2 Earth's Systems	10%	
	ESS3 Earth and Human Activity	5%	
Life Sciences	LS1 From Molecules to Organisms: Structures and Processes	15%	50%
	LS2 Ecosystems: Interactions, Energy, and Dynamics	15%	
	LS3 Heredity: Inheritance and Variation of Traits	12%	
	LS4 Biological Evolution: Unity and Diversity	8%	
Physical Sciences	PS1 Matter and Its Interactions	7%	25%
	PS2 Motion and Stability: Forces and Interactions	7%	
	PS3 Energy	6%	
	PS4 Waves and Their Applications in Technologies for Information Transfer	5%	

Domain/ Reporting Category	Subdomain/ Core Idea	Standard/ Performance Expectation	Standard Description	TASC Emphasis for Forms
Earth and Space Sciences	HS-ESS1 Earth's Place in the Universe	HS-ESS1-1	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.	Medium
		HS-ESS1-2	Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.	Medium
		HS-ESS1-3	Communicate scientific ideas about the way stars, over their life cycle, produce elements.	Medium
		HS-ESS1-4	Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.	High
		HS-ESS1-5	Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.	High
		HS-ESS1-6	Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.	Medium
	HS-ESS2 Earth's Systems	HS-ESS2-1	Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.	Medium
		HS-ESS2-2	Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth's systems.	Low
		HS-ESS2-3	Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.	Medium

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Earth and Space Sciences *continued*	HS-ESS2 Earth's Systems *continued*	HS-ESS2-4	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.	High
		HS-ESS2-5	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	High
		HS-ESS2-6	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	Medium
		HS-ESS2-7	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.	Low
	HS-ESS3 Earth and Human Activity	HS-ESS3-1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	Low
		HS-ESS3-2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	Low
		HS-ESS3-3	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.	Low
		HS-ESS3-4	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.	Medium
		HS-ESS3-5	Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.	High

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Earth and Space Sciences *continued*	HS-ESS3 Earth and Human Activity *continued*	HS-ESS3-6	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.	Medium
Life Sciences	HS-LS1 From Molecules to Organisms: Structures and Processes	HS-LS1-1	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	High
		HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	High
		HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	High
		HS-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	High
		HS-LS1-5	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	High
		HS-LS1-6	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	Low
		HS-LS1-7	Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	High

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Life Sciences *continued*	HS-LS2 Ecosystems: Interactions, Energy, and Dynamics	HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	Medium
		HS-LS2-2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	Medium
		HS-LS2-4	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	Medium
		HS-LS2-5	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Low
		HS-LS2-6	Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	Medium
		HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.	Medium
		HS-LS2-8	Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	Low

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Life Sciences *continued*	HS-LS3 Heredity: Inheritance and Variation of Traits	HS-LS3-1	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	High
		HS-LS3-2	Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.	Medium
		HS-LS3-3	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	Low
	HS-LS4 Biological Evolution: Unity and Diversity	HS-LS4-1	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	High
		HS-LS4-2	Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	Low
		HS-LS4-3	Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	Low
		HS-LS4-4	Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	Low

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Life Sciences *continued*	HS-LS4 Biological Evolution: Unity and Diversity *continued*	HS-LS4-5	Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	Low
		HS-LS4-6	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	Low
Physical Sciences	HS-PS1 Matter and Its Interactions	HS-PS1-1	Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.	High
		HS-PS1-2	Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	Medium
		HS-PS1-3	Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.	High
		HS-PS1-4	Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.	Medium
		HS-PS1-5	Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.	Low
		HS-PS1-7	Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	Low

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Physical Sciences *continued*	HS-PS2 Motion and Stability: Forces and Interactions	HS-PS2-1	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.	High
		HS-PS2-2	Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.	Low
		HS-PS2-3	Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.	Low
		HS-PS2-4	Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.	Medium
		HS-PS2-5	Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.	Low
	HS-PS3 Energy	HS-PS3-1	Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.	Medium
		HS-PS3-2	Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields.	Medium
		HS-PS3-3	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.	Low

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Physical Sciences *continued*	HS-PS3 Energy *continued*	HS-PS3-4	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	Low
		HS-PS3-5	Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.	Low
	HS-PS4 Waves and Their Applications in Technologies for Information Transfer	HS-PS4-1	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	Medium
		HS-PS4-2	Evaluate questions about the advantages of using a digital transmission and storage of information.	Low