Arkansas Science

Physical Science - Integrated: Grades 9, 10, 11, 12

Adopted 2018

Elements, Matter, and Interactions	PSI-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. PSI-PS1-1
	PSI-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. PSI-PS1-2
	PSI-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. PSI-PS1-3
	PSI-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. PSI-PS1-4
	PSI-PS1-7.	Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. PSI-PS1-7
	PSI-ESS2-7.	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. PSI-ESS2-7
Matter in Organisms	PSI-LS1-5.	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. PSI-LS1-5
	PSI-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. PSI-LS1-7
	PSI-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. PSI-LS2-4
	PSI2-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. PSI2-ETS1-2

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Forces and Motion	**PSI-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.** PSI-PS2-1
	PSI-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.** PSI-PS2-3
	PSI-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.** PSI-PS2-5
	PSI-PS2-6.	**Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.** PSI-PS2-6
	PSI-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.** PSI-ESS1-5
	PSI3-ETS1-1.	**Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.** PSI3-ETS1-1
Energy	**PSI-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.** PSI-PS3-1
	PSI-PS3-2.	**Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).** PSI-PS3-2
	PSI-PS3-3.	**Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.** PSI-PS3-3
	PSI-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).** PSI-PS3-4
	PSI4-ETS1-3.	**Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.** PSI4-ETS1-3

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Waves	**PSI-PS4-1.**	**Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.** PSI-PS4-1
	PSI-PS4-2.	**Evaluate questions about the advantages of using a digital transmission and storage of information.** PSI-PS4-2
	PSI-5-ETS1-2.	**Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.** PSI-5-ETS1-2
Interactions of Humans and the Environment	**PSI-LS2-7.**	**Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.** PSI-LS2-7
	PSI-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.** PSI-LS4-5
	PSI-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.** PSI-ESS2-1
	PSI-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.** PSI-ESS3-1
	PSI-ESS3-2.	**Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.** PSI-ESS3-2
	PSI6-ETS1-1.	**Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.** PSI6-ETS1-1
	PSI6-ETS1-2.	**Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.** PSI6-ETS1-2
	PSI6-ETS1-3.	**Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.** PSI6-ETS1-3
	PSI6-ETS1-4.	**Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.** PSI6-ETS1-4