Science: Physics

MOTION AND STABILITY: FORCES AND INTERACTIONS	**1a**	**Predict changes in the motion of a macroscopic object, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force using data (e.g., tables or graphs of position or velocity as a function of time for an object subject to a net unbalanced force).** LC-HS-PS2-1A
	2a	**Identify an example of the law of conservation of momentum (e.g., in a collision, the momentum change of an object is equal to and opposite of the momentum change of the other object) represented using graphical or visual displays (e.g., pictures, pictographs, drawings, written observations, tables, charts).** LC-HS-PS2-2A
	3a	**Evaluate a device (e.g., football helmet or a parachute) designed to minimize force by comparing data (i.e., momentum, mass, velocity, force, or time).** LC-HS-PS2-3A
	4a	**Use Newton's law of universal gravitation as a mathematical model to qualitatively describe or predict the effects of gravitational forces in systems with two objects.** LC-HS-PS2-4A
	4b	**Use Coulomb's law to qualitatively describe or predict the electrostatic forces in systems with two objects.** LC-HS-PS2-4B
	5a	**Identify situations and provide evidence where an electric current is producing a magnetic field.** LC-HS-PS2-5A
	5b	**Identify situations and provide evidence where a magnetic field is producing an electric current.** LC-HS-PS2-5B
ENERGY	**1a**	**Identify a model showing the change in the energy of one component in a system compared to the change in energy of another component in the system.** LC-HS-PS3-1A
	1b	**Identify a model showing the change in 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.** LC-HS-PS3-1B
	2a	**Identify that two factors, an object's mass and height above the ground, affect gravitational potential energy (i.e., energy stored due to position of an object above Earth) at the macroscopic level.** LC-HS-PS3-2A

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	2b Identify that the mass of an object and its speed determine the amount of kinetic energy the object possesses. LC-HS-PS3-2B
	3a Identify the forms of energy that will be converted by a device that converts one form of energy into another form of energy. LC-HS-PS3-3A
	3b Identify steps in a model of a device showing the transformations of energy that occur (e.g., solar cells, solar ovens, generators, turbines). LC-HS-PS3-3B
	3c Describe constraints to the design of the device which converts one form of energy into another form of energy (e.g., cost or efficiency of energy conversion). LC-HS-PS3-3C
	4a Identify the temperatures of two liquids of different temperature before mixing and after combining to show uniform energy distribution. LC-HS-PS3-4A
	4b Investigate the transfer of thermal energy when two substances are combined within a closed system. LC-HS-PS3-4B
	5a Use a model to identify the cause and effect relationships between forces produced by electric or magnetic fields and the change of energy of the objects in the system. LC-HS-PS3-5A
	3b Identify a model or description of electromagnetic radiation as a particle model. LC-HS-PS4-3B
WAVES AND THIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER	**1a** Qualitatively describe cause and effect relationships between changes in wave speed and type of media through which the wave travels using mathematical and graphical representations. LC-HS-PS4-1A
	1b Identify examples that illustrate the relationship between the frequency and wavelength of a wave. LC-HS-PS4-1B
	1c Identify evidence that the speed of a wave depends on the media through which it travels. LC-HS-PS4-1C
	3a Identify a model or description of electromagnetic radiation as a wave model. LC-HS-PS4-3A