Physics MOTION AND STABILITY: FORCES AND INTERACTIONS	
Louisiana Student Standards	**Louisiana Connectors (LC)**
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.	**LC-HS-PS2-1a** 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).
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.	**LC-HS-PS2-2a** 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).
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.	**LC-HS-PS2-3a** 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).
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.	**LC-HS-PS2-4a** 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-PS2-4b Use Coulomb's law to qualitatively describe or predict the electrostatic forces in systems with two objects.
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.	**LC-HS-PS2-5a** Identify situations and provide evidence where an electric current is producing a magnetic field.
	LC-HS-PS2-5b Identify situations and provide evidence where a magnetic field is producing an electric current.

Physics ENERGY	
Louisiana Student Standards	**Louisiana Connectors (LC)**
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.	**LC-HS-PS3-1a** 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-PS3-1b 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.
HS-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 positions of particles (objects).	**LC-HS-PS3-2a** 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-PS3-2b Identify that the mass of an object and its speed determine the amount of kinetic energy the object possesses.
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.	**LC-HS-PS3-3a** 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-PS3-3b 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-PS3-3c 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).
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).	**LC-HS-PS3-4a** Identify the temperatures of two liquids of different temperature before mixing and after combining to show uniform energy distribution.
	LC-HS-PS3-4b Investigate the transfer of thermal energy when two substances are combined within a closed system.
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.	**LC-HS-PS3-5a** 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.

Physics WAVES AND THIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER	
Louisiana Student Standards	**Louisiana Connectors (LC)**
HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	**LC-HS-PS4-1a** 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-PS4-1b Identify examples that illustrate the relationship between the frequency and wavelength of a wave.
	LC-HS-PS4-1c Identify evidence that the speed of a wave depends on the media through which it travels.
HS-PS4-3 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.	**LC-HS-PS4-3a** Identify a model or description of electromagnetic radiation as a wave model.
	LC-HS-PS4-3b Identify a model or description of electromagnetic radiation as a particle model.