

**The Physical Science PLC Team identified the following Idaho State Standards as Essential—Semester 2 Physics**

- 1 • **PSP1-HS-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.
  - Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force.
  - Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.
  
- 2 • **PSP1-HS-2.** Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is not net force on the system.
  - Clarification Statement: Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of Newton's First Law of Motion (Inertia)
  - Assessment Boundary: Assessment is limited to systems of two macroscopic bodies moving in one dimension.
  
- 3 • **PSP1-HS-3.** Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.
  - Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.
  - Assessment Boundary: Assessment is limited to qualitative evaluations and/or algebraic manipulations.
  
- 4 • **PSP1-HS-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.
  - Clarification Statement: Emphasis on both quantitative and conceptual descriptions of gravitational and electric fields.
  - Assessment Boundary: Assessment is limited to systems with two objects.
  
- 5 • **PSP1-HS-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.
  - Assessment Boundary: Assessment is limited to designing and conducting investigations with provided materials and tools.
  
- 6 • **PSP2-HS-1.** Create a computational model to calculate 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.
  - Clarification Statement: Emphasis is on explaining the meaning of the mathematical expressions used in the model.
  - Assessment Boundary: Assessment is limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.
  
- 7 • **PSP3-HS-1.** Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves travelling in various media.
  - Clarification Statement: Examples of data could include electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, and seismic waves traveling through the Earth.
  - Assessment Boundary: Assessment is limited to algebraic relationships and describing those relationships qualitatively.