MAINE SCIENCE AND ENGINEERING STANDARDS

4-PS3 Energy

4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.

Further Explanation: Examples include coasting on a bike down a hill or how bumping into someone or something when walking or running changes speed. Other examples include dropping into a skateboard bowl or off of a ramp.

Constructing Explanations and Designing Solutions, Definitions of Energy, Cause and Effect

4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Planning and Carrying out Investigations, Definitions of Energy, Conservation of Energy and Energy Transfer, Cause and Effect

4-PS3-3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.

Further Explanation: Emphasis is on the changes in the energy due to the changes in speed, not on the forces, as objects interact. These changes can be observed in playing pool or marbles.

Asking Questions and Defining Problems, Definitions of Energy, Conservation of Energy and Energy Transfer, Relationship between Energy and Forces, Cause and Effect

4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Further Explanation: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound and a passive solar heater that converts light into heat. Such devices can be used to make s'mores or to turn on a small light when camping in the Maine woods. Examples of constraints could include the materials, cost, or time to design the device.

Constructing Explanations and Designing Solutions, Natural Hazards, Conservation of Energy and Energy Transfer, Energy in Chemical Processes, Defining Engineering Problems, Cause and Effect