**Physical Science**

**MS-PS4 Waves and Their Application in Technologies for Information Transfer**

**MS-PS4-1 Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.**

Further explanation: Emphasis is on describing waves with both qualitative and quantitative thinking. Possibilities for exploration might include coastal wave erosion, effects of the wind turbines/farms on the air flow patterns and harmonics.

Using mathematics and computational thinking; Obtaining, evaluating, and communicating information; wave properties; patterns

**MS-PS4-2 Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.**

Further explanation: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions. Possibilities for explorations might include Maine’s geographic location for utilizing solar power, power generation from ocean waves, possibility for extended farming seasons with artificial lighting.

Developing and using models; wave properties; electromagnetic radiation; structure and function

**MS-PS4-3 Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.**

Further explanation: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in Wi-Fi devices, and conversion of stored binary patterns to make sound or text on a computer screen.

Obtaining, evaluating, and communicating information; information technologies and instrumentation; structure and function