Science Curriculum Map Overview

Topic	Skills	Approximate Weeks of Study
Forces and Interactions	↠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. [Newton's Laws] ↠ 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. [Momentum] ↠Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. [Momentum and collisions] ↠ Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. [Forces] ↠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. [Electricity and magnetism]	15
Energy	↠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. [Forms of Energy] ↠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 objects and energy associated with the relative position of objects. [Conservation of Energy] ↠Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. ↠ 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] ↠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 [Fields] ↠Analyze data to support the claim that Ohm's Law describes the mathematical relationship among the potential difference, current, and resistance of an electric circuit. [Circuits]	10

Waves and Electromagnetic Radiation	↠Use mathematical representations to support a claim regarding relationships among the period, frequency, wavelength, and speed of waves traveling and transferring energy in various media. [Waves] ↠ Evaluate questions about the advantages of using a digital transmission and storage of information. [research] ↠Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model (quantum theory), and that for some situations one model is more useful than the other.[Modern Physics] ↠ Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. [wave interactions] ↠ Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. [wave transmission] ↠Use mathematical models to determine relationships among the size and location of images, size and location of objects, and focal lengths of lenses and mirrors. [lenses and mirrors]	12