Indiana High School Science
Curriculum Mapping

Physics, 2010 Standards	Boardworks High School Physics Presentation
Standard I: Motion and Forces	
P.1.1 Describe, measure, and analyze using motion maps, graphs, and algebraic equations, constant acceleration motion in terms of time and the vector quantities of displacement, velocity and acceleration.	Acceleration Displacement, Velocity and Acceleration Speed and Velocity Vectors and Scalars
P.1.2 Describe, measure, and analyze, using motion, maps, graphs, and algebraic equations, constant acceleration motion in one dimension in terms of time and the vector quantities of displacement, velocity, and acceleration.	Acceleration Displacement, Velocity and Acceleration Speed and Velocity Vectors and Scalars
P.1.3 Describe, measure, and analyze, using motion, maps, graphs, and algebraic equations, constant acceleration motion in two dimensions in terms of time and the vector quantities of displacement, velocity, and acceleration. Consider specifically projectile motion and uniform circular motion.	Acceleration Circular Motion Displacement, Velocity and Acceleration Projectiles Speed and Velocity Vectors and Scalars
P.1.4 Describe the magnitude and direction of kinds of forces, including both contact forces and non-contact forces, those that act at a distance. Find the net force acting on an object using free-body diagrams and the addition of forces. Use Newton's three laws to deductively analyze static and dynamic systems.	Free-Body Diagrams Newton's First Law Newton's Second Law Newton's Third Law Friction Circular Motion Gravity Mass and Weight Projectiles Springs
P.1.5 Use Newton's Law of universal gravitation and the laws of motion to quantitatively analyze the motions of orbiting objects such as the moon, the planets and satellites, e.g. Kepler's third law.	Newton's First Law Newton's Second Law Newton's Third Law Gravity
P.1.6 Use Newton's law of universal gravitation to quantitatively analyze the motions of orbiting objects such as the moon, the planets and satellites, e.g., Kepler's third law.	–
Standard 2: Energy and Momentum	

P.2.1 Describe qualitatively and quantitatively the concepts of momentum, work, kinetic energy, potential energy, and power.	Momentum Changes in Momentum Conservation of Momentum Work Kinetic Energy Power Gravitational and Potential Energy
P.2.2 Quantitatively predict changes in momentum using the impulse- momentum theorem and in kinetic energy using the work-energy theorem, as developed from Newton's laws of motion.	Changes in Momentum Kinetic Energy
P.2.3 Analyze evidence that illustrates the laws of conservation of energy and conservation of momentum. Apply these laws to analyze elastic and completely inelastic collisions.	Conservation of Energy Conservation of Momentum
P.2.4 Describe and quantify energy in its different mechanical forms (such as kinetic, gravitational potential, elastic potential) and recognize that these forms of energy can be transformed one into another and into non-mechanical forms of energy (such as thermal, chemical, nuclear, and electromagnetic).	Kinetic Energy Gravitational and Potential Energy Energy Transfers Nuclear Fission Nuclear Fusion Conservation of Energy
Standard 3: Temperature and Thermal Energy Transfer	
P.3.1 Describe temperature, thermal energy, and thermal energy transfer in terms of the kinetic molecular model. Expand the concept of conservation of mechanical energy to include thermal energy.	Radiation Conduction and Convection Changing State
P.3.2 Describe the kinetic molecular model, use it to derive the ideal gas law and show how it explains the relationship between the temperature of an object and the average kinetic energy of its molecules.	Particles in Action Changing State
P.3.3 Use the kinetic theory to explain that the transfer of heat occurs during a change of state.	Changing State
P.3.4 Use examples from everyday life to describe the transfer of thermal energy by conduction, convection and radiation.	Conduction and Convection Radiation
Standard 4: Electricity and Magnetism	
P.4.1 Describe and determine the force on a stationary charge due to other stationary charges using Coulomb's Law. Know that this force is many times greater than the gravitational force.	–
P.4.2 Define electric field and describe the motion of a charged particle in a simple electric field.	–

P.4.3 Describe electric potential energy and electric potential (voltage), and use voltage to explain the motion of electrical charges and the resulting electric currents in conductors.	Current, Voltage and Resistance Current and Potential Difference Calculating Resistance
P.4.4 Explain and analyze simple arrangements of electrical components in series and parallel circuits in terms of current, resistance, voltage, and power and use Ohm's and Kirchhoff's laws to analyze circuits.	Series and Parallel Circuits Calculating Resistance Current, Voltage and Resistance Circuit Diagrams Electrical Power Factors Affecting Resistance 1 Factors Affecting Resistance 2
P.4.5 Describe the magnetic forces and fields produced by, and acting on, moving charges and magnetic materials.	Magnetism, Current and Force
Standard 5: Vibrations, Waves	
P.5.1 Identify properties of objects that vibrate, using Newton's Laws to describe and explain the vibrational motion resulting from restoring forces, such as Hooke's Law in the case of spring, or gravity in the case of a small amplitude pendulum.	Springs
P.5.2 Describe how vibrating objects can generate transverse and/or longitudinal waves so that energy is transmitted without the transfer of energy. Distinguish longitudinal waves from transverse waves.	Transverse Waves Longitudinal Waves Waves
P.5.3 Describe and analyze propagating waves in terms of their fundamental characteristics such as wave speed, wavelength, frequency or period, and amplitude.	Sound Waves Transverse Waves Longitudinal Waves
P.5.4 Describe and explain the behavior of waves such as transmission, reflection, interference, and polarizations. Qualitatively describe and explain the production and properties of standing waves.	Reflection Refraction Polarization Superposition and Interference Interference Standing Waves
Standard 6: Light and Optics	
P.6.1 Understand the geometric nature of light in reflection and refraction, and in image formation by lenses and mirrors. Use that geometric nature to graphically predict the formation of images by lens and mirrors.	Reflection Refraction Refractive Index Lenses

P.6.2 Describe the electromagnetic spectrum (radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, gamma rays) in terms of frequency, wavelength and energy, recognizing that all these waves travel at the same speed in a vacuum.	Electromagnetic Waves X-rays Gamma Rays
P.6.3 Understand that electromagnetic waves are produced by the acceleration of charged particles. Describe how electromagnetic waves interact with matter both as packets (photons) and as waves. Show qualitatively how wave theory helps explain polarization and diffraction.	Wave Properties of Particles
Standard 7: Modern Physics	
P.7.1 Explain that electrons, protons, and neutrons are parts of the atom, that the nuclei of atoms are composed of protons and neutrons which experience forces of attraction and repulsion consistent with their charges and masses. Distinguish elements from isotopes.	Structure of the Atom
P.7.2 Explain that the stability of the nucleus, containing only positive or neutral particles indicates the existence of a new force that is only evident within the nucleus, holding the particles together despite the strong repulsive electrical force.	Structure of the Atom
P.7.3 Distinguish fission from fusion processes. Describe how the binding energies of protons and neutrons determine the stability/instability of nuclei.	Nuclear Fission Nuclear Fusion Structure of the Atom
P.7.4 Describe qualitatively how nuclear reactions—fission and fusion—convert very small amounts of matter into large amounts of energy.	Nuclear Fission Nuclear Fusion
P.7.5 Understand that fission results from large, less stable nuclei decomposing to form smaller, more stable nuclei. Understand that fusion results from small nuclei at high temperatures and pressures combining to form larger, more stable nuclei with the release of thermonuclear energy.	Nuclear Fission Nuclear Fusion
Integrated Chemistry - Physics, 2010	**Boardworks High School Physics Presentation**
Standard 1: Motion and Energy of Macroscopic Objects	
ICP.1.1 Measure the motion of objects to understand the relationships between distance, velocity, and acceleration and deepen understanding through graphical analysis of the time dependence of acceleration, velocity and distance.	Acceleration Displacement, Velocity and Acceleration
ICP.1.2 Describe and apply Newton's three laws of motion. By experimentation, determine the relationships among the variables in Newton's laws and how all three laws relate mass, acceleration and force as a triad of proportional variables, leading to the definitions of momentum and energy.	Newton's First Law Newton's Second Law Newton's Third Law

ICP.1.3 Describe how Newton's law of universal gravitation, together with the laws of motion, explains the motions of objects on earth and of the moon, planets and stars.	Gravity
ICP.1.4 Describe the kinetic and potential energies of macroscopic objects, and use measurements to develop an understanding of these forms of energy.	Kinetic Energy Gravitational and Potential Energy
Standard 2: Mechanical Energy and Propagation of Energy by Waves	
ICP 2.1 Identify properties of objects that vibrate, using Newton's laws to understand the motion. Understand that vibrating objects can give rise to mechanical waves.	Particles in Action
ICP.2.2 Identify properties of waves including frequency, wavelength, amplitude, energy, and wave speed.	Longitudinal Waves Transverse Waves Waves
ICP 2.3 Describe how energy is propagated by waves without the transfer of mass using examples such as water waves, earthquakes, and sound waves.	Waves Sound
ICP.2.4 Apply the properties of waves to wave phenomena including reflection, and refraction, as well as the transmission and loss of energy.	Reflection Refraction Energy Transfers Polarization
Standard 3: Properties of Matter: Macroscopic as a Model for Microscopic	
ICP.3.1 Describe how we use macroscopic properties of matter to model microscopic processes.	–
ICP.3.2 Study the characteristics of solids, liquids, and gases and their changes of state and interpret them in terms of a molecular model which describes their energies and motions.	Changing State Particles in Action
ICP 3.3 Understand how thermal energy (the microscopic motions of the atoms and/or molecules) is related to the macroscopic concept of temperature. Examine the differences in these concepts by measuring the temperature changes, and determining specific heat capacity, of water as it is heated or cooled.	–
ICP.3.4 Understand how the microscopic kinetic molecular theory explains observations of macroscopic gas behavior in terms of temperature, volume, pressure, and the number of particles (using the mole concept).	–
Standard 4: Energy Transport	
ICP.4.1 Using conservation of energy, calculate the thermal energy released or absorbed by an object and distinguish between exothermic and endothermic changes.	Conservation of Energy
ICP.4.2 Differentiate between conduction, convection, and radiation and identify them as types of energy transfer.	Conduction and Convection Radiation
ICP.4.3 Explain that electrons can absorb energy and can release energy, and that electrons in atoms do this at specific energies.	Observing Line Spectra

ICP.4.4 Describe the relationships between velocity, frequency, wavelength, and energy in electromagnetic waves. Describe the regions of the electromagnetic spectrum.	Electromagnetic Waves
ICP 4.5 Understand that from diffraction we know that visible light is an electromagnetic wave.	Diffraction Electromagnetic Waves
Standard 5: Chemical Energy, Reactions, and Bonding	
ICP.5.1 Recognize and describe physical properties of matter and use these to differentiate between pure substances and mixtures.	*See Boardworks High School Chemistry for relevent presentations.*
ICP 5.2 Use the periodic table to understand important patterns in properties of elements. Recognize that the pattern of properties of the elements correlates most closely with the configuration of the electrons in each element.	
ICP.5.3 Understand that the atomic number is unique to each element and is the number of protons in the nucleus of the element.	
ICP.5.4 Use the concept of the mole to relate number of moles and the mass of a sample of a pure substance of known chemical composition.	
ICP.5.5 Using conservation principles write and balance chemical equations.	
ICP.5.6 Identify key indicators of a chemical change and classify simple types of chemical reactions. Differentiate between covalent, ionic, hydrogen and Van der Waals bonding, and write formulas for and name compounds of each type.	
ICP.5.7 Explain that in exothermic chemical reactions chemical energy is converted into other forms such as thermal, electrical, light, and sound energy.	
Standard 6: Electrical Energy Propagation and Magnetism	
ICP.6.1 Explain that objects that carry a net charge will exert an electric force on other objects that may be attractive or repulsive.	Static Electricity
ICP.6.2 Explain that when charge is transferred from one object to another, the amount lost by one object equals the amount gained by the other, consistent with the principal of conservation of charge.	–
ICP.6.3 Using the example of electrolysis and its application in batteries, explain the relationship between chemical reactions and electrical energy.	–
ICP.6.4 Define and describe the relationships between voltage, current, resistance and power in open and closed electrical circuits.	Current, Voltage and Resistance Power
ICP.6.5 Describe the differences in current flow in parallel and in series circuits.	Parallel and Series Circuits
ICP.6.6 Explain that some objects, called magnets, exert magnetic forces with no direct contact.	Magnetism, Current and Force
ICP.6.7 Using the examples of motors and generators, explain that electrical energy can be transformed into mechanical energy and vice versa.	Motors
Standard 7: Nuclear Energy (fission/fusion)	

ICP.7.1 Demonstrate how historical models and experiments supported the development of our current understanding of the atom and its nucleus.	Structure of the Atom
ICP.7.2 Differentiate between protons, neutrons, and electrons and determine the number of these subatomic particles in each atom.	Structure of the Atom
ICP.7.3 Understand that the stability of nuclei depends on the numbers of neutrons and protons.	Structure of the Atom
ICP.7.4 Understand that fission results from large, less stable nuclei decomposing to form smaller, more stable nuclei.	Nuclear Fission
ICP.7.5 Understand that fusion results from two smaller nuclei combining to form one larger nucleus.	Nuclear Fusion
ICP 7.6 Understand that the energy radiated from the sun derives from the fusion process.	Nuclear Fusion
ICP.7.7 Describe the various forms of emission that are typical of radioactive decay.	Radioactivity Types of Radiation Structure of the Atom
ICP 7.8 Relate the fission process to the human development and use of the fission process in war (uncontrolled) and in peace (controlled).	Nuclear Fission
Standard 8: Society (Energy production, environment, economics)	
ICP.8.1 Describe how energy needs have changed throughout history and how energy needs are met in modern society.	Nuclear Fission Nuclear Fusion Fossil Fuels
ICP.8.2 Describe the benefits and risks of the development of non-renewable forms of energy such as coal, oil, natural gas and uranium fission sources.	Fossil Fuels
ICP.8.3 Describe the benefits and risks of the development of renewable forms of energy such as solar energy, wind-energy, geothermal energy, fusion energy and biofuels.	Nuclear Fusion
ICP.8.4 Describe how efficient use of renewable and non-renewable energy sources is essential to maintaining an acceptable environment.	–
ICP.8.5 Describe how the availability of energy resources is essential to the development of an economically viable society.	–
ICP.8.6 Contrast the dependence on and use of energy and other natural resources in the economies of industrial nations, of developing nations and of undeveloped nations.	–
ICP.8.7 Describe the energy needs of a modern urban city, and compare and contrast these needs with those of a modern rural community.	–

Physics, 2006 Standards	Boardworks High School Physics Presentation
The Properties of Matter	
P.1.1 Describe matter in terms of its fundamental constituents and be able to differentiate among those constituents.	Structure of the Atom
P.1.2 Measure or determine the physical quantities including mass, charge, pressure, volume, temperature, and density of an object or unknown sample.	–
P.1.3 Describe and apply the kinetic molecular theory to the states of matter.	Changing State Particles in Action
P.1.4 Employ correct units in describing common physical quantities.	–
The Relationships Between Motion and Force	
P.1.5 Use appropriate vector and scalar quantities to solve kinematics and dynamics problems in one and two dimensions.	Vectors and Scalars
P.1.6 Describe and measure motion in terms of position, time, and the derived quantities of velocity and acceleration.	Displacement, Velocity and Acceleration Acceleration Speed and Velocity
P.1.7 Use Newton's Laws (e.g., F = ma) together with the kinematic equations to predict the motion of an object.	Newton's First Law Newton's Second Law Newton's Third Law
P.1.8 Describe the nature of centripetal force and centripetal acceleration (including the formula a = v2/r), and use these ideas to predict the motion of an object.	Circular Motion
P.1.9 Use the conservation of energy and conservation of momentum laws to predict, both conceptually and quantitatively, the results of the interactions between objects.	Conservation of Energy Conservation of Momentum
P.1.10 Demonstrate an understanding of the inverse square nature of gravitational and electrostatic forces.	–
The Nature of Energy	
P.1.11 Recognize energy in its different manifestations, such as kinetic (KE = 1⁄2 mv^2), gravitational potential (PE = mgh), thermal, chemical, nuclear, electromagnetic, or mechanical.	Kinetic Energy Gravitational and Potential Energy Electromagnetic Waves Power Conduction and Convection Nuclear Fission Nuclear Fusion
P.1.12 Use the law of conservation of energy to predict the outcome(s) of an energy transformation.	Conservation of Energy Energy Transfers

P.1.13 Use the concepts of temperature, thermal energy, transfer of thermal energy, and the mechanical equivalent of heat to predict the results of an energy transfer.	Conduction and Convection Energy Transfers
P.1.14 Explain the relation between energy (E) and power (P). Explain the definition of the unit of power, the watt.	Electrical Power
Momentum and Energy	
P.1.15 Distinguish between the concepts of momentum (using the formula p = mv) and energy.	Momentum Changes in Momentum Conservation of Momentum
P.1.16 Describe circumstances under which each conservation law may be used.	Conservation of Momentum Conservation of Energy
The Nature of Electricity and Magnetism	
P.1.17 Describe the interaction between stationary charges using Coulomb's Law. Know that the force on a charged particle in an electrical field is qE, where E is the electric field at the position of the particle, and q is the charge of the particle.	–
P.1.18 Explain the concepts of electrical charge, electrical current, electrical potential, electric field, and magnetic field. Use the definitions of the coulomb, the ampere, the volt, the volt/meter, and the tesla.	Current and Potential Difference Current, Voltage and Resistance Electrical Power Magnetism, Current and Force Static Electricity Types of Current
P.1.19 Analyze simple arrangements of electrical components in series and parallel circuits. Know that any resistive element in a DC circuit dissipates energy, which heats the resistor. Calculate the power (rate of energy dissipation), using the formula Power = IV = I2R.	Series and Parallel Circuits Types of Current Electrical Power
P.1.20 Describe electric and magnetic forces in terms of the field concept and the relationship between moving charges and magnetic fields. Know that the magnitude of the force on a moving particle with charge q in a magnetic field is qvBsina, where v and B are the magnitudes of vectors v and B and a is the angle between v and B.	–
P.1.21 Explain the operation of electric generators and motors in terms of Ampere's law and Faraday's law.	Motors
The Behavior of Waves	

P.1.22 Describe waves in terms of their fundamental characteristics of velocity, wavelength, frequency or period, and amplitude. Know that radio waves, light, and X-rays are different wavelength bands in the spectrum of electromagnetic waves, whose speed in a vacuum is approximately 3 × 108 m/s (186,000 miles/second).	Waves Electromagnetic Waves X-rays Sound Transverse Waves Longitudinal Waves
P.1.23 Use the principle of superposition to describe the interference effects arising from propagation of several waves through the same medium.	Superposition and Interference
P.1.24 Use the concepts of reflection, refraction, polarization, transmission, and absorption to predict the motion of waves moving through space and matter.	Reflection Refraction Refractive Index Polarization Radiation Types of Radiation
P.1.25 Use the concepts of wave motion to predict conceptually and quantitatively the various properties of a simple optical system.	–
P.1.26 Identify electromagnetic radiation as a wave phenomenon after observing refraction, reflection, and polarization of such radiation.	–
The Laws of Thermodynamics	
P.1.27 Understand that the temperature of an object is proportional to the average kinetic energy of the molecules in it and that the thermal energy is the sum of all the microscopic potential and kinetic energies.	–
P.1.28 Describe the Laws of Thermodynamics, understanding that energy is conserved, heat does not move from a cooler object to a hotter one without the application of external energy, and that there is a lowest temperature, called absolute zero. Use these laws in calculations of the behavior of simple systems.	–
The Nature of Atomic and Subatomic Physics	
P.1.29 Describe the nuclear model of the atom in terms of mass and spatial relationships of the electrons, protons, and neutrons.	Structure of the Atom
P.1.30 Explain that the nucleus, although it contains nearly all of the mass of the atom, occupies less than the proportion of the solar system occupied by the sun. Explain that the mass of a neutron or a proton is about 2,000 times greater than the mass of an electron.	Structure of the Atom
P.1.31 Explain the role of the strong nuclear force in binding matter together.	Structure of the Atom
P.1.32 Using the concept of binding energy per nucleon, explain why a massive nucleus that fissions into two medium-mass nuclei emits energy in the process.	Nuclear Fission

P.1.33 Using the same concept, explain why two light nuclei that fuse into a more massive nucleus emit energy in the process.	Nuclear Fusion
P.1.34 Understand and explain the properties of radioactive materials, including half-life, types of emissions, and the relative penetrative powers of each type.	Radioactive Dating Radioactivity Types of Radiation Uses of Radiation
P.1.35 Describe sources and uses of radioactivity and nuclear energy.	Radioactive Dating Radioactivity Types of Radiation Uses of Radiation Radiation Nuclear Fission Nuclear Fusion Gamma Rays

Integrated Chemistry - Physics, 2006	Boardworks High School Physics Presentation
Structure and Properties of Matter	
CP.1.1 Understand and explain that atoms have a positive nucleus (consisting of relatively massive positive protons and neutral neutrons) surrounded by negative electrons of much smaller mass, some of which may be lost, gained, or shared when interacting with other atoms.	Structure of the Atom
CP.1.2 Realize that and explain how a neutral atom's atomic number and mass number can be used to determine the number of protons, neutrons, and electrons that make up an atom.	Structure of the Atom
CP.1.3 Understand, and give examples to show, that isotopes of the same element have the same numbers of protons and electrons but differ in the numbers of neutrons.	Structure of the Atom
CP.1.4 Know and explain that physical properties can be used to differentiate among pure substances, solutions, and heterogeneous mixtures.	–
Changes in Matter	
CP.1.5 Distinguish among chemical and physical changes in matter by identifying characteristics of these changes.	
CP.1.6 Understand and explain how an atom can acquire an unbalanced electrical charge by gaining or losing electrons.	

CP.1.7 Identify the substances gaining and losing electrons in simple oxidation-reduction reactions.	*See Boardworks High School Chemistry for relevent presentations*
CP.1.8 Know and explain that the nucleus of a radioactive isotope is unstable and may spontaneously decay, emitting particles and/or electromagnetic radiation.	
CP.1.9 Show how the predictability of the nuclei decay rate allows radioactivity to be used for estimating the age of materials that contain radioactive substances.	
CP.1.10 Understand that the Periodic Table is a listing of elements arranged by increasing atomic number, and use it to predict whether a selected atom would gain, lose, or share electrons as it interacts with other selected atoms.	
CP.1.11 Understand and give examples to show that an enormous variety of biological, chemical, and physical phenomena can be explained by changes in the arrangement and motion of atoms and molecules.	
CP.1.12 Realize and explain that because mass is conserved in chemical reactions, balanced chemical equations must be used to show that atoms are conserved.	
CP.1.13 Explain that the rate of reactions among atoms and molecules depends on how often they encounter one another, which is in turn affected by the concentrations, pressures, and temperatures of the reacting materials.	
CP.1.14 Understand and explain that catalysts are highly effective in encouraging the interaction of other atoms and molecules.	
Energy Transformations	
CP.1.15 Understand and explain that whenever the amount of energy in one place or form diminishes, the amount in other places or forms increases by the same amount.	Conservation of Energy Energy Transfers
CP.1.16 Explain that heat energy in a material consists of the disordered motions of its atoms or molecules.	Conduction and Convection Particles in Action
CP.1.17 Know and explain that transformations of energy usually transform some energy into the form of heat, which dissipates by radiation or conduction into cooler surroundings.	Energy Transfers
CP.1.18 Recognize and describe the heat transfer associated with a chemical reaction or a phase change as either exothermic or endothermic, and understand the significance of the distinction.	–
CP.1.19 Understand and explain that the energy released whenever heavy nuclei split or light nuclei combine is roughly a million times greater than the energy absorbed or released in a chemical reaction. ($E=mc^2$)	Nuclear Fission Nuclear Fusion
CP.1.20 Realize and explain that the energy in a system is the sum of both potential energy and kinetic energy. Systems could take different forms. One example would be that of an airplane travelling at Mach 3.	–

Motion	
CP.1.21 Understand and explain that the change in motion of an object (acceleration) is proportional to the net force applied to the object and inversely proportional to the object's mass. (a =F/m)	Newton's Second Law
CP.1.22 Recognize and explain that whenever one object exerts a force on another, an equal and opposite force is exerted back on it by the other object.	Newton's Third Law
CP.1.23 Understand and explain that the motion of an object is described by its position, velocity, and acceleration.	Acceleration Displacement, Velocity and Acceleration
CP.1.24 Recognize and explain that waves are described by their velocity, wavelength, frequency or period, and amplitude.	Longitudinal Waves Transverse Waves Waves
CP.1.25 Understand and explain that waves can superpose on one another, bend around corners, reflect off surfaces, be absorbed by materials they enter, and change direction when entering a new material.	Superposition and Interference Reflection Refraction Interference Diffraction Longitudinal Waves Electromagnetic Waves Sound Transverse Waves Polarization
CP.1.26 Realize and explain that all motion is relative to whatever frame of reference is chosen, for there is no absolute motionless frame from which to judge all motion.	–
Forces of Nature	
CP.1.27 Recognize and describe that gravitational force is an attraction between masses and that the strength of the force is proportional to the masses and decreases rapidly as the square of the distance between the masses increases.	Gravity
CP.1.28 Realize and explain that electromagnetic forces acting within and between atoms are vastly stronger than the gravitational forces acting between atoms.	–
CP.1.29 Understand and explain that at the atomic level, electric forces between oppositely charged electrons and protons hold atoms and molecules together and thus, are involved in all chemical reactions.	Structure of the Atom
CP.1.30 Understand and explain that in materials, there are usually equal proportions of positive and negative charges, making the materials as a whole electrically neutral. However, also know that a very small excess or deficit of negative charges will produce noticeable electric forces.	–

CP.1.31 Realize and explain that moving electric charges produce magnetic forces, and moving magnets produce electric forces.	Magnetism, Current and Force