

**Texas High School Chemistry, Beginning with School Year 2010-2011
Science Concepts Mapping**

© Boardworks 2009

PHYSICS	Boardworks High School Physics Presentation
(4) Science concepts. The student knows and applies the laws governing motion in a variety of situations. The student is expected to:	
A) generate and interpret graphs and charts describing different types of motion, including the use of real-time technology such as motion detectors or photogates;	Displacement, Velocity and Acceleration
(B) describe and analyze motion in one dimension using equations with the concepts of distance, displacement, speed, average velocity, instantaneous velocity, and acceleration;	Acceleration, Displacement, Velocity and Acceleration
(C) analyze and describe accelerated motion in two dimensions using equations, including projectile and circular examples;	Circular Motion, Displacement, Velocity and Acceleration, Projectiles
(D) calculate the effect of forces on objects, including the law of inertia, the relationship between force and acceleration, and the nature of force pairs between objects;	Friction Newton's First Law Newton's Second Law Newton's Third Law
(E) develop and interpret free-body force diagrams; and	Free-Body Diagrams
(F) <i>identify and describe motion relative to different frames of reference.</i>	–
(5) Science concepts. The student knows the nature of forces in the physical world. The student is expected to:	
(A) <i>research and describe the historical development of the concepts of gravitational, electromagnetic, weak nuclear, and strong nuclear forces;</i>	–
(B) <i>describe and calculate how the magnitude of the gravitational force between two objects depends on their masses and the distance between their centers;</i>	–
(C) <i>describe and calculate how the magnitude of the electrical force between two objects depends on their charges and the distance between them;</i>	–
(D) <i>identify examples of electric and magnetic forces in everyday life;</i>	–
(E) characterize materials as conductors or insulators based on their electrical properties;	Conductors and Insulators
(F) design, construct, and calculate in terms of current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel combinations;	Current, Voltage and Resistance Electrical Power Series and Parallel Circuits
(G) investigate and describe the relationship between electric and magnetic fields in applications such as generators, motors, and transformers; and	Magnetism, Current and Force Motors
(H) <i>describe evidence for and effects of the strong and weak nuclear forces in nature.</i>	–
(6) Science concepts. The student knows that changes occur within a physical system and applies the laws of conservation of energy and momentum. The student is expected to:	

(A) investigate and calculate quantities using the work-energy theorem in various situations;	Work
(B) <i>investigate examples of kinetic and potential energy and their transformations;</i>	–
(C) calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system;	Gravitational and Potential Energy
(D) demonstrate and apply the laws of conservation of energy and conservation of momentum in one dimension;	Conservation of Energy Conservation of Momentum
(E) <i>describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms;</i>	–
(F) contrast and give examples of different processes of thermal energy transfer, including conduction, convection, and radiation; and	Conduction and Convection Radiation
(G) <i>analyze and explain everyday examples that illustrate the laws of thermodynamics, including the law of conservation of energy and the law of entropy.</i>	–
(7) Science concepts. The student knows the characteristics and behavior of waves. The student is expected to:	
(A) <i>examine and describe oscillatory motion and wave propagation in various types of media;</i>	–
(B) investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength, and calculate using the relationship between wavespeed, frequency, and wavelength;	Waves
(C) compare characteristics and behaviors of transverse waves, including electromagnetic waves and the electromagnetic spectrum, and characteristics and behaviors of longitudinal waves, including sound waves;	Electromagnetic Waves Longitudinal Waves Sound Waves
(D) investigate behaviors of waves, including reflection, refraction, diffraction, interference, resonance, and the Doppler effect;	Doppler Effect Interference Reflection, Refraction
(E) describe and predict image formation as a consequence of reflection from a plane mirror and refraction through a thin convex lens; and	Reflection Refraction
(F) describe the role of wave characteristics and behaviors in medical and industrial applications.	Gamma Rays X-Rays
(8) Science concepts. The student knows simple examples of atomic, nuclear, and quantum phenomena. The student is expected to:	
(A) describe the photoelectric effect and the dual nature of light;	The Photoelectric Effect
(B) <i>compare and explain the emission spectra produced by various atoms;</i>	–

(C) describe the significance of mass-energy equivalence and apply it in explanations of phenomena such as nuclear stability, fission, and fusion; and	Structure of the Atom
(D) give examples of applications of atomic and nuclear phenomena such as radiation therapy, diagnostic imaging, and nuclear power and examples of applications of quantum phenomena such as digital cameras.	Gamma Rays Nuclear Fission X-Rays