

**Exam Title: 2003310 Physical Science**  
**Courses Assessed by this Exam: Physical Science/ Honors (edited Oct2018)**

**Key Vocabulary:** hypothesis, experiment, friction, independent variable, dependent variable, ideal gas law, scientific claim, observations, experimentation, Atomic theory, atoms, cathode, electric fields, alpha particles, energy shells, electrons, protons, neutrons, Dalton's experiment, Thompson, Rutherford, Bohr, Chadwick, Democritus, physics, scientific laws, Newton's Laws of Motion, mass, acceleration, conservation of momentum, inertia, unbalanced forces, balanced forces, speed, chemical composition, intramolecular forces, connectivity, chemical change, pH, density, boiling point, physical changes, isotope, amu, atomic mass, atomic number, reactivity, combustion, single-replacement, double-replacement, synthesis, potential energy, kinetic energy, deceleration, intermolecular bond strength, endothermic, exothermic, electromagnetic force, circuits, insulators, conductors, semiconductors, current, voltage, resistance, power, magnitude, gravitational force, evaporates, volume, catalyst, reactants, products, surface area, redox, reaction rate,

**Student Tasks:**

- Be able to identify the various components of a scientific experiment/scientific method. (i.e. observations, hypothesis, dependent variable, independent variable, constants, duplicating experiments, and drawing a conclusion)
- Be able to identify a valid and testable hypothesis
- Be able to make an inference given a scientific scenario.
- Understand the limitations to experimentation
- Know the various experiments throughout time that led to the development of the current atomic model.
- Be able to differentiate between a scientific law and a scientific theory.
- Know Newton's Laws of Motion and the relationship between mass and acceleration
- Understand the difference between a physical change and a chemical change.
- Be able to give examples of a physical change and a chemical change.
- Be able to give examples of physical properties and chemical properties.
- Understand the relationship between solids, liquids, gases, and plasma states.
- Understand the relationship between gas pressure and volume.
- Know the difference between atomic mass and atomic number
- Know what an isotope is
- Understand how orbitals relate to various energy levels of different atoms.
- Be able to explain how elements are classified in the periodic table of elements.
- Be able to decipher a chemical formula as it relates to the number of atoms of each element.
- Be able to differentiate between a single-replacement reaction and a double-replacement reaction.

- Be able to identify specific energy changes (i.e. kinetic energy to potential energy; chemical energy into heat energy; chemical energy into light energy; mechanical energy to thermal energy)
- Know how the formula for power relates to work and time.
- Identify how temperature relates to kinetic energy.
- Know what activation energy is and be able to identify it on a reaction chart.
- Know what an electromagnetic force is and be able to provide an example.
- Understand the components of an electrical circuit.
- Be able to differentiate between a conductor, semiconductor, and insulator. Be able to provide examples of each.
- Understand the relationship between current, voltage, and resistance.
- Know what gravity is and how it relates to acceleration, the distance between two objects, and mass of the two objects.
- Understand free body diagrams
- Be able to decipher a phase change diagram.
- Be able to decipher a Potential Energy diagram and identify its various components.
- Understand the various factors that can affect the rate of a chemical reaction
- Be able to identify which scientific claims are falsifiable
- Be able to identify which questions can be answered through scientific investigations and which cannot.
- Be able to predict in what ratios elements will form compounds based on their valence electrons.
- Be able to interpret a graph of kinetic energy distribution of molecules of a pure gas.
- Identify a graph showing an exothermic reaction and a graph showing endothermic reaction.
- Be able to explain how conductors, semiconductors, and insulators function.
- Be able to determine an objects acceleration during freefall.
- Understand the differences between accuracy and precision.
- Be able to interpret a distance vs. time graph.
- Identify the relationships between current, voltage, resistance, and circuits.
- Understand the relationship between I, V, R in formula  $I=V/R$
- Understand gravitational forces.
- Describe phase transitions of water in terms of kinetic molecular theory.
- Explain factors that affect the rate of a chemical reaction (concentration, temperature, presence of a catalyst)
- Describe how the gravitational force between two objects depends on the relationship between mass and distance.

