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## Science, Grade 8, 2005

1.) Identify steps within the scientific process.

- Applying process skills to interpret data from graphs, tables, and charts
- Identifying controls and variables in a scientific investigation
- Measuring dimension, volume, and mass using Système International d'Unités (SI units)
- Identifying examples of hypotheses
- Identifying appropriate laboratory glassware, balances, time measuring equipment, and optical instruments used to conduct an investigation

2.) Describe the structure of atoms, including the location of protons, neutrons, and electrons.

- Identifying the charge of each subatomic particle
- Identifying Democritus and Dalton as contributors to the atomic theory

3.) Determine the number of protons, neutrons, and electrons, and the mass of an element using the periodic table.

- Locating metals, nonmetals, metalloids, and noble gases on the periodic table
- Using data about the number of electrons in the outer shell of an atom to determine its reactivity

4.) State the law of conservation of matter.

- Balancing chemical equations by adjusting coefficients

5.) Differentiate between ionic and covalent bonds.

- Illustrating the transfer or sharing of electrons using electron dot diagrams

6.) Define solution in terms of solute and solvent.

- Defining diffusion and osmosis
- Defining isotonic, hypertonic, and hypotonic solutions
- Describing acids and bases based on their hydrogen ion concentration

7.) Describe states of matter based on kinetic energy of particles in matter.

- Explaining effects of temperature, concentration, surface area, and catalysts on the rate of chemical reactions

8.) Identify Newton's three laws of motion.

- Defining terminology such as action and reaction forces, inertia, acceleration, momentum, and friction
- Interpreting distance-time graphs

9.) Describe how mechanical advantages of simple machines reduce the amount of force needed for work.

- Describing the effect of force on pressure in fluids

Example: increasing force on fluid leading to increase of pressure within a hydraulic cylinder

10.) Differentiate between potential and kinetic energy.

Examples:

- potential-rock resting at the top of a hill,
- kinetic-rock rolling down a hill

11.) Explain the law of conservation of energy and its relationship to energy transformation, including

chemical to electrical, chemical to heat, electrical to light, electrical to mechanical, and electrical to sound.

12.) Classify waves as mechanical or electromagnetic.

Examples:

- mechanical-earthquake waves;
- electromagnetic-ultraviolet light waves, visible light waves
- Describing how earthquake waves, sound waves, water waves, and electromagnetic waves can be destructive or beneficial due to the transfer of energy
- Describing longitudinal and transverse waves
- Describing how waves travel through different media
- Relating wavelength, frequency, and amplitude to energy
- Describing the electromagnetic spectrum in terms of frequencies

Example: electromagnetic spectrum in increasing frequencies-microwaves, infrared light, visible light, ultraviolet light, X rays

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