

Physical Science

Adopted 2016

Obtain, evaluate, and communicate information from the Periodic Table to explain the relative properties of elements based on patterns of atomic structure. **SPS1**

- a. Develop and use models to compare and contrast the structure of atoms, ions and isotopes. **SPS1.A**

- b. Analyze and interpret data to determine trends of the following:
 - Number of valence electrons
 - Types of ions formed by main group elements
 - Location and properties of metals, nonmetals, and metalloids
 - Phases at room temperature**SPS1.B**

- c. Use the Periodic Table as a model to predict the above properties of main group elements. **SPS1.C**

Obtain, evaluate, and communicate information to explain how atoms bond to form stable compounds. **SPS2**

- a. Analyze and interpret data to predict properties of ionic and covalent compounds. **SPS2.A**

- b. Develop and use models to predict formulas for stable, binary ionic compounds based on balance of charges. **SPS2.B**

- c. Use the International Union of Pure and Applied Chemistry (IUPAC) nomenclature for translating between chemical names and chemical formulas. **SPS2.C**

Obtain, evaluate, and communicate information to support the Law of Conservation of Matter. **SPS3**

- a. Plan and carry out investigations to generate evidence supporting the claim that mass is conserved during a chemical reaction. **SPS3.A**

- b. Develop and use a model of a chemical equation to illustrate how the total number of atoms is conserved during a chemical reaction. **SPS3.B**

Obtain, evaluate, and communicate information to explain the changes in nuclear structure as a result of fission, fusion and radioactive decay. **SPS4**

- a. Develop a model that illustrates how the nucleus changes as a result of fission and fusion. **SPS4.A**

- b. Use mathematics and computational thinking to explain the process of half-life as it relates to radioactive decay. **SPS4.B**

- c. Construct arguments based on evidence about the applications, benefits, and problems of nuclear energy as an alternative energy source. **SPS4.C**

Obtain, evaluate, and communicate information to compare and contrast the phases

- a. Ask questions to compare and contrast models depicting the particle arrangement and motion in solids, liquids, gases, and plasmas. **SPS5.A**

of matter as they relate to atomic and molecular motion. [SPS5](#)

b. Plan and carry out investigations to identify the relationships among temperature, pressure, volume, and density of gases in closed systems. [SPS5.B](#)

Obtain, evaluate, and communicate information to explain the properties of solutions. [SPS6](#)

a. Develop and use models to explain the properties (solute/solvent, conductivity, and concentration) of solutions. [SPS6.A](#)

b. Plan and carry out investigations to determine how temperature, surface area, and agitation affect the rate solutes dissolve in a specific solvent. [SPS6.B](#)

c. Analyze and interpret data from a solubility curve to determine the effect of temperature on solubility. [SPS6.C](#)

d. Obtain and communicate information to explain the relationship between the structure and properties (e.g., pH, and color change in the presence of an indicator) of acids and bases. [SPS6.D](#)

e. Plan and carry out investigations to detect patterns in order to classify common household substances as acidic, basic, or neutral. [SPS6.E](#)

Obtain, evaluate, and communicate information to explain transformations and flow of energy within a system. [SPS7](#)

a. Construct explanations for energy transformations within a system. [SPS7.A](#)

b. Plan and carry out investigations to describe how molecular motion relates to thermal energy changes in terms of conduction, convection, and radiation. [SPS7.B](#)

c. Analyze and interpret specific heat data to justify the selection of a material for a practical application (e.g., insulators and cooking vessels). [SPS7.C](#)

d. Analyze and interpret data to explain the flow of energy during phase changes using heating/cooling curves. [SPS7.D](#)

Obtain, evaluate, and communicate information to explain the relationships among force, mass, and motion. [SPS8](#)

a. Plan and carry out an investigation and analyze the motion of an object using mathematical and graphical models. [SPS8.A](#)

b. Construct an explanation based on experimental evidence to support the claims presented in Newton's three laws of motion. [SPS8.B](#)

c. Analyze and interpret data to identify the relationship between mass and gravitational force for falling objects. [SPS8.C](#)

d. Use mathematics and computational thinking to identify the relationships between work, mechanical advantage, and simple machines. [SPS8.D](#)

Obtain, evaluate, and communicate information to explain the properties of waves. [SPS9](#)

a. Analyze and interpret data to identify the relationships among wavelength, frequency, and energy in electromagnetic waves and amplitude and energy in mechanical waves. [SPS9.A](#)

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- b. Ask questions to compare and contrast the characteristics of electromagnetic and mechanical waves. SPS9.B**

 - c. Develop models based on experimental evidence that illustrate the phenomena of reflection, refraction, interference, and diffraction. SPS9.C**

 - d. Analyze and interpret data to explain how different media affect the speed of sound and light waves. SPS9.D**

 - e. Develop and use models to explain the changes in sound waves associated with the Doppler Effect. SPS9.E**
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Obtain, evaluate, and communicate information to explain the properties of and relationships between electricity and magnetism. SPS10

- a. Use mathematical and computational thinking to support a claim regarding relationships among voltage, current, and resistance. SPS10.A**

- b. Develop and use models to illustrate and explain the conventional flow (direct and alternating) of current and the flow of electrons in simple series and parallel circuits. SPS10.B**

- c. Plan and carry out investigations to determine the relationship between magnetism and the movement of electrical charge. SPS10.C**