

# Physical Science

The student will demonstrate an understanding of scientific and engineering practices by **PS.1**

**a asking questions and defining problems** **PS.1A**

- i. ask questions that require empirical evidence to answer **PS.1A.I**
  - ii. develop hypotheses indicating relationships between independent and dependent variables **PS.1A.II**
  - iii. offer simple solutions to design problems **PS.1A.III**
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**b planning and carrying out investigations** **PS.1B**

- ii. evaluate the accuracy of various methods for collecting data **PS.1B.II**
  - i. independently and collaboratively plan and conduct observational and experimental investigations; identify variables, constants, and controls where appropriate and include the safe use of chemicals and equipment **PS.1B.I**
  - iii. take metric measurements using appropriate tools and technologies **PS.1B.III**
  - iv. apply scientific ideas or principles to design, construct, and/or test a design of an object, tool, process or system **PS.1B.IV**
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**c interpreting, analyzing, and evaluating data** **PS.1C**

- i. construct and interpret data tables showing independent and dependent variables, repeated trials, and means **PS.1C.I**
  - ii. construct, analyze, and interpret graphical displays of data and consider limitations of data analysis **PS.1C.II**
  - iii. apply mathematical concepts and processes to scientific questions **PS.1C.III**
  - iv. use data to evaluate and refine design solutions to best meet criteria **PS.1C.IV**
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**d constructing and critiquing conclusions and explanations** **PS.1D**

- i. construct scientific explanations based on valid and reliable evidence obtained from sources (including the students' own investigations) **PS.1D.I**
- ii. construct arguments supported by empirical evidence and scientific reasoning **PS.1D.II**
- iii. generate and compare multiple solutions to problems based on how well they meet the criteria and constraints **PS.1D.III**
- iv. differentiate between a scientific hypothesis, theory, and law **PS.1D.IV**

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**e developing and using models** PS.1E

- i. construct, develop, and use models and simulations to illustrate and/or explain observable and unobservable phenomena PS.1E.I
  - ii. evaluate limitations of models PS.1E.II
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**f obtaining, evaluating, and communicating information** PS.1F

- i. read scientific texts, including those adapted for classroom use, to determine the central idea and/or obtain scientific and/or technical information PS.1F.I
  - ii. gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication PS.1F.II
  - iii. construct, use, and/or present an oral and written argument supported by empirical evidence and scientific reasoning PS.1F.III
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The student will investigate and understand that matter is composed of atoms. PS.2

**a our understanding of atoms has developed over time;** PS.2A

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**b the periodic table can be used to predict the chemical and physical properties of matter;** PS.2B

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**c the kinetic molecular theory is used to predict and explain matter interactions.** PS.2C

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The student will investigate and understand that matter has properties and is conserved in chemical and physical processes. PS.3

**a pure substances can be identified based on their chemical and physical properties;** PS.3A

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**b pure substances can undergo physical and chemical changes that may result in a change of properties;** PS.3B

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**c compounds form through ionic and covalent bonding;** PS.3C

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**d balanced chemical equations model the conservation of matter.** PS.3D

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The student will investigate and understand that the periodic table is a model used to organize elements based on their atomic structure. PS.4

**a symbols, atomic numbers, atomic mass, chemical groups (families), and periods are identified on the periodic table;** PS.4A

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**b elements are classified as metals, metalloids, and nonmetals.** PS.4B

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The student will investigate and understand that energy is conserved PS.5

**a energy can be stored in different ways;** PS.5A

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**b energy is transferred and transformed;** PS.5B

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**c energy can be transformed to meet societal needs.** PS.5C

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The student will investigate and understand that waves are important in the movement of energy PS.6

- a energy may be transferred in the form of longitudinal and transverse waves; PS.6A
- b mechanical waves need a medium to transfer energy; PS.6B
- c waves can interact PS.6C
- d energy associated with waves has many applications. PS.6D

The student will investigate and understand that electromagnetic radiation has characteristics. PS.7

- a electromagnetic radiation, including visible light, has wave characteristics and behavior; PS.7A
- b regions of the electromagnetic spectrum have specific characteristics and uses. PS.7B

The student will investigate and understand that work, force, and motion are related PS.8

- a motion can be described using position and time; PS.8A
- b motion is described by Newton's laws. PS.8B

The student will investigate and understand that there are basic principles of electricity and magnetism. PS.9

- a an imbalance of charge generates static electricity; PS.9A
- b materials have different conductive properties; PS.9B
- c electric circuits transfer energy; PS.9C
- d magnetic fields cause the magnetic effects of certain materials; PS.9D
- e electric current and magnetic fields are related; PS.9E
- f many technologies use electricity and magnetism. PS.9F