

## Course/Grade Level: Seventh Grade Physical Science Curriculum

### S.7.1 Students will demonstrate a working knowledge of science using inquiry, history, and nature of science.

Students will...

- S.7.1.1 ▲ identify questions that can be answered through scientific investigations. (5-7.1.1.1)

Instructional Example: generate testable questions to investigate

- S.7.1.2 ▲ design and conduct scientific investigations safely using appropriate tools, mathematics, technology, and techniques to gather, analyze, and interpret data. (5-7.1.1.2)

Instructional Example: components may include hypothesis, independent and dependent variables, constants, materials, procedures, collection and analysis of data and conclusions.

- S.7.1.3 ▲ identify the relationship between evidence and logical conclusions. (5-7.1.1.3)

Instructional Example: check data to determine: Was the hypothesis supported? Did this design work? How could this experiment be improved? What other questions could be investigated?

- S.7.1.4 ▲ communicate scientific procedures, results, and explanations. (5-7.1.1.4)

Instructional Example: present a report of their investigations

- S.7.1.5 ▲ evaluate the work of others to determine evidence, which scientifically supports or contradicts the results, identify faulty reasoning or conclusions that go beyond evidence and/or are not supported by data. (5-7.1.3.2)

Instructional Example: explain how a reasonable conclusion is supported and analyze evidence and data which supports or contradicts various theories.

- S.7.1.6 ▲ recognize that new knowledge leads to new questions and new discoveries, replicate historic experiments to understand principles of science, and relate contributions of men and women to the fields of science. (5-7.7.2.1)

Instructional Example: discuss discoveries that replaced previously held knowledge such as safety of saccharine or Pluto's status as a planet. Research the contributions of men and women in science: i.e. Galileo, Newton, Pasteur, Wegner, Mendel, Darwin, Einstein, and the Curies.

## **S.7.2 Students will acknowledge that the universe is composed of matter and they will evaluate the interactions of atoms with matter.**

Students will...

- S.7.2.1 ▲ compare and classify the states of matter: solids, liquids, gases, and plasmas. (5-7.2.1.1)  
Instructional Example: demonstrate that the molecules of a solid have definite volume and shape, the molecules of a liquid have a definite volume but an indefinite shape, the molecules of a gas have an indefinite volume and indefinite shape.
- S.7.2.2 compare and contrast the classes of matter, elements, compounds, and mixtures. (5-7.2.1.2)  
Instructional Example: identify by property various kitchen powders. Given a chemical formula, use a periodic table to identify the number and type of elements in a compound.
- S.7.2.3 identify and communicate properties of matter including but not limited to, boiling point, solubility, and density. (5-7.2.1.3)  
Instructional Example: measure and graph the boiling point temperatures for several different liquids; observe substances that dissolve (sugar) and substances that do not dissolve (sand)
- S.7.2.4 ▲ analyze the relationship of atoms to elements and elements to compounds. (5-7.2.2.1)  
Instructional Example: draw a diagram to show how different compounds are composed of elements in various combinations.
- S.7.2.5 ▲ measure and graph the effects of temperature on matter. (5-7.2.2.2)  
Instructional Example: change water from solid to liquid to gas using heat. Measure and graph temperature changes. Observe changes in volume occupied.

## **S.7.3 Students will analyze how forces affect the motion of matter.**

Students will...

- S.7.3.1 identify the forces that act on an object (e.g., gravity and friction). (5-7.2.3.1)
- S.7.3.2 ▲ describe, measure, and represent data on a graph showing the motion of an object (position, direction of motion, speed). (5-7.2.3.2)  
Instructional Example: trace the force, direction, and speed of an object from a fixed position to a determined location.
- S.7.3.3 ▲ recognize and describe examples of Newton's Laws of Motion. (5-7.2.3.3)  
Instructional Example: place a small object on a rolling toy vehicle, stop the vehicle abruptly, and observe the motion of the small object. Research safety equipment, such as seat belts and safety helmets, and the role they play related to inertia.

## **S.7.4 Students will relate how machines convert energy in conjunction with work.**

Students will...

- S.7.4.1 ▲ investigate and explain how simple machines multiply force at the expense of distance. (5-7.2.3.4)  
Instructional Example: investigate the force that can be moved as the number of pulley's in a system is increased. Investigate how bicycle gears work.
- S.7.4.2 compare and contrast potential and kinetic energy. (5-7.2.4.1)  
Instructional Example: use a pendulum to compare kinetic energy (speed) with potential energy (height)
- S.7.4.3 ▲ comprehend that when work is done energy transforms from one form to another, including mechanical, heat, light, sound, electrical, chemical, and nuclear energy, yet is conserved. (5-7.2.4.2)  
Instructional Example: sequence the transmission of energy through various real-life systems.

## **S.7.5 Students will determine how light and heat interacts with matter.**

Students will...

- S.7.5.1 ▲ observe and communicate how light (electromagnetic) energy interacts with matter: transmitted, reflected, refracted, and absorbed. (5-7.2.4.3)  
Instructional Example: classify classroom objects as to how they interact with light: a window transmits; black paper absorbs; a pencil appears to bend when placed in water demonstrating refraction; a mirror reflects.
- S.7.5.2 ▲ examine how heat energy can be transferred from hot to cold by radiation, convection, and conduction. (5-7.2.4.4)  
Instructional Example: add colored warm water to cool water, observe convection, measure and graph temperature over time.

## **S.7.6 Students will determine how environmental factors affect human health.**

Students will...

- S.7.6.1 ▲ identify individual nutrition, exercise, and rest needs based on science and use a scientific approach to thinking critically about personal health, lifestyle choices, risks, and benefits. (5-7.6.1.1)  
Instructional Example: evaluate the risks and benefits of foods, medicines, and personal products; compare the nutritional and toxic properties of foods.
- S.7.6.2 ▲ investigate the effects of human activities on the environment and analyze decisions based on the knowledge of benefits and risks. (5-7.6.2.1)  
Instructional Example: evaluate the benefits of burning fossil fuels to meet energy needs against the risks of increased air pollution, etc.