

Science Curriculum - Grade 7

GRADE SEVEN ESSENTIAL SKILLS

Content Skills - Students will demonstrate an understanding of cellular structures and functions. Students will demonstrate an understanding of the laws governing transfer of energy and change in matter.

- **Process Skills/Scientific Method** - Children will use the scientific method in our inquiry-based activities in all grade levels and content areas in the science curriculum
- **Scientific Technology & Tools** - Students will use appropriate tools, technology, and techniques to gather, analyze, interpret and share data. (Thermometers, graduated cylinders, rulers (inch & cm), magnifying glasses, simple microscopes, balances, computers and probes, and safety goggles)
- **Science Safety** - Students will follow safety instructions, directions, and use appropriate safety equipment

LIFE SCIENCE CONTENT

Cellular Biology

- Students will identify and diagram cellular structure in a variety of living organisms
- Students will present orally or in written form all functions of cell parts
- Students will observe, identify and describe, microscopic life forms
- Students will relate photosynthesis to energy production and storage in plants

• **Note:** Greater emphasis on laboratory reporting, research, and lab activities in both seventh and eighth grade science content areas.

PHYSICAL SCIENCE CONTENT

Physics - Quantities and Qualities of Motion

- Students will observe and describe objects in motion, including linear, free fall, projectile, circular, and vibrational motion
- Students will explain the 4 states and changes of states of matter, including plasma
- Students will demonstrate through modeling and analogy of Newton's Three Laws of Motion; including momentum
- Students will describe momentum and conduct an experiment to illustrate conservation and transfer of momentum
- Students will explain the causes and controls of motion: force and work
- Students will identify/explain the forms and states of energy (heat, electrical, light, mechanical, and nuclear) transformation of energy, and conservation of energy
- Students will show by examples how types of energy are used for specific purposes
- Students will build or design a device to demonstrate energy transfer and apply the knowledge gained to how energy transfer impacts on the operation of devices found in the home, e.g. home heating systems, refrigerators
- Students will describe or sketch how energy is released when the nuclei of some atoms undergo fission or fusion
- Students will explain quantitatively exchanges of energy within a system, e.g. hot metal in cold water
- Students will explore and identify sources of heat including chemical, mechanical, and absorption of radiation; identify the effect of heat on common substances

- Students will demonstrate an understanding of the difference between heat and temperature

PHYSICAL SCIENCE CONTENT

Physics – Quantities and Qualities of Motion - Continued

- Students will compare and contrast electric charge and electric current flow
- Students will experiment to determine specific properties of substances that are useful in identification of the substance such as density, strength, tension, and melting point
- Students will identify the electronic nature of all material; electric forces between protons and electrons that hold atoms together (cohesive force that holds an atom together, the bonds between different atoms when compounds form)
- Using magnets, students will investigate and demonstrate magnetic forces
- Students will demonstrate the relationship between electrical and magnetic forces
- Students will construct a series, parallel, and compound circuit, including a simple electrical motor
- Students will measure volts, amps, and ohms as electrical properties; will be introduced to Ohm's Law
- Students will use a prism to separate white light into the visible spectrum and will explain in their own words the principles of refraction
- Students will use a mirror to explain in their own words the principles of reflection
- Students will use opaque objects to explain in their own words the principles of absorption; contrast with transparent and translucent materials
- Students will explain in their own words, with or without visuals, that light travels in a straight line in the form of waves or particles
- Using a variety of objects, students will demonstrate that when light hits an object it can be reflected, absorbed, or it passes through the object
- Students will distinguish among amplitude, wavelength, frequency and velocity of longitudinal and transverse waves (vibrational motion)
- Students will demonstrate an understanding of the electromagnetic spectrum