



STAFFORD COUNTY PUBLIC SCHOOLS

Curriculum Overview Eighth Grade Physical Science

Course Description:

Physical Science stresses an in-depth understanding of the nature and structure of matter and the characteristics of energy. Research methods and skills are emphasized as students focus on understanding the nature and process of science. Students use appropriate tools for gathering data in classroom experimentations and share their work in written reports and other presentations. Major areas of study include: basic properties of matter and atomic structure; understanding and using the periodic table; physical and chemical changes; types, transfers, and transformations of energy; principles of work, force and motion. The nature of light, sound, electricity, and magnetism are studied and investigated. Students enrolled in this course will take the Grade 8 Science Standards of Learning test.

Essential Skills/Processes:

The goals of the course are to educate the student in the material content of Physical Science, to increase science inquiry skills and logical thinking, and foster positive attitudes for further science study. There will be preparation for the Grade Eight Science Standards of Learning Test.

- The student will investigate and understand the basic nature of matter
 - The student will investigate and understand the modern and historical models of atomic structure
 - The student will investigate and understand the organization and use of the periodic table of elements to obtain information
 - The student will investigate and understand changes in matter and the relationship of these changes to the Law of Conservation of Matter and Energy
 - The student will investigate and understand states and forms of energy and how energy is transferred and transformed
 - The student will investigate and understand temperature scales, heat, and heat transfer
 - The student will investigate and understand characteristics of sound and technological applications of sound waves
 - The student will investigate and understand the nature and technological applications of light
 - The student will investigate and understand scientific principles and technological applications of work, force, and motion
 - The student will investigate and understand basic principles of electricity and magnetism
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Essential Knowledge:

Essential knowledge and skills is categorized into four strands.

Science as Process:

- Research skills utilizing a variety of sources to investigate problems and questions.
- Data recorded and interpreted from bar, line, and circle graphs; valid conclusions made after analyzing data.
- Independent and dependent variables, constants, controls, and repeated trials identified.
- Data measured and reported in metric units for length, mass, volume, temperature, weight, and force.
- Appropriate balances, thermometers, rulers, and graduated cylinders used to gather data.
- Results presented in appropriate written form and numbers expressed in scientific notation where appropriate.

- Data tables for descriptive statistics showing specific measures of central tendency, range of data set, and number of repeated trials constructed and interpreted.
- Frequency distributions, scattergrams, line plots, and histograms are constructed and interpreted.
- An emphasis on laboratory safety.

Chemistry:

- The particle theory of matter.
- Elements, compounds, mixtures, acids, bases, salts, organic and inorganic.
- States of matter.
- Physical and chemical properties of matter.
- Contributions of Dalton, Thomson, Rutherford, and Bohr to understanding the atom.
- The modern model of atomic structure.
- How to use the periodic table of elements including atomic numbers, atomic mass, chemical families, periods, valence numbers, metals, metalloids, and nonmetals.
- Chemical activity, formulas, and bonding.
- Law of Conservation of Matter and Energy.
- Physical changes including effects of temperature and pressure on states of matter.
- Chemical changes including types of reactions, reactants and products, and balanced equations.
- Nuclear reactions including fission and fusion and their environmental effects.
- How energy is transferred and transformed; potential and kinetic energy

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