Cumberland County Schools

Curriculum Guide

Physical Science

High School Level

PHYSICAL SCIENCE

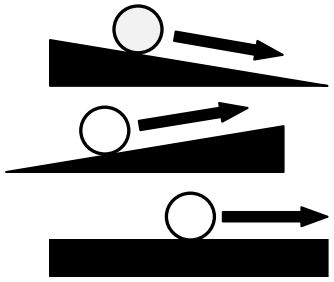
Science, by nature, is an inquiry-based discipline whereby students gain knowledge through observation and experimentation. Scientific investigations involve collection of relevant evidence, use of logical reasoning, application of imagination to devise hypotheses, and explanations to make sense of collected evidence. The process skills of scientific inquiry support development of reasoning and problem-solving ability and are the core of scientific methodologies.

The high school Physical Science curriculum encompasses the following three strands: Forces and Motion; Matter: Properties and Change; and Energy: Conservation and Transfer. Students begin with an introduction to scientific measurement and the process of scientific inquiry. In the Forces and Motion strand, gravitational forces, frictional forces, and Newton's three laws of motion will all be used to help students understand how forces affect the motion of objects in nature. In the Matter: Properties and Change strand, students will understand types, properties, and structure of matter and what causes changes in matter to occur. In the Energy: Conservation and Transfer strand, students will understand that conservation of energy and energy transfer involve an understanding of energy types, wave nature, electricity, and magnetism. By the end of the year, students will have developed a depth of understanding of Physical Science that will prepare them for further study at the college level.

Forces and Motion

Understand motion in terms of speed, velocity, acceleration, and momentum.

1. Explain motion in terms of frame of reference, distance, and displacement.
2. Compare speed, velocity, acceleration, and momentum using investigations, graphing, scalar quantities, and vector quantities.



Understand the relationship between forces and motion.

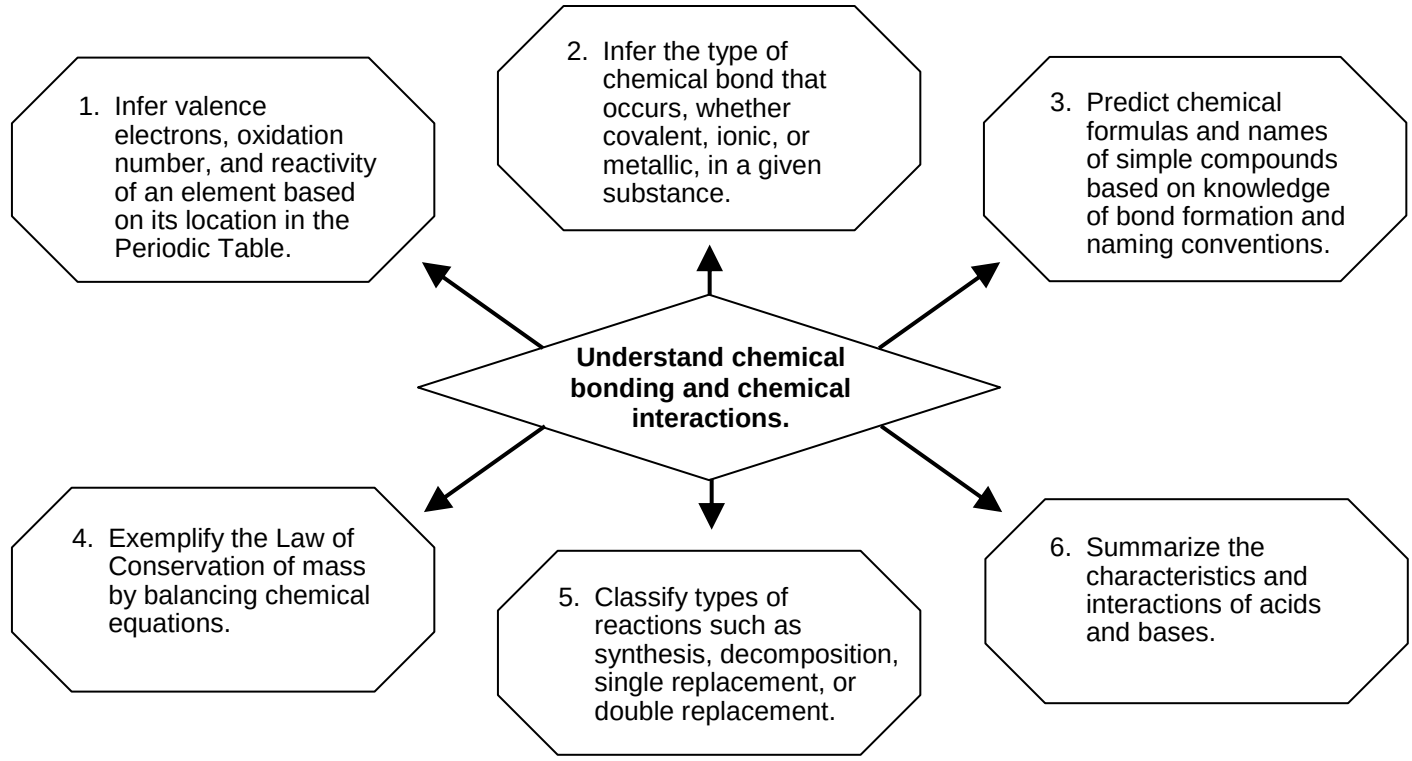
1. Explain how gravitational force affects the weight of an object and the velocity of an object in freefall.
2. Classify frictional forces into one of four types: static, sliding, rolling, and fluid.
3. Explain forces using Newton's Three Laws of Motion.

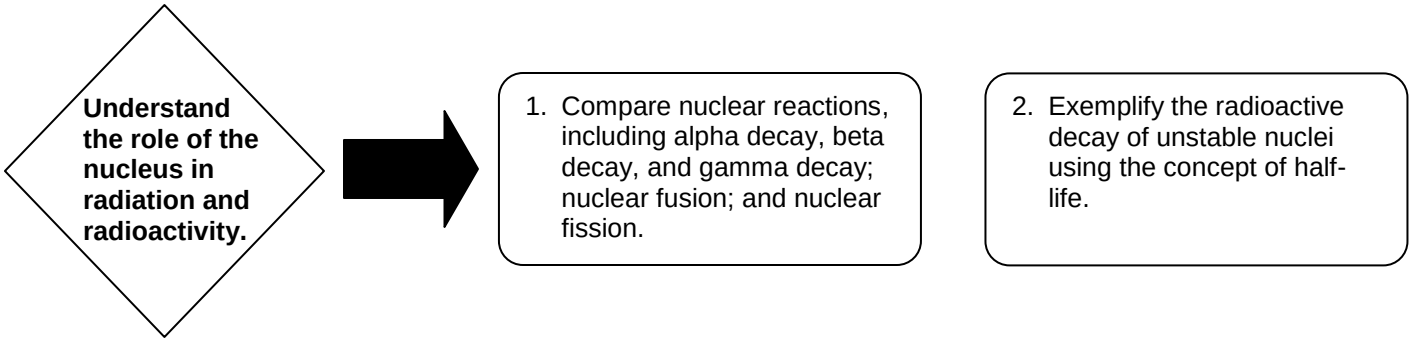
Matter: Properties and Change

Understand types, properties, and structure of matter.

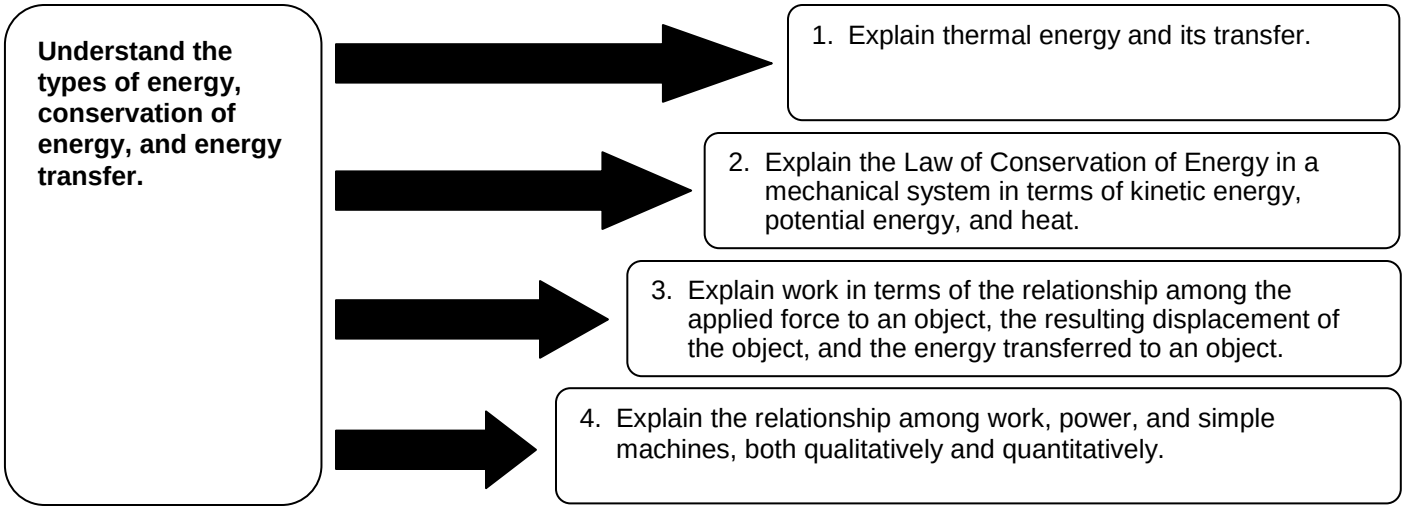
1. Classify matter as homogeneous or heterogeneous; pure substance or mixture; element or compound; metals, nonmetals, or metalloids; solution, colloid, or suspension.
2. Explain the phases of matter and the physical changes that matter undergoes.
3. Compare physical and chemical properties of various types of matter.
4. Interpret data presented in Bohr model diagrams and dot diagrams for atoms and ions of elements 1 through 18.

Matter: Properties and Change (Continued)

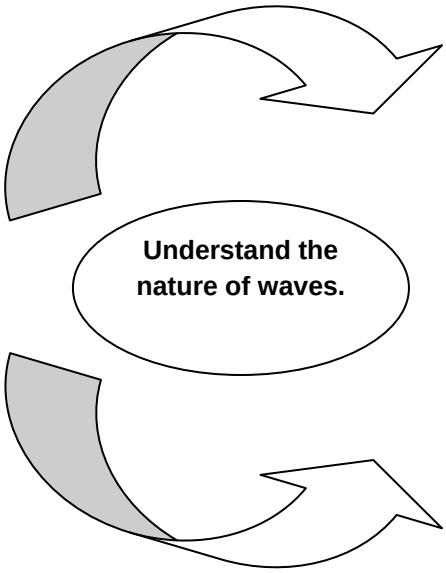




Energy: Conservation and Transfer

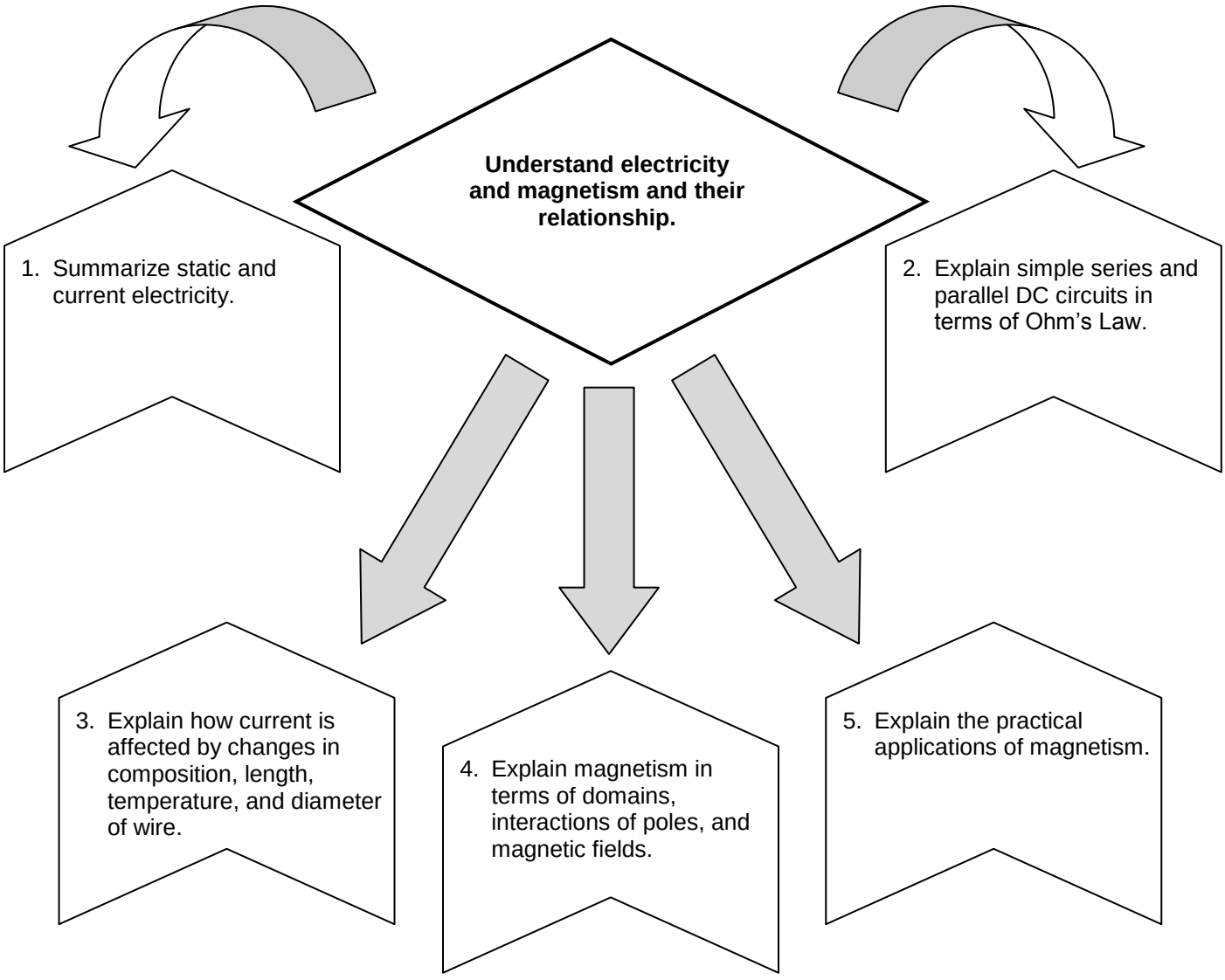


Energy: Conservation and Transfer (Continued)



Understand the nature of waves.

1. Explain the relationships among wave frequency, wave period, wave velocity, and wavelength through calculation and investigation.
2. Compare waves (mechanical, electromagnetic, and surface) using their characteristics.
3. Classify waves as transverse or compressional (longitudinal).
4. Illustrate the wave interactions of reflection, refraction, diffraction, and interference.



Understand electricity and magnetism and their relationship.

1. Summarize static and current electricity.
2. Explain simple series and parallel DC circuits in terms of Ohm's Law.
3. Explain how current is affected by changes in composition, length, temperature, and diameter of wire.
4. Explain magnetism in terms of domains, interactions of poles, and magnetic fields.
5. Explain the practical applications of magnetism.