

NORTH CAROLINA ESSENTIAL STANDARDS

Physical Science

Grade: **High School**

Course: **Forces and Motion**

NCES.PSc.1.1 - Understand motion in terms of speed, velocity, acceleration, and momentum.

NCES.PSc.1.1.1 - Explain motion in terms of frame of reference, distance, and displacement.

NCES.PSc.1.1.2 - Compare speed, velocity, acceleration and momentum using investigations, graphing, scalar quantities and vector quantities.

NCES.PSc.1.2 - Understand the relationship between forces and motion.

NCES.PSc.1.2.1 - Explain how gravitational force affects the weight of an object and the velocity of an object in freefall.

NCES.PSc.1.2.2 - Classify frictional forces into one of four types: static, sliding, rolling, and fluid.

NCES.PSc.1.2.3 - Explain forces using Newton's three laws of motion.

Course: **Matter: Properties and Change**

NCES.PSc.2.1 - Understand types, properties, and structure of matter.

NCES.PSc.2.1.1 - Classify matter as: homogeneous or heterogeneous; pure substance or mixture; element or compound; metals, nonmetals or metalloids; solution, colloid or suspension.

NCES.PSc.2.1.2 - Explain the phases of matter and the physical changes that matter undergoes.

NCES.PSc.2.1.3 - Compare physical and chemical properties of various types of matter.

NCES.PSc.2.1.4 - Interpret data presented in Bohr model diagrams and dot diagrams for atoms and ions of elements 1 through 18.

NCES.PSc.2.2 - Understand chemical bonding and chemical interactions.

NCES.PSc.2.2.1 - Infer valence electrons, oxidation number, and reactivity of an element based on its location in the Periodic Table.

NCES.PSc.2.2.2 - Infer the type of chemical bond that occurs, whether covalent, ionic or metallic, in a given substance.

NCES.PSc.2.2.3 - Predict chemical formulas and names for simple compounds based on knowledge of bond formation and naming conventions.

NCES.PSc.2.2.4 - Exemplify the Law of Conservation of mass by balancing chemical equations.

NCES.PSc.2.2.5 - Classify types of reactions such as synthesis, decomposition, single replacement or double replacement.

NCES.PSc.2.2.6 - Summarize the characteristics and interactions of acids and bases.

NCES.PSc.2.3 - Understand the role of the nucleus in radiation and radioactivity.

NCES.PSc.2.3.1 - Compare nuclear reactions including; alpha decay, beta decay and gamma decay; nuclear fusion and nuclear fission.

NCES.PSc.2.3.2 - Exemplify the radioactive decay of unstable nuclei using the concept of half-life.

Course: **Energy: Conservation and Transfer**

NCES.PSc.3.1 - Understand the types of energy, conservation of energy and energy transfer.

NCES.PSc.3.1.1 - Explain thermal energy and its transfer.

NCES.PSc.3.1.2 - Explain the Law of Conservation of Energy in a mechanical system in terms of kinetic energy, potential energy and heat.



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NCES.PSc.3.1.3 - Explain work in terms of the relationship among the applied force to an object, the resulting displacement of the object and the energy transferred to an object.

NCES.PSc.3.1.4 - Explain the relationship among work, power and simple machines both qualitatively and quantitatively.

NCES.PSc.3.2 - Understand the nature of waves.

NCES.PSc.3.2.1 - Explain the relationships among wave frequency, wave period, wave velocity and wavelength through calculation and investigation.

NCES.PSc.3.2.2 - Compare waves (mechanical, electromagnetic, and surface) using their characteristics.

NCES.PSc.3.2.3 - Classify waves as transverse or compressional (longitudinal).

NCES.PSc.3.2.4 - Illustrate the wave interactions of reflection, refraction, diffraction, and interference.

NCES.PSc.3.3 - Understand electricity and magnetism and their relationship.

NCES.PSc.3.3.1 - Summarize static and current electricity.

NCES.PSc.3.3.2 - Explain simple series and parallel DC circuits in terms of Ohm's law.

NCES.PSc.3.3.3 - Explain how current is affected by changes in composition, length, temperature, and diameter of wire.

NCES.PSc.3.3.4 - Explain magnetism in terms of domains, interactions of poles, and magnetic fields.

NCES.PSc.3.3.5 - Explain the practical applications of magnetism.