



North Carolina Essential Standards Draft 3.0 Physics

Forces and Motion

	Essential Standard	Clarifying Objectives	
Phy.1.1	Analyze the motion of objects.	Phy.1.1.1	Analyze motion graphically and numerically using vectors, graphs and calculations.
		Phy.1.1.2	Analyze motion in one dimension using time, distance, and displacement.
		Phy.1.1.3	Analyze motion in two dimensions using angle of trajectory, time, distance, and displacement.
Phy.1.2	Analyze systems of forces and their interaction with matter.	Phy.1.2.1	Analyze forces and systems of forces graphically and numerically using vectors, graphs and calculations.
		Phy.1.2.2	Analyze systems of forces in one dimension and two dimensions using free body diagrams.
		Phy.1.2.3	Explain forces using Newton's Laws of Motion.
		Phy.1.2.4	Explain systems of forces including weight, normal, tension and friction.
		Phy.1.2.5	Analyze basic forces related to rotation in a circular path (Centripetal Force).
Phy.1.3	Analyze the motion of objects based on the principles of conservation of momentum, conservation of energy and impulse.	Phy.1.3.1	Analyze the motion of objects involved in completely elastic and completely inelastic collisions by using the principles of conservation of momentum and conservation of energy.
		Phy.1.3.2	Analyze the relationship between momentum and impulse.

Energy: Conservation and Transfer

	Essential Standard	Clarifying Objectives	
Phy.2.1	Understand work, energy and power, as well as, the relationship among them.	Phy.2.1.1	Interpret data on work and energy presented graphically and numerically.
		Phy.2.1.2	Compare potential and kinetic energy in terms of the conservation of energy.
		Phy.2.1.3	Explain the relationship among work, energy and power.
Phy.2.2	Analyze the behavior of waves.	Phy.2.2.1	Analyze the relationship among the fundamental characteristics of waves: wavelength, period, frequency, amplitude, and wave velocity.
		Phy.2.2.2	Analyze wave behaviors in terms of transmission, reflection, refraction and interference.
		Phy.2.2.3	Compare mechanical and electromagnetic waves in terms of wave characteristics and behavior (specifically sound and light).
Phy.2.3	Analyze the nature of moving charges and electric circuits.	Phy.2.3.1	Explain Ohm's law in relation to electric circuits.
		Phy.2.3.2	Differentiate the behavior of moving charges in conductors and insulators.
		Phy.2.3.3	Compare the general characteristics of AC and DC systems without calculations.
		Phy.2.3.4	Analyze electric systems in terms of their energy and power.
		Phy.2.3.5	Analyze systems with multiple potential differences and resistors connected in series and parallel circuits, both conceptually and mathematically, in terms of voltage, current and resistance.

Interactions of Energy and Matter

	Essential Standard	Clarifying Objectives	
Phy.3.1	Explain charges and electrostatic systems.	Phy.3.1.1	Explain the qualitative nature of charges and their interactions.
		Phy.3.1.2	Explain basic electric fields.

	Essential Standard	Clarifying Objectives	
		Phy.3.1.3	Explain how Coulomb’s law is fundamental to electrostatics.
		Phy.3.1.4	Explain the mechanisms for the movement of charges including charging by friction, conduction, and induction.
		Phy.3.1.5	Explain voltage and current relative to an electrostatic system.
Phy.3.2	Explain the concept of magnetism.	Phy.3.2.1	Understand the relationship between magnetic domains and magnetism.
		Phy.3.2.2	Explain the composition and characteristics of electromagnets.
		Phy.3.2.3	Explain how transformers and power distributions are application of electromagnetism.

DRAFT