

Active Physics Correlation to the North Carolina High School Physics Standards

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	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3

COMPETENCY GOAL 1: The learner will develop abilities necessary to do and understand scientific inquiry.

Objectives																		
1.01 Identify questions and problems that can be answered through scientific investigations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
1.02 Design and conduct scientific investigations to answer questions about the physical world.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Create testable hypotheses.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Identify variables.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Use a control or comparison group when appropriate.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Select and use appropriate measurement tools.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Collect and record data.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Organize data into charts and graphs.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Analyze and interpret data.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Communicate findings.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
1.03 Formulate and revise scientific explanations and models using logic and evidence to:	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Explain observations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Make inferences and predictions.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Explain the relationship between evidence and explanation.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
1.04 Apply safety procedures in the laboratory and in field studies:	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• recognize and avoid potential hazards.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• safely manipulate materials and equipment needed for scientific investigations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

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1.05 Analyze reports of scientific investigations of physical phenomena from an informed scientifically literate viewpoint including considerations of:	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Adequacy of experimental controls.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Replication of findings.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Alternative interpretations of the data.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

COMPETENCY GOAL 2: The learner will build an understanding of linear motion.

Objectives

2.01 Analyze velocity as a rate of change of position:													X	X	XX	X	X	XX	X	X
• Average velocity.													X	X	XX	X	X	XX	X	X
• Instantaneous velocity.															XX			XX		
2.02 Compare and contrast as scalar and vector quantities:																				
• Speed and velocity.													X	X	XX					
• Distance and displacement.															XX	X	X	XX	X	
2.03 Analyze acceleration as rate of change in velocity.																				
2.04 Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:																				
• Position.																				
• Average velocity.																				
• Instantaneous velocity																				
• Acceleration.																				
• Time.																				

COMPETENCY GOAL 3: The learner will build an understanding of twodimensional motion including circular motion.

Objectives

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3.01 Analyze and evaluate projectile motion in a defined frame of reference.													XX		XX			X
3.02 Design and conduct investigations of two-dimensional motion of objects.											X	X	XX	X	XX	X		X
3.03 Analyze and evaluate independence of the vector components of projectile motion.													XX		XX			X
3.04 Evaluate, measure, and analyze circular motion.											X			X		X		
3.05 Analyze and evaluate the nature of centripetal forces.											X			X		X		
3.06 Investigate, evaluate and analyze the relationship among:											X			X		X		
• Centripetal force.											X			X		X		
• Centripetal acceleration.											X			X		X		
• Mass.											X			X		X		
• Velocity.											X			X		X		
• Radius.											X			X		X		
COMPETENCY GOAL 4: The learner will develop an understanding of forces and Newton's Laws of Motion.																		
Objectives																		
4.01 Determine that an object will continue in its state of motion unless acted upon by a net outside force (Newton's First Law of Motion, The Law of Inertia).													XX		XX	X		XX
4.02 Assess, measure and calculate the conditions required to maintain a body in a state of static equilibrium.													XX		XX	X		XX

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5.05 Assess real world applications of the impulse and momentum, including but not limited to, sports and transportation.														XX	X			XX
COMPETENCY GOAL 6: The learner will develop an understanding of energy as the ability to cause change.																		
Objectives																		
6.01 Investigate and analyze energy storage and transfer mechanisms:					XX													
• Gravitational potential energy.													X	X	X			X
• Elastic potential energy.													X					
• Thermal energy.				XX	XX	X			X				X					
• Kinetic energy.				X	XX	X	X					X	X	X	X			X
6.02 Analyze, evaluate, and apply the principle of conservation of energy.					XX								X		X			
6.03 Analyze, evaluate, and measure the transfer of energy by a force.																		
• Work.					XX	X												
• Power.					XX	X												
6.04 Design and conduct investigations of:																		X
• Mechanical energy.					XX	XX												
• Power.					XX	X												
COMPETENCY GOAL 7: The learner will develop an understanding of wave motion and the wave nature of sound and light.																		
7.01 Analyze, investigate, and evaluate the relationship among the characteristics of waves:	XX	X	X				X		X			X	X			X		X
• Wavelength.	XX	X	X				X						X					X
• Frequency.	XX	X	X				X						X					X
• Period.							X					X						
• Amplitude.							X											X
7.02 Describe the behavior of waves in various media.	XX															X		X
7.03 Analyze the behavior of waves at boundaries between media:	XX																	X

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• Reflection, including the Law of Reflection.	XX								X									
• Refraction, including Snell's Law.	XX							XX										
7.04 Analyze the relationship between the phenomena of interference and the principle of superposition.			X				X											
7.05 Analyze the frequency and wavelength of sound produced by a moving source (the Doppler Effect).			X						X									
COMPETENCY GOAL 8: The learner will build an understanding of static electricity and direct current electrical circuits.																		
Objectives																		
8.01 Analyze the nature of electrical charges.					XX	X												
• Investigate the electrical charging of objects due to transfer of charge.						X												
• Investigate the conservation of electric charge.					XX	X												
• Analyze the relationship among force, charge and distance summarized in Coulomb's law.						X												
8.02 Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit.	X				XX	X												
8.03 Analyze and measure the relationship among current, voltage, and resistance in circuits.					XX	X												
• Series.		X			XX	X												
• Parallel.		X			XX	X												
• Series-parallel combinations.		X			XX	X												
8.04 Analyze and measure the nature of power in an electrical circuit.		X			XX	X												