

Warren County Schools



PHYSICS PACING GUIDE 2017 – 2018 (SEMESTER)

Philosophical approach to the process of teaching and learning science in the Warren County School District (WCS).

In WCS there is an emphasis on both traditional and innovative teaching methodologies of science curriculum. Whereas traditional laboratory experiences provide opportunities to demonstrate how science is constant, historic, probabilistic, and replicable; intuitive-practical solutions to scientific problem solving are encouraged. Even though there are no fixed steps that all scientists follow, scientific investigations usually involve collections of relevant evidence, the use of logical reasoning, the application of imagination to devise hypotheses, and explanations to make sense of collected evidence. Student engagement in scientific investigation provides background for understanding the nature of scientific inquiry. In addition, the science process skills necessary for inquiry are acquired through active experience. The process skills support development of reasoning and problem-solving ability and are the core of scientific methodologies.

# of Instruction Weeks	Topic/Standard	Essential Questions/Learning Intensions	Benchmark Testing Window Dates	UNIT Assessments & NCFC Test Dates
1 Day	First Day of Semester <i>Syllabus/classroom procedures/class policies etc.</i>	What is physics?		
2 Days	<ul style="list-style-type: none"> The Scientific Method Experimental design The Metric System Scientific Notation Lab Safety 	<ul style="list-style-type: none"> What are some of the advantages of the metric system over the imperial system? 		TBD by Site Administration

UNIT 1: Simple Motion and Constant Velocity

Week 1

NC Essential Standard: Phy.1.1
Analyze the motion of objects.
Phy.1.1.1 Analyze motion graphically and numerically using vectors, graphs and calculations

- How do you mathematically analyze the motion of an object in one dimension?
- How do you mathematically analyze the motion of an object in two dimensions?

TBD by Site Administration

UNIT 2: Constant Acceleration

<p>Week 2</p>	<p>NC Essential Standard: 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, velocity, and acceleration</p>	<ul style="list-style-type: none"> • What is the difference between velocity and acceleration? • What impact does a constant velocity have on the acceleration of a moving object? 		<p>TBD by Site Administration</p>
<p>UNIT 3: Free particles/Inertia</p>				
<p>Week3-4</p>	<p>NC Essential Standard: 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 as well as the universal law of gravitation. Phy.1.2.4 Explain the effects of forces (including weight, normal, tension and friction) on objects.</p>	<ul style="list-style-type: none"> • How do you mathematically analyze the motion of an object in two dimensions? • In what ways can you describe the forces acting on an object or system? 		

Week (5-6)	NC Essential Standard: Phy.1.1.3 Analyze motion in two dimensions using angle of trajectory, time, distance, displacement, velocity, and acceleration.	<ul style="list-style-type: none"> • How does force have an effect on the motion of an object? 		TBD by Site Administration
UNIT 4: Constant Force				
Week(7-8)	NC Essential Standard: Phy.1.1.3 Analyze motion in two dimensions using angle of trajectory, time, distance, displacement, velocity, and acceleration. Phy.1.2.3 Explain forces using Newton’s laws of motion as well as the universal law of gravitation. Phy.1.2.5 Analyze basic forces related to rotation in a circular path (centripetal force).	<ul style="list-style-type: none"> • How do you analyze the motion of an object moving in a circular path? • How do velocity and radius of an object’s path relate to the centripetal acceleration of that object? • How does mass and distance relate to the force of gravity between objects? • How does gravity apply in centripetal 		TBD by Site Administration

		force problems?		
UNIT 5: Projectile Motion				
Week(9-10)	<p>NC Essential Standard Phy.1.1.3 Analyze motion in two dimensions using angle of trajectory, time, distance, displacement, velocity, and acceleration., Phy.1.2.3 Explain forces using Newton’s laws of motion as well as the universal law of gravitation. Phy.1.2.5 Analyze basic forces related to rotation in a circular path (centripetal force).</p>	<ul style="list-style-type: none"> • How can an object travel a distance, but have zero displacement? • How can an object can be in motion and not experience acceleration? 		TBD by Site Administration
UNIT 6: Circular Motion				

<p>Week(11-12)</p>	<p>NC Essential Standard Phy.1.1.3 Analyze motion in two dimensions using angle of trajectory, time, distance, displacement, velocity, and acceleration.</p>	<ul style="list-style-type: none"> • Compare and contrast the mass and weight of an object on earth and on the moon. • How can an object not experience friction? 		<p>TBD by Site Administration</p>
<p>UNIT 7: Energy</p>				
<p>Week-12</p>	<p>NC Essential Standards: Phy.2.1 Understand the concepts of work, energy, and power, as well as the relationship among them</p>	<ul style="list-style-type: none"> • How are work and energy related? • How are changes in potential and kinetic energy related in both closed and open systems? • How does power represent the rate at which work is done? 		<p>TBD by Site Administration</p>

UNIT 8: Impulse and Momentum

Week-13

NC Essential Standards

Phy.1.3.1 Analyze the motion of objects in completely elastic and completely inelastic collisions by using the principles of conservation of momentum and conservation of energy.

- How momentum is conserved in a closed a system?
- How does the force exerted on an object?
- How do elastic and inelastic collisions differ translate into a change in momentum?

UNIT 8: Impulse and Momentum (Continued)

Week-14	NC Essential Standards <i>Phy.1.3.2</i> Analyze the motion of objects based on the relationship between momentum and impulse.			TBD by Site Administration
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UNIT 9: Waves and Light

Week-15	NC Essential Standards <i>Phy.2.2</i> Analyze the behavior of waves. Phy.2.2.1 Analyze how energy is transmitted through waves, using the fundamental characteristics of waves: wavelength, period, frequency, amplitude, and wave velocity.	<ul style="list-style-type: none"> • What are the fundamental characteristics of waves? • What are the fundamental differences between sound and light as wave? • What happens when an electromagnetic wave encounters a boundary between two media? 		TBD by Site Administration
	NC Essential Standards Phy.2.3 Analyze the nature of	<ul style="list-style-type: none"> • How do charged objects interact? • What are the ways 		

Week-16	moving charges and electric circuits. Phy.3.1 Explain charges and electrostatic systems. Phy.3.2 Explain the concept of magnetism.	that an object can obtain a charge? <ul style="list-style-type: none"> • How do charged objects exert a force on one another? • How can you graphically represent electric fields? 		
Review /NC Final Exam				
Weeks 17-18	The NCFE: based upon the three NC Physics learning goals: 1- Force and Motion 2- Energy: Conservation and Transfer 3- Interaction of Energy and Matter			TBD by Site Administration