

**Argenta-Oreana High School
Physics**

Text: Physics: Merrill Principles and Problems 1995©

Date Semester	IL Learning Standards	Unit and/or Essential Question Content and/or Skills	Assessments and/or Products
August Week 1	13.A.5a	<u>Lab Safety Protocols</u> <ul style="list-style-type: none"> • Creating a safe lab environment • Understanding clean up procedures • Handling instruments/chemicals • Working with fire • Creating Lab Protocol 	Lab Safety Quiz
August Week 2	11.A.5a 11.A.5b 11.A.5c 11.B.5c	<u>Chapter 1: What is Physics?</u> <ul style="list-style-type: none"> • Section 1.1: Physics: The Search for Understanding Skills: <ul style="list-style-type: none"> • State what physics is • Understand some of the Greek philosopher's ideas regarding science and nature • Recognize the roles of theory and experimentation in physics 	Homework: <ul style="list-style-type: none"> • Concept Review • Chapter Review Laboratory: <ul style="list-style-type: none"> • The Paper Tower Lab • Lab Write Up and Documentation Assessment <ul style="list-style-type: none"> • Section 1 Quiz
August Weeks 2&3	6.B.5 7.B.5 7.C.5a 8.B.5 11.A.5a 11.A.5b 11.A.5c	<u>Chapter 2: A Mathematical Toolkit</u> <ul style="list-style-type: none"> • Section 2.1: The Measure of Science • Section 2.2: Not all is Certain • Section 2.3: Displaying Data • Section 2.4: Manipulating Equations Skills: <ul style="list-style-type: none"> • State and make calculations using the fundamental SI units for time, length, and mass • Demonstrate the ability to use scientific notation • Convert between units of the metric system with an understanding of the prefixes used 	Homework: <ul style="list-style-type: none"> • Concept Rev. 2.1 • Concept Rev. 2.2 • Concept Rev. 2.3 • Concept Rev. 2.4 Laboratory: <ul style="list-style-type: none"> • Getting Straight • Lab Write Up and Documentation Assessment: <ul style="list-style-type: none"> • Chapter 1&2 Test

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		<ul style="list-style-type: none"> • Recognize that all measured quantities have uncertainties • Distinguish between accuracy and precision • Use and understand the concept of significant digits • Distinguish between dependent and independent variables • Recognize linear, direct, quadratic, and inverse relationships • Demonstrate the ability to manipulate algebraic equations 	
<p style="text-align: center;"><u>August</u> Week 4 <u>September</u> Week 1</p>	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 12.D.5a	<p><u>Chapter 3: Describing Motion: Velocity</u></p> <ul style="list-style-type: none"> • 3.1: How Far and How Fast? • 3.2: New Meanings For Old Words <p>Skills:</p> <ul style="list-style-type: none"> • Define and give an example of frame of reference • Understand average velocity and how to calculate it • Determine the slope of a curve on a position-time graph and calculate the velocity • Distinguish displacement from distance and velocity from speed • Distinguish instantaneous from average velocity 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 3.1 • Concept Rev. 3.2 <p>Assessment:</p> <ul style="list-style-type: none"> • Quiz 3.1-3.2
<p style="text-align: center;"><u>September</u> Weeks 2&3</p>	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.511.A.5a 11.A.5b 11.A.5c 12.D.5b	<p><u>Chapter 4: Acceleration</u></p> <ul style="list-style-type: none"> • 4.1: What is acceleration? • 4.2: Displacement during constant acceleration <p>Skills:</p> <ul style="list-style-type: none"> • Calculate average acceleration • Calculate final velocity (uniform acceleration) • Calculate the displacement of an object undergoing uniform acceleration when two of the three key quantities are known (acceleration, time, velocity) 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 4.1 • Concept Rev. 4.2 <p>Laboratory:</p> <ul style="list-style-type: none"> • Accelerated Motion <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 3&4 Test

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<p><u>September</u> Week 4 <u>October</u> Weeks 1, 2, and 3</p>	<p>6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 11.A.5a 11.A.5b 11.A.5c 12.D.5b</p>	<ul style="list-style-type: none"> • Solve problems of the motion of objects uniformly accelerated by gravity <p><u>Chapter 5: Forces</u></p> <ul style="list-style-type: none"> • 5.1: Newton’s Laws of Motion • 5.2: Using Newton’s Laws <p>Skills:</p> <ul style="list-style-type: none"> • Name the four basic forces, their relative strengths, and examples of each • State and understand Newton’s three laws of motion • Apply Newton’s Second Law to solve problems ($F = ma$) • Understand the concepts of net forces, balanced forces, and unbalanced forces • Distinguish between weight and mass and use Newton’s Second Law of Motion to relate them • Understand the nature of frictional forces and how to calculate the coefficient of friction • Calculate the acceleration using the net force and mass of an object 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 5.1 • Concept Rev. 5.2 <p>Laboratory:</p> <ul style="list-style-type: none"> • Newton’s 2nd Law • Friction <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 5 Test
<p><u>October</u> Week 4 <u>November</u> Weeks 1&2</p>	<p>6.A.5 6.B.5 7.C.5a 8.B.5 8.C.5 8.D.5 9.C.5b 11.A.5a 11.A.5b</p>	<p><u>Chapter 6: Vectors</u></p> <ul style="list-style-type: none"> • 6.1: Graphical Method of Vector Addition • 6.2: Analytical Method of Vector Addition • 6.3: Applications of Vectors <p>Skills:</p> <ul style="list-style-type: none"> • Show an ability to add vectors by the graphical method • Recognize that the order of vector addition does not matter • Recognize the independence of perpendicular vector 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 6.1 • Concept Rev. 6.2 • Concept Rev. 6.3 <p>Laboratory:</p> <ul style="list-style-type: none"> • Addition of Force Vectors <p>Assessment:</p>

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	11.A.5c 12.D.5b	quantities <ul style="list-style-type: none"> • Understand the addition of forces and be able to solve force vector addition problems • Recognize the applications of geometry and trigonometry to vector addition and be able to solve problems using these methods • Specify the proper method of resolving vectors into perpendicular components 	<ul style="list-style-type: none"> • Chapter 6 Test
<u>November</u> Weeks 3&4 <u>December</u> Week 1	6.A.5 6.B.5 7.C.5a 8.B.5 8.C.5 8.D.5 9.C.5b 11.A.5a 11.A.5b 11.A.5c 12.D.5b	<u>Chapter 7: Motion</u> <ul style="list-style-type: none"> • 7.1: Projectile Motion • 7.2: Periodic Motion Skills <ul style="list-style-type: none"> • Demonstrate and understanding of the independence of horizontal and vertical velocities of a projectile • Find the maximum height of an object launched at an arbitrary angle • Show an understanding of the centripetal acceleration of objects in circular motion and be able to apply Newton's laws to such motion 	Homework: <ul style="list-style-type: none"> • Concept Rev. 7.1 • Concept Rev. 7.2 Laboratory: <ul style="list-style-type: none"> • Projectile Motion • Range of a Projectile Assessment: <ul style="list-style-type: none"> • Chapter 7 Test
<u>December</u> Weeks 2&3	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 11.A.5a 11.A.5b 11.A.5c	<u>Application of Forces Unit</u> <ul style="list-style-type: none"> • Students will build toothpick bridges and test them for the amount of force that the bridge can withstand Skills: <ul style="list-style-type: none"> • Construct a toothpick bridge and determine how much mass it can hold before breaking 	Homework: <ul style="list-style-type: none"> • 2 Blueprints of Bridge Laboratory: <ul style="list-style-type: none"> • Construction of bridge Assessment: <ul style="list-style-type: none"> • Breaking of bridge

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	11.B.5c 11.B.5d 12.D.5b		to determine the maximum amount of mass the bridge can hold.
January Weeks 1&2	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 11.A.5a 11.A.5b 11.A.5c 12.D.5b	<p><u>Chapter 9: Momentum and Its Conservation</u></p> <ul style="list-style-type: none"> • 9.1: Impulse and Change in Momentum • 9.2: The Conservation of Momentum <p>Skills:</p> <ul style="list-style-type: none"> • Define momentum and impulse and be able to calculate momentum • State the Law of Conservation of Momentum and how to use it • Solve collision problems using vectors 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 9.1 • Concept Rev. 9.2 <p>Laboratory:</p> <ul style="list-style-type: none"> • Conservation of Momentum <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 9 Test
January Weeks 3&4	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 11.A.5a 11.A.5b 11.A.5c 12.D.5b	<p><u>Chapter 10: Work, Energy, and Simple Machines</u></p> <ul style="list-style-type: none"> • 10.1: Work and Energy • 10.2: Machines <p>Skills:</p> <ul style="list-style-type: none"> • Calculate work done by a force • Differentiate between work and power and correctly calculate power used • Demonstrate knowledge of why simple machines are useful • Understand the concept of mechanical advantage as it applies to ideal and real machines • Calculate mechanical advantage for some complex machines 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 10.1 • Concept Rev. 10.2 <p>Laboratory:</p> <ul style="list-style-type: none"> • Torques <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 10 Test

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<p><u>February</u> Weeks 1&2</p>	<p>11.A.5b 11.A.5b 11.A.5c 12.D.5b</p>	<p><u>Chapter 11: Energy</u></p> <ul style="list-style-type: none"> • 11.1: Energy in its Many Forms • 11.2: Conservation of Energy <p>Skills:</p> <ul style="list-style-type: none"> • Define and distinguish between kinetic and potential energy • Calculate kinetic energy and apply the work-energy theorem • Demonstrate an ability to solve problems involving gravitational potential energy • State the law of conservation of energy • Demonstrate the ability to solve problems using the law of conservation of energy • Understand the difference between elastic and inelastic collisions 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 11.1 • Concept Rev. 11.2 <p>Laboratory:</p> <ul style="list-style-type: none"> • Conservation of Energy <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 11 Test
<p><u>February</u> Weeks 3&4</p>	<p>6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 11.A.5a 11.A.5b 11.A.5c 11.B.5c 12.D.5b</p>	<p><u>Chapter 13: States of Matter</u></p> <ul style="list-style-type: none"> • 13.1: The Fluid States • 13.2: The Solid State <p>Skills:</p> <ul style="list-style-type: none"> • Calculate pressure and total force • Understand the main ideas behind Pascal's and Archimedes' principles • Explain Bernoulli's principle and how it allows for flight of aircraft • Understand the origin of evaporation and condensation 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 13.1 • Concept Rev. 13.2 <p>Laboratory:</p> <ul style="list-style-type: none"> • Archimedes' Principle <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 13 Test

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		from the viewpoint of kinetic energy <ul style="list-style-type: none"> • Define plasma and gives examples of plasmas in nature • Display an understanding of the difference between solids, liquids, and gases at the microscopic level • Solve problems involving linear thermal expansion 	
<u>March</u> Weeks 1&2	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 9.D.5 11.A.5a 12.D.5b	<u>Chapter 14: Waves and Energy Transfer</u> <ul style="list-style-type: none"> • 14.1: Wave Properties • 14.2: Wave Interference Skills: <ul style="list-style-type: none"> • Recognize that waves transfer energy without transferring matter • Distinguish between compressional waves and transverse waves • Define amplitude, wavelength, frequency, and period • Understand that wave speed depends on the medium • Be able to solve problems waves crossing boundaries 	Homework: <ul style="list-style-type: none"> • Concept Rev. 14.1 • Concept Rev. 14.2 Assessment: <ul style="list-style-type: none"> • Chapter 14 Test
<u>March</u> Weeks 3&4	6.A.5 6.B.5 7.A.5 7.C.5a 8.B.5 8.D.5 9.D.5 11.A.5a 11.A.5b 11.A.5c	<u>Chapter 15: Sound</u> <ul style="list-style-type: none"> • 15.1: Properties of Sound • 15.2: The Sound of Music Skills: <ul style="list-style-type: none"> • Demonstrate knowledge of the nature of sound waves and the properties sound shares with other waves • Solve problems relating the frequency, wavelength, and velocity of sound • Describe the origin of sound in general and in various 	Homework: <ul style="list-style-type: none"> • Concept Rev. 15.1 • Concept Rev. 15.2 Laboratory: <ul style="list-style-type: none"> • Resonance in an Open Tube Assessment: <ul style="list-style-type: none"> • Chapter 15 Test

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	12.D.5b	musical instruments <ul style="list-style-type: none"> • Identify parts of the ear and the function of each in detecting sounds 	
<p style="text-align: center;"><u>April</u> Weeks 1&2</p>	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 11.A.5a	<p><u>Chapter 16: Light</u></p> <ul style="list-style-type: none"> • 16.1: Light Fundamentals • 16.2: Light and Matter <p>Skills:</p> <ul style="list-style-type: none"> • Recognize that light is an electromagnetic wave, and know its wavelength range • Solve problems involving the speed of light • Define transparent, translucent, and opaque • Understand the formation of color by addition of light and by subtraction of pigments or dyes 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 16.1 • Concept Rev. 16.2 <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 16 Test
<p style="text-align: center;"><u>April</u> Weeks 3&4</p>	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 11.A.5a 11.B.5c 12.C.5a 12.C.5b 12.D.5b	<p><u>Chapter 28: The Atom</u></p> <ul style="list-style-type: none"> • 28.1: The Bohr Model • 28.2: The Present Model of the Atom <p>Skills:</p> <ul style="list-style-type: none"> • Explain the method that Rutherford and co-workers used to determine the nuclear model • List Bohr's assumptions; define energy levels, ground and excited states; understand the connection between photon energy and energy level differences • Using orbital radius and energy level equations to solve problems using the Bohr model • Describe the shortcomings of the Bohr model • Describe the quantum model of the atom 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 28.1 • Concept Rev. 28.2 <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 28 Test

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<p style="text-align: center;"><u>May</u> Weeks 1-4</p>	6.A.5 6.B.5 7.C.5a 8.B.5 8.D.5 11.A.5a 12.C.5a 12.C.5b	<p><u>Chapter 30: The Nucleus</u></p> <ul style="list-style-type: none"> • 30.1: Radioactivity • 30.2: The Building Blocks of Matter <p>Skills:</p> <ul style="list-style-type: none"> • Define atomic number and mass number; find the charge and mass of a nucleus • Define isotope and nuclide; calculate the number of neutrons, protons, and electrons in an isotope • Describe modes of radioactive decay; explain the changes in atomic number or mass number for each mode; write equations for the three forms of radioactive decay • Balance nuclear equations showing the result of nuclear reactions • Describe the quark content of the proton and neutron 	<p>Homework:</p> <ul style="list-style-type: none"> • Concept Rev. 30.1 • Concept Rev. 30.2 <p>Assessment:</p> <ul style="list-style-type: none"> • Chapter 30 Test