Lehighton Area School District

Curriculum Framework

Course Title:	Physics and Technology
Content Area:	Science
Grade Level(s):	11-12
Course Overview:	This course is intended to give a basic overview of physics principles as they apply to daily living experiences. The purpose of this course is to provide a better understanding of scientific concepts through activities, experimentation, class work, and projects, as well as traditional assessments.
PA Core Standards:	PA STEELS Standards
Key Course Text and Materials:	McLaughlin, W., Thompson, (1999). Physical Science. New York: Glencoe, McGraw-Hill.
Key Assessments/Projects:	Written tests, Vocabulary assignments, building projects

Big Idea/Unit:	**The Nature of Science / The scientific method can be used to learn about and describe the world around us.**			
Pacing:	4 weeks			
Standards	**Objective/Skill**	**Vocabulary**	**Additional Resources**	**Assessment/Project**
3.2.9-12	The Nature of Science Science is Everywhere Scientific Methods Problem Solving Special Effects Exploring Science	Constant Control Dependent variable Independent variable experiment hypothesis model observation physical science technology theory	Clay Newspaper puzzles Pendulums	Pendulum activity Vocabulary review assignment Study Guide Chapter test

Big Idea/Unit:	Physical Science Methods / Measurement is used to quantify the physical world			
Pacing:	4 weeks			
Standards	**Objective/Skill**	**Vocabulary**	**Additional Resources**	**Assessment/Project**
3.2.9-12	Physical Science Methods Standards of Measurement Using SI Units Graphing	Density Derived unit Graph Kelvin Kilogram Liter Mass Meter Second SI Standard Time	Chromebooks Coins mass balance rulers measuring tapes vernier calipers stopwatches	No need to count coins More graphing Vocabulary review assignment Study Guide Chapter test

Big Idea/Unit:	Exploring Motion and Forces / Motion can be desribed in mathematical terms.			
Pacing:	4 weeks			
Standards	**Objective/Skill**	**Vocabulary**	**Additional Resources**	**Assessment/Project**
3.2.9-12	Physical Science Methods Standards of Measurement	Density Derived unit Graph Kelvin Kilogram	Chromebooks Coins mass balance rulers	Constant speed graph Vocabulary review assignment

3.2.9-12	Using SI Units Graphing	Liter Mass Meter Second SI	rulers measuring tapes vernier calipers stopwatches	assignment Study Guide Chapter test

Big Idea/Unit: Acceleration and Momentum / Motion includes things moving in circles and in freefall

Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.2.9-12I 3.2.9-12J	Accelerated Motion Projectile and Circular Motion Satellites Action-Reaction Momentum	Air Resistance Artificial satellite centripetal acceleration centripetal force Law of conservation of momentum momentum Newton's second law of motion Newton's third law of motion projectile terminal velocity	Inertial mass Chromebook with sparkview Motion sensors Force sensors Coffee Filters Trashbags and string Constant speed buggy Tops and Levitron	Satellites research Vocabulary review assignment Study Guide Chapter test

Big Idea/Unit: Energy / Energy is the ability to do work

Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.2.9-12O 3.2.9-12P 3.2.9-12Q 3.2.9-12R	Energy and Work Temperature and Heat Thermal Pollution Measuring Thermal Energy	Energy Heat Kinetic energy Law of conservation of energy mechanical energy potential energy specific heat temperature thermal energy thermal pollution work	Chromebooks with SparkVue Temperature sensors "An Inconvenient Truth" Hot plate Beakers Colored ice metal objects	Thermal pollution Calorimetry experiment Vocabulary review assignment Study Guide Chapter test

Big Idea/Unit: Using Thermal Energy / Thermal energy can be used to keep us warm and heat our homes.

Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.2.9-12O 3.2.9-12P 3.2.9-12R	Thermal Energy on the Move Using Heat to Stay Warm Using Heat to Do Work Energy From the Oceans	Combustion Conduction Convection External combustion engine Fluid Heat Engine Heat Mover Insulator Internal combustion engine Radiation Radiator Solar collector Solar energy	Chromebooks with SparkVue Temperature sensors Hot plate Beakers Sterling engine	Vocabulary review assignment Study Guide Chapter test

Big Idea/Unit: Machines / Simple machines can be used to make work easier.

Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.2.9-12O 3.2.9-12P 3.2.9-12R	Why We Use Machines Simple Machines Mending with Machines Using Machines	Bionics Compound machine Efficiency Effort arm Effort force Fulcrum Ideal machine Inclined plane Lever Machine Mechanical advantage Power Resistance arm Resistance force Screw Simple machine Wedge Wheel and Axle	Levers pulleys inclined planes spring scales friction blocks coins Lego kits	Lever worksheet Pulley worksheet Inclined plane worksheet Lego worksheet Vocabulary review assignment Study Guide Chapter test

Big Idea/Unit: Waves and Sound / Sound is a type of wave.

Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project

3.2.9-12T	Characteristics of Waves The Nature of Sound Sound in Medicine Music	Acoustics Amplitude Compressional wave Crest Frequency Intensity Interference Loudness Medium Music Noise Pitch Resonance Reverberation Transverse wave Trough Ultrasonic technology Wave Wavelength	Chromebooks with SparkVue Gummy's, tape, and sticks Doppler demo Sound generator Picket fences	Vocabulary review assignment Study Guide Chapter test

Big Idea/Unit: Light / Light is another type of wave. Electromagnetic waves have many different wavelengths.
Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.2.9-12T 3.2.9-12V 3.2.9-12W	Electromagnetic Radiation Light and Color Light bulbs Wave Properties	Diffraction Electromagnetic radiation Fluorescent Incandescent Modulation Opaque Pigment Reflection Refraction Translucent Transparent Visible radiation	Primary light Paint and brushes Incandescent, fluorescent, and LED bulbs mirrors lenses rulers	Primary pigment painting Reflection lab Refraction lab Vocabulary review assignment Study Guide Chapter test

Big Idea/Unit: Mirrors and Lenses / Mirrors and lenses can be used to bend light and produce images.
Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.2.9-12T	The Optics of Mirrors The Optics of Lenses	Coherent light Concave and convex Focal point Incoherent light Microscope	Curved mirrors Curved lenses light source	Curved mirror activity Curved lens activity

3.2.9-12T 3.2.9-12V 3.2.9-12W	Optical Instruments The Hubble Space Telescope Light Applications	Microscope Optical fiber Polarized light Reflecting telescope Refracting telescope TIR Virtual image	light source Microscope Telescope Laser Difraction gratings	Curved lens activity Vocabulary review assignment Study Guide Chapter test