Effective Date: 2008-2009

Hamburg Area School District

Name of Course:PS PhysicsDepartment:Science

Grade Level: 11-12 Instructional Time: 180 days Length of Course: 1 year Period Per Cycle: 7 Length of Period: 45 min

Texts and Resources:Conceptual Physics: Media Update 10/E – Paul Hewitt
Conceptual Physics Interactive Media
Virtual Physics Lab
World Wide Web

Assessments:

Tests Quizzes Lab Reports Projects

Course Name: PS Physics Unit: Measurement

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Definitions of Science and Physics	Students will understand what physics is and that there are	3.4.10A
Scientific Method	common methods used by all scientists.	3.4.10B 3.4.10C
Metric System	Students will understand the metric system and SI system of units, along with the idea of uncertainty within measured	3.7.10B
Scientific Notation	values.	
Uncertainty	Students will understand the relationships represented through graphs.	
Significant Figures		
Graphing Techniques		
Measurement Lab		
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Course Name: PS Physics Unit: Vectors

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Graphical Methods of Vector Addition	Students will understand what a vector is and how to solve	3.4.10A
Analytical Addition of Perpendicular Vectors	problems involving vectors.	3.4.10B 3.4.10C
Analytic Vector Addition using Components	Students will understand how to use the ideas of vectors to solve problems involving forces at an angle.	3.7.10B
Applied Forces at an Angle		
Equilibrium		
Motion on Inclined Planes		
Vector Labs		
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Course Name: PS Physics Unit: Forces & the Laws of Motion

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Newton's Laws	Students will understand the connection between forces and	3.4.10A
	motion, as described by Newton's Laws.	3.4.10B
Horizontal Motion		3.4.10C
Forces and Vertical Motion		3.7.10B
Pulleys		
Combined Horizontal and Vertical Motion		
Force Labs		

Course Name: PS Physics Unit: Velocity

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Introduction to Velocity	Students will be able to solve uniform velocity problems.	3.4.10A
		3.4.10B
Construction of Velocity-Related Graphs	Students will be able to describe motion through the use of	3.4.10C
	velocity-time graphs.	3.7.10B
Position-Time Graphs		
	Students will understand the principle of relative velocity.	
Relative Velocity		
Motion Labs		

Course Name: PS Physics Unit: Acceleration

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Introduction to Acceleration	Students will understand the concept of acceleration.	3.4.10A
		3.4.10B
Equation of a Body Experiencing Constant		3.4.10C
Acceleration		3.7.10B
Acceleration Due to Gravity		
Acceleration Labs		

Course Name: PS Physics Unit: Conservation of Momentum

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Momentum and Impulse	Students will understand the principle of impulse and its	3.4.10A
Angular Momentum	connection to the principle of conservation of momentum.	3.4.10B 3.4.10C
Conservation of Momentum	Students will understand the difference between elastic and inelastic collisions, as well as the energy changes that occur within each	3.7.10B
Elastic Collisions		
Inelastic Collisions		
Conservation of Momentum in Two Dimensions		
Momentum Labs		

Course Name: PS Physics Unit: Work & Energy

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Definitions of Work & Energy	Students will understand what kinetic energy is, as well as	3.4.10A
Work & Direction of Force	the connection between kinetic energy and work.	3.4.10B 3.4.10C
Potential & Kinetic Energy	Students will understand what is meant by the law of conservation of energy and be able to solve problems using	3.7.10B
Work & Kinetic Energy	it.	
Conservation of Energy	Students will understand what potential energy is, as well as the connection between potential energy and work.	
Power	Students will understand what is meant by the term work,	3.4.10A
	and its connection to energy.	3.4.10B
Work & Energy Labs		3.4.10C
	Students will understand the connection between work and power.	3.7.10B

Course Name: PS Physics Unit: Motion in Two Dimensions

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Introduction to Projectile Motion	Students will understand projectile motion as an application	3.4.10A
Objects Launched Horizontally	of motion in two dimensions.	3.4.10B 3.4.10C
Objects Launched at an Angle	Students will understand circular motion as an application of motion in two dimensions.	3.7.10B
Circular Motion	Students will understand simple harmonic motion as an	
Torque	application of motion in two difficusions.	
Simple Harmonic Motion		
Two-Dimensional Motion Labs		
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Course Name: PS Physics Unit: Universal Gravitation

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Kepler's Laws	Students will understand how Kepler's Laws explain the	3.4.10A
Universal Gravitation	motion of planets and satellites in space.	3.4.10B 3.4.10C
Motion of Planets and Satellites	Students will understand the role of Newton's Law of Universal Gravitation in explaining gravitational attraction between objects	3.7.10B
Weight and Weightlessness	between objects.	
Gravitational Fields	Students will understand the connection between gravitational force and the motion of planets and satellites.	
Einstein's Theory of Gravity		
Universal Gravitation Lab		

Course Name: PS Physics Unit: Heat & Thermodynamics

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Heat Transfer	Students will be able to apply energy principles to solve	3.4.10A
	problems involving heat transfer.	3.4.10B
Calorimetry		3.4.10C
	Students will be able to apply energy principles to solve	3.7.10B
Heats of Fusion and Vaporization	problems involving change of states.	
Laws of Thermodynamics	Students will be able to understand and apply the laws of	3.4.10A
	thermodynamics.	3.4.10B
Thermal Energy Labs		3.4.10C
		3.7.10B

Course Name: PS Physics Unit: Current Electricity

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Electric Power	Students will understand the principle of moving charges	3.4.10A
	within an electric circuit, and the techniques used to	3.4.10B
Ohm's Law	measure current, voltage, and resistance within them.	3.4.10C
		3.7.10B
Diagramming Circuits	Students will understand the connection between circuits	
	and electrical energy, as well as techniques used to measure	
Energy Transfer in Electric Circuits	energy transfer within them.	
Kilowatt Hours		
Electrical Energy Lab		

Course Name: PS Physics Unit: Series and Parallel Circuits

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Series Circuits	Students will understand how different arrangements of	3.4.10A 3.4.10P
Resistance	resistance of electric circuits.	3.4.10C 3.7.10B
Current		
Voltage Drops		
Voltage Dividers		
Parallel Circuits		
Series-Parallel Circuits		
Series & Parallel Circuit Labs		

Course Name: PS Physics Unit: Static Electricity & Electric Fields

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Electrical Charges	Students will understand the connection between static	3.4.10A
Coulomb's Law	charges and force, as described through Coulomb's law.	3.4.10B 3.4.10C
Electric Fields	Students will understand how static charges set up an electric field around themselves.	3.7.10B
Electric Potential		
Capacitors	Students will understand the principle of the capacitor in	3.4.10A
Milikan's Oil Drop Experiment	terms of charge and the electric field.	3.4.10B 3.4.10C
Capacitors Lab	Students will understand the role of Milikan's Experiment in determining the charge of an electron.	3.7.10B

Course Name: PS Physics Unit: Magnetism

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Magnets	Students will understand the connection between charge, current, and the magnetic field.	3.4.10A 3.4.10B
Magnetic Fields	Students will understand the principle of magnetism and its	3.4.10C 3.7.10B
Forces with Magnetic Fields	role in creating a magnetic field around magnetized objects.	5.7.10D
Forces on Charged Particles		
Electromotive Forces		
Electric Generators		
Transformers		
Lenz's Law		
Mass of the Electron		
Mass Spectrometer		
Magnetism Lab		

Course Name: PS Physics Unit: Waves

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Frequency, Wavelength, & Velocity of Waves	Students will understand the significance of the principle of	3.4.10A
Wave Interference at Boundaries	superposition in predicting wave behavior.	3.4.10B
Superposition of Waves		3.4.10C
Standing Waves	Students will understand how waves are affected by	3.7.10B
Reflection, Refraction, Diffraction, Interference	reflection, refraction, diffraction, and interference.	
Waves Lab		
	Students will understand the general principles of waves.	

Course Name: PS Physics Unit: Sound

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Sound Waves	Students will demonstrate knowledge of the nature of sound	3.4.10A
	waves and the basic properties that sound shares with all	3.4.10B
Doppler Shift	other waves.	3.4.10C
Pitch and Loudness		3.7.10B
Resonance and Quality of Sound		
Sound Labs		

Course Name: PS Physics Unit: Light

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Speed of Light	Students will demonstrate knowledge of the nature of light	3.4.10A
	waves and the basic properties that light shares with all	3.4.10B
Sources of Light	other waves.	3.4.10C
		3.7.10B
Light and Matter		
Light Lab		

Course Name: PS Physics Unit: Refraction

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Refraction & Snell's Law	Students will understand how certain properties of materials	3.4.10A
	govern the bending of light when moving from one material	3.4.10B
Index of Refraction	to another.	3.4.10C
		3.7.10B
Total Internal Reflection	Students will understand the principle of refraction of light	
	and its relationship to the design and shape of the refracting	
Lenses	surface.	
Dispersion	Students will understand the principle of refraction of light	
	between boundaries.	
Refraction Labs		

Course Name: PS Physics Unit: Reflection

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Law of Reflection	Students will understand the principle of reflection of light	3.4.10A
	and its relationship to the design and shape of the reflecting	3.4.10B
Plane Mirrors	surface.	3.4.10C
		3.7.10B
Concave Mirrors		
Convex Mirrors		
Reflection Labs		

Course Name: PS Physics Unit: Diffraction and Interference

Essential Content/ Essential Questions	Performance Objectives	Standards/Anchors
Single-Slit Interference Patterns	Students will understand the principle of diffraction and	3.4.10A
Double Slit Interference Patterns	interference, as it relates to light passing through one or	3.4.10B 3.4.10C
Double-sht interference i atterns	more sman sites.	3.7.10B
Diffraction Gratings		
Applications of Diffraction		
Diffraction Lab		