

Teacher: CORE Intro to Physics

Year: 2012-13

Course: PHYSICS

Month: All Months

S e p t e m b e r	Pls. visit www.newburyport.k12.ma.us/moodle/						
	Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
	Metric system						
	Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
	Why is measurement important?	Metric System Review	Students should be able to convert from english to metric units as well as convert units of measure within in the metric system.	metric assesment 9/13/2012 conversion quiz 9/13/2012	metric lab	students will use British and Metric units interchangeably. Students can communicate both verbally and literally to each other and the teacher via the SI system of measurement.	
	Linear Motion						
	Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
	How is the motion of an	Velocity, acceleration,	Students should be able to use lab	Quiz 9/13/2012 Exam 9/1/2012	Graphing Lecture /	Students should be able to	STE.13.01.03- Distinguish

object predictable?	displacement, time & graphing	equipment and software to demonstrate a mastery of the described content material. Interpret data from lab experiments and be able to draw conclusions Manipulate formulas involving velocity, distance, and time	Linear Motion Lab 9/1/2012	Demonstration	interpret, define and solve for velocity, time, acceleration, and displacement. Students should also be able to interpret data to graph for these variables. HS.PS-FM Forces and Motion (c) HS-ETS-ETSS Engineering, Technology, Science, and Society (a,b,c,d)	between, and solve problems involving, velocity, speed, and constant acceleration. STE.13.01.04- Create and interpret graphs of motion (position vs. time, speed vs. time, velocity vs. time, constant acceleration vs. time).
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linear motion cont./ Projectile motion

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
Can students predict the outcome of motion in two dimensions?	vector diagrams, pythagorean theorem, two dimensional motion	Students should be able to use lab equipment and software to demonstrate a mastery of the	Test & Lab 10/22/2012 Cannon Lab 10/1/2012	lecture/ powerpoint	Solve for velocity, time, distance, acceleration & gravity. -collect and	STE.13.01.01- Distinguish between vector quantities (velocity, acceleration, and

		described content material. Interpret data from lab experiments and be able to draw conclusions Manipulate formulas involving velocity at angles, range, distance, and time			interpret data for objects moving in one dimension both arithmetically and graphically. -Use of free body diagram to identify forces on an object. -Calculate for force, acceleration & velocity for objects -represent the motion of a projectile through vector diagrams.	force) and scalar quantities (speed and mass). STE.13.01.02- Illustrate how to represent vectors graphically and be able to add them graphically.
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Newtonian Mechanics

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How can Newtons Three Laws of Motion be used to describe and calculate the motion of various objects?	Newtons 3 Laws of Motion	Students should be able to use lab equipment and software to demonstrate a mastery of the described content material.	video presentation 11/1/2012 Pulley Lab 11/1/2012 Force Table Lab 11/1/2012 Test 11/1/2012	newtons Laws Video	Students will calculate for the force, mass and acceleration of an object in motion. Students will have a mastery of the variables used	STE.13.01.06- Interpret and apply Newton's first law of motion. STE.13.01.07- Interpret and apply Newton's second law of

		<p>Interpret data from lab experiments and be able to draw conclusions</p> <p>Manipulate formulas involving force, acceleration, and mass</p>			<p>to describe Newtons three laws of motion. HS.PS-FM Forces and Motion (a, c, d)</p> <p>HS-ETS-ETSS Engineering, Technology, Science, and Society (b,c)</p> <p>HS.ETS-ED Engineering Design (b,c)</p>	<p>motion to show how an object's motion will change only when a net force is applied. STE.13.01.08- Use a free body force diagram with only co-linear forces to show forces acting on an object, and determine the net force on it. STE.13.01.10- Interpret and apply Newton's third law of motion.</p>
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Conservation of Momentum

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How is the velocity of an object predictable after an elastic or	The Law of Conservation of Momentum	Students should be able to use lab equipment and software to	Collision Lab 11/1/2012 MomentumImpulse Quiz 11/1/2012	The Law of Conservation of Momentum lecture and	Students will be able to use the Law of conservation of	STE.13.01.05- Explain the relationship between mass

inelastic collision when momentum is conserved?	Inelastic and Elastic Collisions Impulse	demonstrate a mastery of the described content material. Interpret data from lab experiments and be able to draw conclusions Manipulate formulas involving velocity at angles, range, distance, and time		demonstration Impulse Demos	momentum to solve for the velocity, force, time, impulse, and momentum of objects involved in a collision. HS.PS-FM Forces and Motion (b, c, d, e) HS.ETS-ED Engineering Design (e, f) HS.ETS-ETSS Engineering, Technology, Science, and Society (c)	and inertia. STE.13.01.06- Interpret and apply Newton's first law of motion.	
D e c	Conservation of Energy						
	Essential	Content	Skills	Assessments	Lessons	Learning	Standards

e m b e r	Questions			Benchmarks		
	<p>How does The Law of Conservation of Energy make all motion predictable in the universe?</p>	<p>Conservation of Energy Kinetic and Potential Energy Work and Power</p>	<p>Students should be able to use lab equipment and software to demonstrate a mastery of the described content material. Interpret data from lab experiments and be able to draw conclusions Manipulate formulas involving KE, PE, work, and power Provide examples of how energy can be transformed from kinetic to potential and vice versa Construct a virtual rollercoaster,</p>	<p>Construct and analyze a real or virtual roller coaster . 12/31/2012 Determine power and energy output through stair climb activity. 12/31/2012 Principle of mechanical equalivance via Atwood's machine. 12/31/2012 Quiz solve for KE and PE 12/15/2012 Unit Test Conservation of Energy, Work, Momentum/Impulse, and Power 12/22/2012</p>	<p>Gravitational Potential Energy Solving for GPE Introduce Kinetic Energy Introduce Conservation of Energy Introduce Work Power Problem solving - Energy, work , power Review Energy, Work, and Power</p>	<p>Understand how The Law of Conservation of Energy applies to our world. Be able to use The Law Conservation of Energy to solve complex problems involving PE, KE, work, and power HS.PS-FM Forces and Motion (b, c, e) HS.PS-E Energy (a, b, e, h) HS.ETS-ED Engineering Design (a, b, c) HS-ETS-ETSS Engineering, Technology,</p>

		check for its efficiency, its PE & KE at various points, and work required to initiate movement.			Science, and Society (b, c, d)	
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Heat and Thermodynamics

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How does the predictable nature of thermal energy effect everything in our universe?	<p>The Laws of Thermodynamics</p> <p>Phases of matter</p> <p>Temperature scales</p> <p>Specific Heat of materials</p> <p>Heat transfer between materials</p> <p>Review all mechanics for midterm</p>	<p>Students should be able to use lab equipment and software to demonstrate a mastery of the described content material.</p> <p>Interpret data from lab experiments and be able to draw conclusions</p> <p>Manipulate formulas involving mass, temperature, specific heat, and thermal energy</p>	<p>Quiz Heat Transfer 1/7/2013</p> <p>Heat transfer between mediums 1/16/2013</p> <p>Midterm mechanics 1/23/2013</p>	<p>Temperature</p> <p>How does mass and specific heat effect heat transfer</p> <p>Solving heat transfer problems</p> <p>Solving complex heat transfer problems</p> <p>Review for Midterm</p>	<p>Be able to relate temperatures in different scales to each other</p> <p>Understand how heat relates to energy and how heat transfers between mediums.</p> <p>Determine what factors effect heat transfer in order to solve complex problems.</p>	<p>STE.13.03.01- Relate thermal energy to molecular motion.</p> <p>STE.13.03.02- Differentiate between specific heat and heat capacity.</p> <p>STE.13.03.03- Explain the relationship among temperature change in a substance for a given amount of heat transferred, the amount (mass) of the substance, and</p>

		Analyze graphs in order to solve complex heat transfer problems Be able to determine when to use different temperature scales and interchange between them.				the specific heat of the substance. STE.13.03.04- Recognize that matter exists in four phases, and explain what happens during a phase change.
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Wave Theory

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How is the motion of energy that travels as a mechanical wave predictable?	Transverse, Longitudinal, and Mechanical waves wavelength, frequency, period, and speed of waves Pendulums Sound waves Doppler effect	Students should be able to use lab equipment and software to demonstrate a mastery of the described content material. Interpret data from lab experiments and be able to draw conclusions	Waves Quiz 2/12/2013 Pendulum Lab 2/1/2013 Sound Quiz 2/20/2013 Doppler effect quiz 2/25/2013 Waves and Sound Test 2/28/2013	Simple Harmonic Motion What is a wave and how it travels Types of waves Waves properties Sound Doppler effect	Differentiate between longitudinal, transverse, and mechanical waves Recognize how different waves travel in different mediums Solve for period of pendulum and recognize how gravity affects the period and frequency	STE.13.04.01- Differentiate between wave motion (simple harmonic nonlinear motion) and the motion of objects (nonharmonic). STE.13.04.02- Recognize the measurable properties of waves (e.g., velocity,

		<p>Manipulate formulas involving frequency, period, and velocity</p> <p>Describe the measurable properties of waves (velocity, frequency, wavelength, amplitude, period) and explain the relationships among them. Recognize examples of simple harmonic motion.</p>			<p>Explain what the doppler effect is and how it effects the properties of a wave</p> <p>frequency, wavelength) and explain the relationships among them. STE.13.04.03- Distinguish between transverse and longitudinal waves. STE.13.04.04- Distinguish between mechanical and electromagnetic waves. STE.13.04.06- Recognize the effects of polarization, wave interaction, and the Doppler effect. STE.13.04.07- Explain, graph, and interpret graphs of constructive and destructive interference of waves. STE.13.04.08-</p>
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							Explain the relationship between the speed of a wave (e.g., sound) and the medium it travels through. STE.13.04.09-Recognize the characteristics of a standing wave and explain the conditions under which two waves on a string or in a pipe can interfere to produce a standing wave.
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h EM Wave Propogation

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How has the knowledge and use of the electromagnetic waves effected our society?	Characteristics of EM waves (speed, wavelength, frequency, energy level) Visible Light (Color)	Students should be able to use lab equipment and software to domonstrate a mastery of the described content material. Interpret data	Quiz EM Wave 3/7/2013 Light Quiz 3/15/2013 Light Quiz 3/20/2013 Wave presentations 3/1/2013	EM Spectrum Color Demo Characteristics and properties of light	Be able to describe how each of the 7 EM waves differ from each other and how/why each of them are used in technology. Be able to solve	STE.13.04.02-Recognize the measurable properties of waves (e.g., velocity, frequency, wavelength) and explain the relationships

		The Law of Reflection, Refraction, Diffraction, and Dispersion of Light	from lab experiments and be able to draw conclusions Manipulate formulas involving speed, wavelength, and frequency of EM waves			mathematically for speed, frequency, and wavelength for a light wave Understand what happens to light as it travels through a transparent medium (converging/diverging lenses).	among them. STE.13.04.04-Distinguish between mechanical and electromagnetic waves. STE.13.04.05- Interpret and be able to apply the laws of reflection and refraction (qualitatively) to all waves. STE.13.04.08- Explain the relationship between the speed of a wave (e.g., sound) and the medium it travels through.
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Wave Theory Continued ~ Optics

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How has the knowledge and use of the visible light waves effected technology in our	Optics - Mirrors and Lenses	Students will be able to draw a ray diagram for all types of mirrors and lenses to	Optics Lab 4/1/2013 Optics Presentations 4/1/2013 Light Wave Test	Optics Demo Convex and Concave Mirrors Converging and Diverging Lenses	Understand what happens to light as it travels through a transparent medium (converging/diverging lenses).	STE.13.04.05- Interpret and be able to apply the laws of reflection and refraction (qualitatively) to

society?		determine and describe the images produced. Manipulate formulas involving focal point, image/object distances, and magnification.	4/15/2013		Understand what happens to light as it reflects of curved surfaces (concave and convex mirrors) Understand how the properties of concave/convex mirrors and lenses effect the image of an object.	all waves. STE.13.04.08- Explain the relationship between the speed of a wave (e.g., sound) and the medium it travels through.
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Electrostatics and Circuits

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How has the predictable nature of electricity (both static and kinetic) had an effect on our lives?	Atomic Structure Static Electricity Circuits	Students should be able to use lab equipment and software to demonstrate a mastery of the described content material. Interpret data from lab experiments and be able to draw conclusions	Static Electricity Lab 5/1/2013 Static Electricity Quiz 5/1/2013 Circuit Lab 5/1/2013 Circuit Exam 5/1/2013	Atomic Theory and Structure Properties of Materials (conductors and Insulators) Static Electricity Circuit Diagrams Effects of Voltage and Resistance on the Current in a Circuit	Understand how a materials atomic structure effects it's ability to hold or carry a charge. Understand how the resistance and voltage in a circuit effect the amount of current that flows through a circuit Understand the	

		<p>Manipulate formulas involving voltage, resistance, current, and power</p> <p>Students will be able draw and solve for any variable in a circuit diagram</p>			<p>properties of a series, parallel, and combination circuit and be able to solve for the different variables.</p>	
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Review MCAS/ Final

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How has the knowledge of sound and light waves along with electricity shaped our society.	Thermodynamics, Wave Theory, Sound, Light, Optics, Electrostatics, and Circuits	Have the ability to use and manipulate a variety of formulae to calculate for any of the for mentioned domains in the content area.	Physics Final Exam 6/12/2013	Final Review	Students should be comfortable manipulating equations and using physics theory to solve problems.	STE.13.02.06- Identify appropriate standard international units of measurement for energy, work, power, and momentum. STE.13.03.01- Relate thermal energy to molecular motion.

						<p>STE.13.03.02- Differentiate between specific heat and heat capacity.</p> <p>STE.13.03.03- Explain the relationship among temperature change in a substance for a given amount of heat transferred, the amount (mass) of the substance, and the specific heat of the substance.</p> <p>STE.13.03.04- Recognize that matter exists in four phases, and explain what happens during a phase change.</p>
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