NHPS Physics CURRICULUM OVERVIEW

To be Revised 07-08

I) Traditional Physics (Honors/Academic)

II)Physics for All (Academic/Conceptual)

Physics Curriculum Outline 2001

Unit 1: Skills and Concepts

Topics: Scientific Notation
Metric System
Graphs and Charts
Equation Manipulation
Laboratory Safety

Performance Standards:
After completing this unit the student will be able to:

1. Demonstrate the ability to use scientific notation.
2. Perform arithmetic operations.
3. State the fundamental metric system units of time, length, mass and volume.
4. Prepare tables, charts, and graphs and read and interpret data.
5. Demonstrate knowledge of safety rules by following them in the laboratory.

Activities:

1. Paper Tower
2. Reaction Time

Unit 2: Mechanics

Topics: Scalars and Vectors
Kinematics (Motion)
Newton's Laws of Motion
Energy, Work and Power
Impulse and Momentum
Universal Gravitation

Performance Standards:
After completing this unit the student will be able to:

1. Differentiate between vector and scalar quantities.
2. Add vectors graphically and analytically.
3. Resolve a vector into its horizontal (x) and vertical (y) components.
4. Differentiate between displacement, distance, velocity, and speed.
5. Calculate the velocity of a moving object.
6. Plot and interpret a velocity-time graph.
7. Differentiate between instantaneous and average velocity.
8. Determine the velocity and displacement for objects under constant acceleration.
9. Learn to use an organized strategy for solving motion problems.
10. State Newton's three Law's of Motion and display an understanding of their applications.
11. Use Newton's Laws of Motion in solving problems.
12. Calculate the work done by a force.
13. Differentiate between work and power.
14. Define kinetic and potential energy.
15. Apply work-energy theorem.
16. State the law of conservation of energy.
17. Apply the law of conservation of energy to mechanical systems.
18. Demonstrate knowledge of the way simple machines are useful.
19. Define momentum and impulse.
20. Use the momentum-impulse theorem to calculate the changes in momentum.
21. Demonstrate the difference between elastic and inelastic collisions.
22. Recognize how Kepler's Laws resulted in Newton's Laws of Gravitation.
23. State that gravitational force is proportional to both masses and the inverse square of the distance between the centers of spherical bodies.

Activities:

1. Finding the resultant vector.
2. The elevator ride.

3. Getting straight.
4. Your power
5. Playground/Amusement Park Physics

Demonstrations:

1. Momentum conservation
2. Collisions
3. Newton's Second Law

Laboratory Experiments:

1. Calculating Coefficients of friction.
2. Two-Dimensional motion.
3. Velocity and Acceleration
4. Gravitational experiment
5. Projectile experiment
6. Pendulum experiment
7. Slinky Lab

Unit 3: Waves

Topics: Wave Properties
Types of Waves
Wave Interference
Reflection and Refraction
Sound
Light

Performance Standards:
After completing this unit the student will be able to:

1. Define wavelength, frequency, period and amplitude.
2. Distinguish between longitudinal and transverse waves.
3. Demonstrate that wave speed depends upon the medium.
4. State the law of reflection.
5. Describe refraction in terms of behavior of a transmitted wave.
6. Define defraction of a wave around a barrier.
7. Relate physical properties of sound waves to perceived pitch and loudness.
8. Define the Doppler shift and identify some applications.
9. Show an understanding of resonance.
10. Identify the parts of the ear and the function of each in detecting sound.
11. Define transparent, translucent, and opaque.
12. Demonstrate the formation of color by addition of light and by subtraction by pigments and dyes.
13. Describe methods of producing polarized light.
14. Predict whether a ray will be bent toward or away from normal when light moves from one medium to another.
15. Describe the image produced by a plane mirror.
16. Explain how concave mirrors form real and virtual images.
17. Explain how convex mirrors form virtual images using ray diagrams.

Activities:

1. Waves on a Snaky

Demonstrations:

1. Doppler Effect
2. Frequency
3. Resonance
4. Mixing colored light

Laboratory Experiments:

1. Bending of Light
2. Determining the speed of sound

Unit 4: Electricity and Magnetism

Topics:
Charges
Static Electricity
Coulomb's Law
Current, Voltage, and Resistance
Ohm's Law
Series and Parallel Circuits
Electromagnetism
Motors and Generators

Performance Standards:
After completing this unit the student will be able to:

1. Recognize the basic properties of electrical interaction.
2. Demonstrate how to charge an object.
3. State the difference between conductors and insulators.
4. State Coulomb's Law and how the force depends on the charges and their separation.
5. Define an electric current and the ampere.
6. Solve problems involving current, voltage, resistance, and power.
7. Describe Ohm's Law.
8. Diagram simple electric circuits.
9. Describe a series connection.
10. Calculate current, voltage drops and equivalent resistance when devices are connected in series.
11. Describe a parallel connection.
12. Calculate current, voltage drops and equivalent resistance when devices are connected in parallel.
13. Describe magnetic fields around permanent magnets and between like and unlike poles.
14. Explain the design and operation of an electric motor.
15. Explain how an electric generator works and how it differs from an electric motor.

Demonstrations:

1. Tesla coil or balloon static

Laboratory Experiments:

1. Coulomb's Law
2. Circuits
3. What's the Charge?
4. Light Intensity

Teacher Strategies

1. Lecture/Discussion/Overhead Presentation
2. Small-group work/Cooperative Learning
3. Manipulatives
4. Independent Study/Projects
5. Technology/Scientific Advancements
6. Questioning Teacher/Student dialogue, developing critical thinking skills
7. Facilitating Active Scientific Inquiry

Assessment

I. Performance Based Assessment of Laboratory Reports, Projects, Written Work—including Research Papers and Essays, and Oral Presentations/Communication

Rubrics—Holistic and Analytical
- Student Self-Assessments
- Teacher Evaluation of Product

I. Traditional
- Chapter/Unit Exams
- Quizzes
- Homework
- Mid-term and Final Exams

I. Direct Observation of Groupwork
- Cooperative Learning groups

I. Grading
- Mid-term and Final Exams are each 10% of the final grade for the course.
- Each Marking Period Grade is 20% of the final grade for the course.
- Each Marking Period Grade varies according to the needs of the group: generally 30-60% Written Work, 20-40% Tests/Quizzes, 20-50% Laboratory Activities, and 10-20% Class Participation/Presentations.

Resources

Brueningsen, Chris & Wesley Krawiec. TI: Exploring Physics and Math with CBL System.

Brueningsen C., Bower B., Antinone L., and Brueningsen E. TI: Real World Math with CBL & TI 82.

Zitzewitz, Paul. Physics: Principles and Problems, Glencoe, 1992.

ACADEMIC/CONCEPTUAL PHYSICS

Physics is the most basic of sciences. It is the study of the physical world, the interrelationship between matter and energy. Topics included in the study of Physics include the theoretical and experimental study of motion and forces, friction and momentum, fluid dynamics, thermodynamics and heat, wave motion, sound, light and optics, electromagnetism and modern physics. An integral part of the course is extensive laboratory experiments with a variety of equipment, from simple to highly technological. Students are expected to mathematically analyze physical phenomena and apply the laws of physics. Students will work with scientific concepts by analyzing data, solving problems, group work and discussion and extensive applications of math and writing.

Throughout the course students work in cooperatively to investigate physical phenomena, collect and analyze data and draw conclusions. Students also apply physics to real world situations, and use their experiences to make decisions. All students who plan any type of scientific, medical or engineering career should complete a high school physics course.

Honors students are expected to complete extensive projects, be independently motivated, and have high-level math ability.

Prerequisites:

C or better in Algebra I, completion of Geometry
completion or concurrent enrollment in Chemistry

(Honors)
B or better in Algebra I, completion of Algebra II.
C or better in Chemistry
Science Department recommendation

(see www.richtherrn.net/physics)

Beginning Curriculum Map	Subject: PHYSICS	Grade: 11-12 :

	August/September	October
Essential Questions	How do we analyze moving objects? What makes a good observation, measurement and experiment in physics?	Should I speed up or slow down at a yellow light? How can physics be used to analyze motion and traffic?
Content	-Properties and measurement -Graphing -Graphing of motion -Distance and Velocity	-One Dimensional Acceleration (Kinematics) - Relative Motion
Objectives	-use measuring devices and senses to observe and record physical properties of matter -Develop an understanding of the measurements and units used in physics -Design and conduct a good physics experiment. -Use distance time and velocity time graphs to analyze moving objects -Be able to explain speed (velocity), time, and acceleration.	-continue using math, measurement, observation and experimentation skills to analyze moving objects. -use computer assisted technology to analyze moving objects. -develop the relationships between the variables involved in moving objects. -use algebraic equations to solve simple one dimensional motion word problems. -use physics to make predictions about accelerated objects. -use research skills and algebra to apply knowledge of accelerated motion to a real life situation. -determine what factors affect the acceleration due to gravity.
Instructional Strategies/ Activities	-gyroscope investigation -science sleuth day at the races -moving on down car lab (open ended) -stump the teacher, design own unit activities -graphing motion lab with graphing calculators. -graphing motion activities	-Interactive Physics with accelerated motion -Rolling Down ramp lab with “Where Will They Collide?” and “Half The Trip” components. - Determination of g gravity lab. (open ended) - word problem group activities -Yellow Light Project -Long Term Traffic Study
Assessment Types	-moving on down car lab (schoolwide rubric) -group lab activities -essay on speed in life (schoolwide rubric) -quizzes and tests	-labs, including g lab (schoolwide rubric) -word problems -Yellow Light Project -essay on traffic (schoolwide rubric) -test
Science Inquiry Skills	ALL (numeracy, experimentation, measurement, communication, society)	ALL (numeracy, experimentation, measurement, communication, society)
Interdisciplinary Connections	MATH	MATH SOCIAL STUDIES

Beginning Curriculum Map	**Subject:** PHYSICS	**Grade: 11-12**

	November	**December**
Essential Questions	Why is all motion relative? How can we analyze two dimensional motion? How can I use physics to shoot a dart gun at my teacher?	What makes things move? What are the fundamental forces? How do Newton's Laws predict the behavior of moving objects? How do other forces (air resistance/friction) affect moving objects? (dynamics)
Content	-Relative Motion -Special Relativity -Vectors -Projectile Motion	-Forces -Newton's Laws -Air Resistance/Friction
Objectives	**1. continue using math, measurement, observation and experimentation skills to analyze moving objects.** **2. use computer assisted technology to analyze moving objects.** **3. use the concepts of relative motion.** **4. be able to explain the consequences of special relativity for moving objects.** **5. use vectors to analyze 2 dimensional motion.** **6. determine the results of projectile motion using x and y sets of kinematic equations.**	**1. continue using math, measurement, observation and experimentation skills to analyze moving objects.** **2. use computer assisted technology to analyze moving objects.** **3. explain the fundamental forces in the universe.** **4. use Newton's Laws to explain the relationship between force, mass and acceleration.** **5. be able to predict the results of air resistance (terminal velocity)** **6. find out what factors affect friction** **7. use physics to analyze Santa Claus**
Instructional Strategies/ Activities	-Relative Motion on Interactive Physics -Special Relativity Movies and Readings. -Vector Mapping Lab and Class Races. -Projectile Lab (Ball off a Table), using 2D. -Dart Gun Lab "The Firing Squad" -vector movie -Three sets of word problems and group sheets	-movie/reading on fundamental field forces. -Newton's Laws Investigation -Terminal Velocity Lab (interactive physics and real (coffee filters/balloons)). -Determination of Friction Lab -Three sets of word problems and group sheets. -Physics of Santa activity
Assessment Types	-Group Labs (Vector, relative, Projectile) -Individual Lab "Firing Squad" (schoolwide rubric) -Homework checks quiz and test	-Homework and group class work. -Group Labs -Individual Labs (Friction) (schoolwide rubric) -Quiz

Science Inquiry Skills	ALL (numeracy, experimentation, measurement, communication, society)	ALL (numeracy, experimentation, measurement, communication, society)
Interdisciplinary Connections	MATH	MATH

Beginning Curriculum Map	**Subject:** PHYSICS	**Grade: 11-12**

	January	**February**
Essential Questions	How can physics be used to analyze traffic collisions?	How much energy does my life use in a week? Should we use simple machines? How are mechanical energy transformations analyzed and how do they affect your life?
Content	Forces (continued) Conservation of Momentum Collisions	-Energy -Work and Mechanical Advantage -Simple and Complex Machines -Mechanical Energy
Objectives	**1. continue using math, measurement, observation and experimentation skills to analyze moving objects.** **2. use computer assisted technology to analyze moving objects.** **3. determine all the forces and properties, including momentum, on a moving object.** **4. use the principle of conservation of momentum in elastic and inelastic collisions.** **5. determine all the factors involved in common collisions, and use physics to evaluate.**	**1. describe how energy is transformed and conserved in everyday life and technology.** **2. explain the use of machines to gain mechanical advantage and in assisting society.** **3. analyze the transformations of mechanical energy (kinetic, gravitational and elastic) in moving objects.** **4. relate the different types of energy and how they are measured.**
Instructional Strategies/ Activities	-conservation of momentum lab. -pool game activity -collision of cars activity -police/traffic investigation -videodisc science sleuth traffic accident	-energy transformations in society discussion, video and activity. -simple and complex machines lab -word problems on mechanical energy and work. -science sleuths collapsing bleachers, moving monuments. -energy of bouncing ball lab, energy of elastic ball lab -Energy in Life Project -Rube Goldberg competition and videos
Assessment Types	-one set of word problems -traffic study (pt 2) -group labs -test	- group labs -two sets of word problems -use of complex machines in society essay (schoolwide rubric) -test

Science Inquiry Skills	ALL (numeracy, experimentation, measurement, communication, society	ALL (numeracy, experimentation, measurement, communication, society)
Interdisciplinary Connections	MATH SOCIAL STUDIES	MATH TECH ED SOCIAL STUDIES ART

Beginning Curriculum Map	**Subject:** PHYSICS	**Grade: 11-12**

	March	**April**
Essential Questions	How much energy does my life use in one week? How are energy transformations analyzed and how do they affect your life? How do we get and use electricity? How do we get and use heat?	How is fluid pressure like energy? How can we use physics to make things fly? How do we analyze simple harmonic oscillators and wave motion, and how can they be useful?
Content	-Energy transformations (cont) -Electricity, electric generation, circuits -Heat and thermodynamics	-Pressure and density -Bernouilli's Principle and flight -Simple harmonic oscillators -Wave Motion
Objectives	**1. analyze energy transformations in electricity and heat.** **2. explain basic concepts of power, current, voltage, resistance in electrical circuits and relate it to mechanical energy.** **3. describe the energy transformations needed to generate electricity for our devices.** **4. analyze series and parallel circuits.** **5. explain the concepts of heat transfer** **6. relate the laws of thermodynamics and work**	**1. explain the units and measurements of pressure and density.** **2. describe how Bernouilli's Principle is a restatement of the conservation of energy.** **3. use fluid pressure principles to analyze flight** **----------** **4. describe and analyze the behavior of simple harmonic oscillator systems, such as pendulums and springs.** **5. describe the property of waves**
Instructional Strategies/ Activities	-electrical investigations online -science sleuth energy mystery house -electric generator/motor demo/lab -electric circuit lab -Energy to take a shower activity -Energy in Life Project -Heat and Work Lab (specific heat) -Newton's Law of Cooling Lab -science sleuth burning barn	-pressure investigation with water and bottles. -pressure word problems and conceptual questions. -videos and notes on flight. -paper airplane contest. -lab with pendulum and spring -wave motion problems. -wave tank labs.
Assessment Types	-essay on energy use in life (school-wide rubric) -group labs (electric, heat) -Individual lab: Heat Cooling (School-wide	-group labs -word problem sets -individual lab (school-wide rubric) -test

	rubric) -Conceptual question sets (three) on heat -electric word problems -Energy in Life Project, and discussion/forum -Test	
Science Inquiry Skills	ALL (numeracy, experimentation, measurement, communication, society)	ALL (numeracy, experimentation, measurement, communication, society)
Interdisciplinary Connections	MATH HEALTH SOCIAL STUDIES	MATH TECH ED

Beginning Curriculum Map	**Subject:** PHYSICS	**Grade: 11-12**

	May	**June**
Essential Questions	How can we build better rides at an amusement park? How are all types of waves related? How do sound waves make music?	What causes us to see the things we do?
Content	-Circular Motion -Sound Waves -Music	-Light production -color -reflection and refraction -polarization
Objectives	**1. relate motion, waves and circular motion with frequency, period and wavelength.** **2. use principles of physics in designing and analyzing amusement park rides.** **3. explain the cause of different sounds.** **4. describe and predict music**	**1. explain how light is produced and perceived** **2. describe applications of color addition and subtraction** **3. use the principles of reflection and refraction to analyze light.**
Instructional Strategies/ Activities	-circular motion investigation -design roller coaster lab -Lake Compounce Amusement Park Field trip -circular motion word problems -sound wave notes -computer analysis of sound activity. -resonance sound lab -musical instrument study --science sleuths noises in school	-Light notes -Color/Spectra Lab -Dark Suckers -Mirror/Lenses Lab -Group Laser Challenge - science sleuth fogged filters
Assessment Types	-group labs -design process worksheets -word problem and classwork checks -quiz (circular)	-group labs -conceptual question sheets -essay on application of light and sound waves (school-wide rubric) -Test
Science Inquiry Skills	ALL (numeracy, experimentation, measurement, communication, society)	ALL (numeracy, experimentation, measurement, communication, society)
Interdisciplinary Connections	MATH MUSIC	MATH ART

PHYSICS **CURRICULUM TEMPLATE**

Essential Questions: How do we analyze moving objects?

What makes a good observation, measurement and experiment in physics?

OBJECTIVES	**CORRESPONDING CT FRAMEWORKS**	**RECOMMENDED INSTRUCTIONAL STRATEGIES**	**ASSESSMENT TOOL**	**TIMELINES**	**RESOURCES**
1. use measuring devices and senses to observe and record physical properties of matter **2. Develop an understanding of the measurements and units used in physics** **3. Design and conduct a good physics experiment.**		1. gyroscope investigation 2. science sleuth day at the races 3. moving on down car lab (open ended) 4. stump the teacher, design own unit activities	moving on down car lab (school-wide rubric) -group lab activities -essay on speed in life (school-wide rubric) -quizzes and tests	2 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets
4. Use distance time and velocity time graphs to analyze moving objects **5. Be able to explain speed (velocity), time, and acceleration.**		1. graphing motion lab with graphing calculators. 2. graphing motion activities		2 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets

PHYSICS **CURRICULUM**

Essential Questions: Should I speed up or slow down at a yellow light?
How can physics be used to analyze motion and traffic

OBJECTIVES	CORRESPONDING CT FRAMEWORKS	RECOMMENDED INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL	TIMELINES	RESOURCES
1. continue using math, measurement, observation and experimentation skills to analyze moving objects. **2. use computer assisted technology to analyze moving objects.** **3. develop the relationships between the variables involved in moving objects.** **4. use algebraic equations to solve simple one dimensional motion word problems.** **5. use physics to make predictions about accelerated objects.** **6. use research skills and algebra to apply knowledge of accelerated motion to a real life situation.** **7. determine what factors affect the acceleration due to gravity**		-Interactive Physics with accelerated motion -Rolling Down ramp lab with "Where Will They Collide?" and "Half The Trip" components. - Determination of g gravity lab. (open ended) - word problem group activities -Yellow Light Project -Long Term Traffic Study	labs, including g lab (school-wide rubric) -word problems -Yellow Light Project -essay on traffic (school-wide rubric) -test	4 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets

PHYSICS **CURRICULUM**

Essential Questions: Why is all motion relative?

How can we analyze two dimensional motion?

OBJECTIVES	**CORRESPONDING CT FRAMEWORKS**	**RECOMMENDED INSTRUCTIONAL STRATEGIES**	**ASSESSMENT TOOL**	**TIMELINES**	**RESOURCES**
1. continue using math, measurement, observation and experimentation skills to analyze moving objects. **2. use computer assisted technology to analyze moving objects.** **3. use the concepts of relative motion.** **4. be able to explain the consequences of special relativity for moving objects.** **5. use vectors to analyze 2 dimensional motion.** **6. determine the results of projectile motion using x and y sets of kinematic equations.**		Relative Motion on Interactive Physics -Special Relativity Movies and Readings. -Vector Mapping Lab and Class Races. -Projectile Lab (Ball off a Table), using 2D. -Dart Gun Lab "The Firing Squad" -vector movie -Three sets of word problems and group sheets	-Group Labs (Vector, relative, Projectile) -Individual Lab "Firing Squad" (schoolwide rubric) -Homework checks quiz and test	4 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets

PHYSICS **CURRICULUM**

OBJECTIVES	**CORRESPONDING CT FRAMEWORKS**	**RECOMMENDED INSTRUCTIONAL STRATEGIES**	**ASSESSMENT TOOL**	**TIMELINES**	**RESOURCES**
1. continue using math, measurement, observation and experimentation skills to analyze moving objects. **2. use computer assisted technology to analyze moving objects.** **3. explain the fundamental forces in the universe.** **4. use Newton's Laws to explain the relationship between force, mass and acceleration.** **5. be able to predict the results of air resistance (terminal velocity)** **6. find out what factors affect friction** **7. use physics to analyze Santa Claus**		-movie/reading on fundamental field forces. -Newton's Laws Investigation -Terminal Velocity Lab (interactive physics and real (coffee filters/balloons)). -Determination of Friction Lab -Three sets of word problems and group sheets. -Physics of Santa activity	-Homework and group class work. -Group Labs -Individual Labs (Friction) (schoolwide rubric) -Quiz	3 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets

PHYSICS **CURRICULUM**

Essential Question: How can physics be used to analyze traffic collisions?

OBJECTIVES	**CORRESPONDING CT FRAMEWORKS**	**RECOMMENDED INSTRUCTIONAL STRATEGIES**	**ASSESSMENT TOOL**	**TIMELINES**	**RESOURCES**
1. continue using math, measurement, observation and experimentation skills to analyze moving objects. **2. use computer assisted technology to analyze moving objects.** **3. determine all the forces and properties, including momentum, on a moving object.** **4. use the principle of conservation of momentum in elastic and inelastic collisions.** **5. determine all the factors involved in common collisions, and use physics to evaluate**.		-conservation of momentum lab. -pool game activity -collision of cars activity -police/traffic investigation -videodisc science sleuth traffic accident	-one set of word problems -traffic study (pt 2) -group labs -test MIDTERM EXAM: Motion, Forces	3 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets

PHYSICS **CURRICULUM**

Essential Questions: How much energy does my life use in a week?
Should we use simple machines?
How are mechanical energy transformations analyzed and how do they affect your life?

OBJECTIVES	**CORRESPONDING CT FRAMEWORKS**	**RECOMMENDED INSTRUCTIONAL STRATEGIES**	**ASSESSMENT TOOL**	**TIMELINES**	**RESOURCE**
1. describe how energy is transformed and conserved in everyday life and technology. **2. explain the use of machines to gain mechanical advantage and in assisting society.** **3. analyze the transformations of mechanical energy (kinetic, gravitational and elastic) in moving objects.** **4. relate the different types of energy and how they are measured.**		1. energy transformations in society discussion, video and activity. 2. simple and complex machines lab 3. word problems on mechanical energy and work. 4. science sleuths collapsing bleachers, moving monuments. 5. energy of bouncing ball lab, energy of elastic ball lab 6. Energy in Life Project 7.Rube Goldberg competition and videos	- group labs -two sets of word problems -use of complex machines in society essay (school-wide rubric) -test	3 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets

PHYSICS **CURRICULUM**

Essential Questions: How much energy does my life use in one week?
How are energy transformations analyzed and how do they affect your life?
How do we get and use electricity?
How do we get and use heat?

OBJECTIVES	**CORRESPONDING CT FRAMEWORKS**	**RECOMMENDED INSTRUCTIONAL STRATEGIES**	**ASSESSMENT TOOL**	**TIMELINES**	**RESOURCES**
1. analyze energy transformations in electricity and heat. **2. explain basic concepts of power, current, voltage, resistance in electrical circuits and relate it to mechanical energy.** **3. describe the energy transformations needed to generate electricity for our devices.** **4. analyze series and parallel circuits.** **5. explain the concepts of heat transfer** **6. relate the laws of thermodynamics and work**		electrical investigations online -science sleuth energy mystery house -electric generator/motor demo/lab -electric circuit lab -Energy to take a shower activity -Energy in Life Project -Heat and Work Lab (specific heat) -Newtons Law of Cooling Lab -science sleuth burning barn	-essay on energy use in life (schoolwide rubric) -group labs (electric, heat) -Individual lab: Heat Cooling (Schoolwide rubric) -Conceptual question sets (three) on heat -electric word problems -Energy in Life Project, and discussion/forum -Test	4 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets

PHYSICS **CURRICULUM**

Essential Questions: How is fluid pressure like energy?
How can we use physics to make things fly?
How do we analyze simple harmonic oscillators and wave motion, and how can they be useful?

OBJECTIVES	**CORRESPONDING CT FRAMEWORKS**	**RECOMMENDED INSTRUCTIONAL STRATEGIES**	**ASSESSMENT TOOL**	**TIMELINES**	**RESOURCES**
1. explain the units and measurements of pressure and density. **2. describe how Bernouilli's Principle is a restatement of the conservation of energy.** **3. use fluid pressure principles to analyze flight**		1. pressure investigation with water and bottles. 2.pressure word problems and conceptual questions. 3. videos and notes on flight. 4. paper airplane contest	-group labs -word problem sets -test	2 weeks	lab equipment videodisc computers labpros measuring tools teacher made labs and sheets
---------- **1. describe and analyze the behavior of simple harmonic oscillator systems, such as pendulums and springs.** **2. describe the property of waves**		**----------** 1. sho lab with pendulum and spring 2. wave motion problems. 3. wave tank labs.	-word problem sets -test -individual lab (sho) (schoolwide rubric)	2 weeks	

PHYSICS **CURRICULUM**

Essential Questions: How can we build better rides at an amusement park?
How are all types of waves related?
How do sound waves make music?

OBJECTIVES	CORRESPONDING CT FRAMEWORKS	RECOMMENDED INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL	TIMELINES	RESOURCES
1. relate sho motion, waves and circular motion with frequency, period and wavelength. **2. use principles of physics in designing and analyzing amusement park rides.** **----------** **1. explain the cause of different sounds.** **2. describe and predict music**		-circular motion investigation -design roller coaster lab -Lake Compounce Amusement Park Field trip -circular motion word problems ---------- -sound wave notes -computer analysis of sound activity. -resonance sound lab -musical instrument study --science sleuths noises in school	-group labs -design process worksheets -word problem and classwork checks -quiz (circular) -group labs -word problem and classwork checks -quiz (sound)		lab equipment videodisc computers labpros measuring tools teacher made labs and sheets

PHYSICS **CURRICULUM**

Essential Questions: What causes us to see the things we do?

OBJECTIVES	CORRESPONDING CT FRAMEWORKS	RECOMMENDED INSTRUCTIONAL STRATEGIES	ASSESSMENT TOOL	TIMELINES	RESOURCES
1. explain how light is		-Light notes -Color/Spectra Lab	-group labs -conceptual	2 weeks	lab equipment videodisc

produced and perceived **2. describe applications of color addition and subtraction** **3. use the principles of reflection and refraction to analyze light.**		-DarkSuckers -Mirror/Lenses Lab -Group Laser Challenge - science sleuth fogged filters	question sheets -essay on application of light and sound waves (schoolwide rubric) -Test FINAL EXAM (Energy, Waves)		computers labpros measuring tools teacher made labs and sheets