

Wallenpaupack Area School District

COURSE: Physics I

GRADE LEVEL: 10-12

LENGTH OF COURSE: 120 hours

TEXT: Modern Physics, third edition

PUBLISHER: Holt

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COURSE DESCRIPTION:

This course is designed to be a college preparatory introductory course. It covers the areas of kinematics and dynamics, force and motion, circular and curved motion, atomic theory, thermodynamics and waves using algebra and geometry as its mathematical base. Effective presentation of this physics material is based on a rigorous treatment of mechanics. Measurement and problem solving techniques are also presented. Because mathematics is the language of physics, an adequate preparation in algebra is an essential prerequisite. Geometry and trigonometry necessary for some problem solving are presented by the instructor as part of the physics curricula. The course also stresses the importance of using high tech tools such as computer data collection and analysis as a necessary part of high school and college physics.

CURRICULUM WRITING TEAM:

T. Kietrys

DATE OF REVISION:

2005

Wallenpaupack Area School District

Course: Physics I

Grade Level: Grade 10 - 12

Unit: Velocity and Acceleration

PA Standards: 3.1.10.A
3.1.10.C
3.1.12.C

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| Topics: <ol style="list-style-type: none">1. Velocity and speed2. Acceleration3. Newton's law of motion4. Gravitation | Skills: <ol style="list-style-type: none">1. 9 Problems solving skills2. MKS unit analysis3. Graphing, data analysis4. Data collection using high tech tools, interface and probes5. Calculator skills and operation of scientific functions6. Laboratory procedures for measuring and calculating, D, vel, accel and time |
| Activities: <ol style="list-style-type: none">1. Laboratory work in laboratory groups2. Group projects and individual projects3. Cooperative learning groups4. Board demonstrations5. Guided practice6. Homework | Performance Assessments: <ol style="list-style-type: none">1. Teacher-made chapter tests and quizzes2. Student notebook3. Projects (individual & group)4. Laboratory work and reports5. Final Exam |

Wallenpaupack Area School District

Course: Physics I

Grade Level: 10-12

Unit: Concurrent and Parallel Forces

PA Standards: 3.1.10.D
 3.1.10.E
 3.1.12.D
 3.1.12.E
 3.2.10.C
 3.4.10.B
 3.4.12.B
 3.7.10.A
 3.7.10.B
 3.7.12.A

| Topics: | Skills: |
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| 1. Vectors: concurrent and opposing 2. Vectors: right angle interactions 3. Resultant and equilibrant vectors and force tables 4. Non-right angle interactions and vector solution methods 5. Multiple vector interactions 6. Inclined planes 7. Friction 8. Frictional vectors as components of gravitation 9. Parallel forces and torque | 1. Higher order problem solving skills 2. Metric system prefixes 3. Graphing, data analysis 4. Data collection using high tech tools, interface and probes 5. Calculator skills, operations involving sin, cosine, tan and inverse functions 6. Laboratory procedures for measuring and calculating vectors and resultant vectors analysis using a force table 7. Applying equilibrant vectors |
| Activities: | Performance Assessments: |
| 1. Laboratory work in laboratory groups 2. Groups projects and individual projects 3. Cooperative learning groups 4. Board demonstrations 5. Guided practice 6. Homework | 1. Teacher-made chapter tests and quizzes 2. Student notebook 3. Projects (individual & group) 4. Laboratory work and reports 5. Final Exam |

Wallenpaupack Area School District

Course: Physics I

Grade Level: 10-12

Unit: Two dimensional and periodic motion

PA Standards: 3.1.10.B
3.1.10.C
3.1.10.D
3.1.12.C
3.1.12.D
3.4.10.A
3.7.10.A
3.7.10.B
3.7.12.A

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| Topics: <ol style="list-style-type: none">1. Motion in a curved path2. Motion in a circular path3. Harmonic motion4. Periodic motion5. Pendulum6. Rotary motion | Skills: <ol style="list-style-type: none">1. Graphing, data analysis2. Data collection using high tech tools, interface and probes3. Calculator skills, operations involving sin, cos, tan and inverse functions4. Laboratory procedures for measuring and calculating centripetal force and acceleration, vertical velocity, period of harmonic motion and rotary motion demos |
| Activities: <ol style="list-style-type: none">1. Laboratory work in laboratory groups2. Group projects and individual projects3. Cooperative learning groups4. Board demonstrations5. Guided practice6. Homework | Performance Assessments: <ol style="list-style-type: none">1. Teacher-made chapter tests and quizzes2. Student notebook3. Projects (individual & group)4. Laboratory work and reports5. Final Exam |

Wallenpaupack Area School District

Course: Physics I

Grade Level: 10-12

Unit: Conservation of energy and momentum

PA Standards: 3.1.10.B
 3.1.10.C
 3.1.10.D
 3.1.12.C
 3.1.12.D
 3.1.12.E
 3.2.12.A
 3.7.10.A
 3.7.10.B
 3.7.12.A

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| Topics: | Skills: |
| <ol style="list-style-type: none"> 1. Work, machines and power 2. Energy: gravitational and kinetic 3. Momentum: Linear 4. Elastic and inelastic events 5. Angular momentum | <ol style="list-style-type: none"> 1. Data collection using high tech tools, interface and probes 2. Laboratory procedures for measuring and calculating linear work, potential energy and kinetic energy 3. Momentum labs using motion sensors |
| Activities: | Performance Assessments: |
| <ol style="list-style-type: none"> 1. Laboratory work in laboratory groups 2. Group projects and individual projects 3. Cooperative learning groups 4. Board demonstrations 5. Guided practice 6. Homework | <ol style="list-style-type: none"> 1. Teacher-made chapter tests and quizzes 2. Student notebook 3. Projects (individual & group) 4. Laboratory work and reports 5. Final Exam |

Wallenpaupack Area School District

Course: Physics I

Grade Level: 10-12

Unit: Phases of matter

PA Standards: 3.10.10.B
3.10.10.C
3.1.12.C
3.4.10.C
3.4.12.C

| Topics: | Skills: |
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| <ol style="list-style-type: none">1. Structure of matter2. Solids3. Liquids4. Gasses and gas laws5. Plasma | <ol style="list-style-type: none">1. Understanding of the atomic theory, kinetic molecular theory and the electrical nature of matter2. Phase change causes and effects3. Nuclear fusion and plasma hydrogen protons |
| Activities: | Performance Assessments: |
| <ol style="list-style-type: none">1. Laboratory work in laboratory groups2. Group projects and individual projects3. Cooperative learning groups4. Board demonstrations5. Guided practice6. Homework | <ol style="list-style-type: none">1. Teacher-made chapter tests and quizzes2. Student notebook3. Projects (individual & group)4. Laboratory work and reports5. Final Exam |

Wallenpaupack Area School District

Course: Physics I

Grade Level: 10-12

Unit: Thermodynamics

PA Standards: 3.1.10.C
3.1.12.C
3.4.10.C
3.7.10.A
3.7.10.B
3.7.12.A

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| Topics: <ol style="list-style-type: none">1. Units of temperature and heat2. Heat exchange and heat capacity3. Gas laws: Boyles, Charlel, Gay-Lussac, Ideal and combined gas laws | Skills: <ol style="list-style-type: none">1. Measuring heat and temperature2. Measuring the heat transferred in a conservation of energy lab3. Linear expansion measurement4. Volume expansion measurements5. Gas laws labs using pressure and temperature probes6. |
| Activities: <ol style="list-style-type: none">1. Laboratory work in laboratory groups2. Group projects and individual projects3. Cooperative learning groups4. Board demonstrations5. Guided practice6. Homework | Performance Assessments: <ol style="list-style-type: none">1. Teacher-made chapter tests and quizzes2. Student notebook3. Projects (individual & group)4. Laboratory work and reports5. Final Exam |

Wallenpaupack Area School District

Course: Physics I

Grade Level: 10-12

Unit: Waves

PA Standards: 3.1.10.B
3.1.10.C
3.4.10.C
3.4.12.C

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| Topics: | Skills: |
| <ol style="list-style-type: none">1. Introduction of waves and wave theory2. Energy transfer3. Waves measurements and calculations | <ol style="list-style-type: none">4. Measuring wavelength, velocity, amplitude, frequency and energy of waves5. Waves along an elastic mediums6. Electromagnetic wave theory |
| Activities: | Performance Assessments: |
| <ol style="list-style-type: none">1. Laboratory work in laboratory groups2. Group projects and individual projects3. Cooperative learning groups4. Board demonstrations5. Guided practice6. Homework | <ol style="list-style-type: none">1. Teacher-made chapter tests and quizzes2. Student notebook3. Projects (individual & group)4. Laboratory work and reports5. Final Exam |