

Wallenpaupack Area School District

COURSE: Principles of Technology II

GRADE LEVEL: 10-12

LENGTH OF COURSE: 120 hours

TEXT: Principles of Technology, second edition, Units 6, 7, 8 and 9

PUBLISHER: CORD

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COURSE DESCRIPTION:

This course is designed to allow students to apply scientific training in the following areas: energy power, force transformers, momentum, waves and wave vibrations. Students will use these principles where applicable in a hands-on approach in mechanical, fluid, electrical and thermal systems.

CURRICULUM WRITING TEAM:

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Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: Grade 10 – 12

Unit: Review of Principles of
Technology I

PA Standards: 3.1.12.A
3.1.12.C

Topics:	Skills:
Force, work, rate, resistance and energy in mechanical, fluid electrical and thermal systems	Review previously learned topics from Principles of Technology I for incorporation into Principles of Technology II curriculum
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Student notebook from Principles of Technology I Individual and group projects Laboratory work and reports Review sheets

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Power in Mechanical Systems

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

Topics: Power Work and time Rate and efficiency Linear and rotational mechanical systems	Skills: Define power, work, rate and efficiency Identify units of power Measure power and efficiency in a mechanical system Compare power in a linear system to power in a rotational system
Activities: Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Performance Assessments: Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Power in Fluid Systems

PA Standards: 3.1.12.B
3.1.12.C
3.1.12.D
3.4.12.A
3.7.12.A
3.7.12.B

Topics:	Skills:
Power in fluid systems, hydraulic systems and air systems	Define power in a fluid system Identify workplace applications where technicians measure or control power in fluid systems Measure power using various devices Work problems with the units of power Nm/sec, ft.lb/sec, watts and Hp
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Power in Electrical Systems

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

Topics:	Skills:
Electrical power Units of power in electrical systems Measurement techniques for determining power	Calculating power in electrical systems in the units of Watts and Hp Use the equation for power in an electrical system to solve for an unknown Compare power to voltage and current in electrical systems
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Power in Thermal Systems

PA Standards: 3.1.12.B

3.1.12.C

3.4.12.C

Topics:	Skills:
Power in thermal systems as a function of work and time Thermal rate and thermal power	Define power in a thermal system Relate power in a thermal system to thermal rate Analyze the units of thermal power
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Force transformers in linear
Mechanical Systems

PA Standards: 3.1.12.C
3.4.12.C
3.7.10.A
3.7.10.B
3.7.12.A

Topics:	Skills:
Effects of force transformers Input and output Work, rate and efficiency	Explain the relationship between input work and output work for linear force transformers Use the equation: work input = work output to find an unknown force when using a particular force transformer Explain the three different classes of levers Measure mechanical advantage of a linear force transformer
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Force transformers done in rotational Mechanical Systems

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

Topics:	Skills:
<ul style="list-style-type: none"> Input work and output work for rotational force transformers Mechanical advantage Efficiency Workplace applications 	<ul style="list-style-type: none"> Measure work input and work output in a rotational force transformers Explain the relationship between input and output work for a rotational force transformers List or identify various rotational force transformers Identify workplace applications of rotational force transformers
Activities:	Performance Assessments:
<ul style="list-style-type: none"> Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework 	<ul style="list-style-type: none"> Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Force transforms in Fluid Systems

PA Standards: 3.4.12.B
3.7.10.A
3.7.10.B
3.7.12.A
3.7.12.B

Topics:	Skills:
Hydraulic systems and hydraulic jacks Pressure intensifiers Fluid force transformers	Relate input work to output work for a hydraulic jack Find the mechanical advantage of a hydraulic jack List or identify various fluid transformers Identify workplace applications
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Force transformers in Electrical Systems

PA Standards: 3.2.12.B
3.4.12.A

Topics:	Skills:
Voltage transformer Step up and step down transformers Power input vs. power output for electrical transformers Electrical advantage of a voltage transformer	Measure voltage output and input for an AC transformer Explain the relationship between voltages in, out and the number of wire windings in a voltage transformer Measure electrical advantage of a voltage transformer
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Momentum in Mechanical and Fluid Systems

PA Standards: 3.1.12.E
3.4.12.A
3.7.12.A
3.7.12.B

Topics:	Skills:
Momentum for linear systems Units of momentum Impulse Force, impulse, mass and velocity Conservation of momentum	Measure and define linear momentum Measure and define fluid momentum Apply momentum equations to the movement of objects and fluids Solve problems that involves conservation of momentum
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports

Wallenpaupack Area School District

Course: Principles of Technology II

Grade Level: 10-12

Unit: Waves and Vibrations

PA Standards: 3.1.10.E
3.1.12.E
3.4.10.B
3.4.12.B
3.7.12.A
3.7.12.B

Topics:	Skills:
Characteristics of waves Applications of waves and vibrations Harmonic waves Wavelength Frequency Amplitude Wave phase Wave speed Longitudinal and transverse waves	List the characteristics of longitudinal and transverse waves Describe and plot a sine wave Compare frequency to wavelength and wave speed Define traveling harmonic wave Distinguish between characteristics of wave Classify waves as longitudinal or transverse
Activities:	Performance Assessments:
Laboratory work in laboratory groups Group projects and individual projects Cooperative learning groups Board demonstrations Guided practice Homework	Teacher made chapter tests and quizzes Student notebook Projects (individual and group) Laboratory work and reports