Wallenpaupack Area School District
Planned Course Curriculum Guide

Career & Technical Education

Outdoor Power Equipment Technology 1

Course Description:

In the Outdoor Power/Recreational Equipment Technology program, students will learn to repair, rebuild and tune up several types of engines. Students will also learn metal skills, including electric arc, MIG, and oxyacetylene welding. The program is designed to teach skills in service, sales, operation/repair of lawn and garden equipment, chain saws, outboard motors, portable generators, pumps, farm equipment, motorcycles, industrial equipment, and snowmobiles. Students will perform “live work,” which gives them invaluable experience in estimating, parts ordering, repair, and customer service. Students will study measuring tools, ordering and record keeping, small engine design and components, fuel systems, lubrication systems, starting/electrical systems, troubleshooting, overhaul, drivelines, and welding.

Initial Creation Date (if applicable) and Revision Dates:

September 23, 2025

Wallenpaupack Area School District Curriculum	
COURSE: OPE 1	**GRADE/S: 11th**
UNIT 1: Shop Safety	**TIMEFRAME:** 3–4 Weeks

PA COMMON CORE/NATIONAL STANDARDS:

101	Interpret Safety Data Sheets (SDS).
102	Lift and move heavy objects.
103	Handle and store flammable materials and toxic substances.
104	Follow Occupational Safety and Health Administration (OSHA) rules and regulations.
105	Identify job-site hazards.
106	Wear personal protective equipment, e.g., safety goggles, hearing protection and respiratory protection.
107	Select appropriate fire extinguisher according to fire type.
108	Follow safety rules for Exposure Control Procedures (ECP) for blood borne pathogens.
109	Use safe work habits while working with electrical systems.
701	Use common hand tools.
702	Use manufacturer's specialty tools.
703	Use electric, air, and hydraulic tools.

ELA:
CC.1.2.11–12.F Evaluate how words and phrases shape meaning and tone in texts.
CC.1.2.11–12.J Acquire and use accurately general academic and domain specific words and phrases, sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Math:
CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.

CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.

Career Education:
13.2.11.D Analyze, revise, and apply an individualized career portfolio to chosen career path.
13.3.11.A Evaluate personal attitudes and work habits that support career retention and advancement.

Science:
3.1.12. A. Apply concepts of systems, subsystems, feedback, and control to solve complex technological problems.

Apply knowledge of control systems concept by designing and modeling control systems that solve specific problems.
Apply systems analysis to predict results.
Analyze and describe the function, interaction and relationship among subsystems and the system itself.
Compare and contrast several systems that could be applied to solve a single problem.
Evaluate the causes of a system's inefficiency.

3.2.12. A. Evaluate the nature of scientific and technological knowledge.
Know and use the ongoing scientific processes to continually improve and better understand how things work.

UNIT OBJECTIVES (SWBATS):

- Demonstrate how to keep a clean orderly, safe work area.
- Demonstrate the use of a fire extinguisher.
- Demonstrate the safe use of hand and power tools.
- Demonstrate safe dress and use of relevant safety gear and personal protective equipment (PPE).
- Discuss the importance of Environmental Protection Agency (EPA) regulation/guidelines related to power equipment.
- Recognize and observe OSHA Regulations.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Direct instruction on shop safety rules, including PPE usage, emergency procedures, and safe equipment handling.
- Safety walkthroughs and demonstrations for each type of outdoor power equipment.
- Student-led safety audits of the shop environment.
- Role-playing emergency scenarios (e.g., fire, chemical spill, equipment malfunction).
- Visual signage and labeling exercises to reinforce hazard awareness.
- Integration of OSHA guidelines and Pennsylvania safety standards into daily routines.

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- **Diagnostic**: Initial safety knowledge quiz to assess prior understanding.
- **Formative**: Daily safety checklists and peer evaluations during lab work.
- **Benchmark**: Mid-term safety inspection project where students identify and correct hazards.
- **Summative**: Final written and practical safety exam covering PPE, equipment handling, and emergency response.

DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):

- **Acceleration**: Students may research and present advanced safety systems (e.g., automatic shut-off mechanisms, ergonomic designs).

- **Enrichment**: Opportunities to lead safety briefings or mentor peers in proper shop procedures.
- Visual aids, hands-on practice, and simplified safety guides for students needing additional support.

RESOURCES (Technology Based Resources, Text Resources, etc.):

- **Technology-Based**:
- OSHA e-learning modules
- Interactive safety simulations
- QR-coded safety posters linking to instructional videos
- **Text Resources**:
- Pennsylvania STEELS and Technology & Engineering Standards
- Equipment manufacturer safety manuals
- Career and Technical Education (CTE) safety curriculum guides

- **KEY VOCABULARY:**
- **Personal** Protective Equipment (PPE)
- Lockout/Tagout
- Hazard
- Ergonomics
- Fire Extinguisher
- First Aid
- Safety Data Sheet (SDS)
- Risk Assessment
- Emergency Stop
- Ventilation

Wallenpaupack Area School District Curriculum	
COURSE: OPE 1	**GRADE/S: 11th**
UNIT 2: Principles of Engine Operation	**TIMEFRAME:** 3–4 Weeks

PA COMMON CORE/NATIONAL STANDARDS:

1001	Diagnose performance problems in a 2-stroke cycle gasoline engine.
1003	Perform top end compression test.
1004	Perform crankcase vacuum/pressure test.
1005	Identify the component parts in a short block of a 2-stroke cycle engine and explain their purposes.
1006	Pressure test a fuel system on a 2-stroke cycle engine.
1007	Explain 2-stroke cycle engine operating theory.
1010	Identify the types of 2-stroke cycle engine valves.
1011	Inspect and service 2-stroke cycle engine exhaust systems.
1101	Disassemble, clean, and identify engine components.
1103	Explain 4-stroke cycle engine operating theory.
1105	Inspect shaft(s) bearings and gears.
1107	Measure crankshaft end play, run-out and determine necessary repairs.
1108	Inspect and service valve train components.
1112	Install valve springs using a valve spring compressor.
1113	Adjust valve clearances/lash.
1114	Measure cylinder bore for oversize, out of round, taper, and piston to cylinder wall clearance.
1115	Deglaze/hone a cylinder.
1116	Perform a cylinder balance test.
1117	Perform a cylinder compression test.
1118	Perform a cylinder leak-down test.
1119	Install a crankshaft and bearings.
1120	Install a piston using a ring compressor.
1121	Check ring end gap and side clearance.
1122	Verify camshaft timing.
1123	Install all gaskets and seals according to specifications.

ELA:

CC.1.2.11–12.F Evaluate how words and phrases shape meaning and tone in texts.

CC.1.2.11–12.J Acquire and use accurately general academic and domain specific words and phrases, sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Math:

CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.

CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.

Career Education:
13.2.11.D Analyze, revise, and apply an individualized career portfolio to chosen career path.
13.3.11.A Evaluate personal attitudes and work habits that support career retention and advancement.

Science:
3.1.12. A. Apply concepts of systems, subsystems, feedback, and control to solve complex technological problems.
Apply knowledge of control systems concept by designing and modeling control systems that solve specific problems.
Apply systems analysis to predict results.
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Evaluate the causes of a system's inefficiency.

3.2.12. A. Evaluate the nature of scientific and technological knowledge.
Know and use the ongoing scientific processes to continually improve and better understand how things work.

UNIT OBJECTIVES (SWBATS):

- Identify and describe the components and operation of 2-stroke and 4-stroke engines.
- Compare and contrast the mechanical cycles of 2-stroke vs. 4-stroke engines.
- Perform basic diagnostics and maintenance on small engines.
- Interpret technical diagrams and service manuals.
- Calculate engine displacement and fuel/oil ratios.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Hands-on engine teardown and reassembly labs.
- Animated simulations of engine cycles.
- Group comparison charts of 2-stroke vs. 4-stroke engines.
- Technical reading and interpretation of service manuals.
- Math integration: calculating compression ratios and fuel mixtures.

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- **Diagnostic**: Pre-assessment on engine knowledge and terminology.
- **Formative**: Daily lab performance and engine cycle quizzes.
- **Benchmark**: Mid-unit engine identification and function test.

- **Summative**: Final project involving engine teardown, inspection, and written analysis.

DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):

- **Acceleration**: Advanced students may analyze engine performance data or explore EFI systems.
- **Enrichment**: Opportunities to research alternative engine technologies (e.g., electric, hybrid).
- Visual aids, guided notes, and peer collaboration for students needing support.

RESOURCES (Technology Based Resources, Text Resources, etc.):

- **Technology-Based**:
- Engine simulation software
- Manufacturer training videos
- QR-linked interactive diagrams
- **Text Resources**:
- Small engine repair manuals
- CTE curriculum guides
- Technical specification sheets

- **KEY VOCABULARY:**
- Crankshaft
- Piston
- Cylinder
- Compression
- Intake/Exhaust Stroke
- Spark Plug
- Carburetor
- Fuel/Oil Ratio
- Displacement
- 2-Stroke / 4-Stroke Cycle

Wallenpaupack Area School District Curriculum	
COURSE: OPE 1	**GRADE/S: 11th**
UNIT 3: Fuel System Service	**TIMEFRAME:** 3–4 Weeks

PA COMMON CORE/NATIONAL STANDARDS:

401	Identify the types of fuel systems and explain the function of all components.
	RESERVED (402)
403	Identify types of carburetor designs.
	RESERVED (404)
405	Describe the operation of the idle fuel circuit and the main fuel circuit.
406	Explain the venturi principle and variable venturi carburetors.
407	Identify and service fuel enrichment devices.
	RESERVED (408)
	RESERVED (409)
410	Identify the function of electronic fuel injection (EFI) components.
411	Identify the function and components of gaseous fuel systems.
412	Identify types and grades of fuels used in internal combustion engines
413	Describe how fuel additives protect fuel systems.
414	Remove, service, and replace carburetor.
	RESERVED (415)
416	Remove, service, and replace a fuel system's air filter and air intake assembly.
417	Remove, service, and replace a fuel pump.
418	Install and adjust throttle and choke linkage.
419	Adjust carburetor mixture screws per manufacturer specifications.
420	Adjust carburetor float level and metering levers.
421	Remove, service and replace a fuel tank, filters, caps, and lines.
	RESERVED (422)
423	Check the fuel pump pressure and flow rate.
424	Pressure test the carburetor.
425	Check the engine for proper starting, idle and acceleration.
	RESERVED (426)
	RESERVED (427)
428	Remove and replace an intake manifold.
429	Remove, service and replace electronic fuel injection (EFI) fuel system components.
430	Diagnose electronic fuel injection (EFI) system failures.
431	Test and replace an anti-backfire/fuel shutoff solenoid.

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3.2.12. A. Evaluate the nature of scientific and technological knowledge.
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UNIT OBJECTIVES (SWBATS):

- Identify components of fuel systems in 2-stroke and 4-stroke engines.
- Diagnose common fuel system issues (e.g., clogged carburetor, fuel line leaks).
- Perform maintenance tasks including cleaning, replacing filters, and adjusting carburetors.
- Interpret fuel system diagrams and manufacturer specifications.
- Calculate proper fuel/oil mixtures and understand fuel types.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Hands-on labs: disassemble, inspect, and reassemble fuel systems.
- Fuel system troubleshooting simulations.
- Technical reading of service manuals and SDS documents.
- Math integration: fuel/oil ratio calculations and pressure readings.
- Group discussions on fuel types, additives, and environmental impact.

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- **Diagnostic**: Pre-assessment on fuel system knowledge and terminology.
- **Formative**: Daily lab performance and troubleshooting logs.
- **Benchmark**: Mid-unit fuel system inspection and service report.
- **Summative**: Final hands-on assessment and written analysis of fuel system servic

DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):

- **Acceleration**: Advanced students may explore EFI (electronic fuel injection) systems or alternative fuels.
- **Enrichment**: Research project on fuel system innovations or emissions reduction.
- Scaffolded instruction using diagrams, guided notes, and peer collaboration.

RESOURCES (Technology Based Resources, Text Resources, etc.):

- **Technology-Based**:
- Fuel system simulation software
- Manufacturer training videos
- QR-linked interactive diagrams
- **Text Resources**:
- Small engine fuel system manuals
- CTE curriculum guides
- Safety Data Sheets (SDS) for fuels and additives

- **KEY VOCABULARY:**
- Carburetor
- Fuel Line
- Fuel Filter
- Primer Bulb
- Fuel/Oil Ratio
- Tank Vent
- Float Bowl
- Jet
- Throttle
- Vapor Lock

Wallenpaupack Area School District Curriculum	
COURSE: OPE 1	**GRADE/S: 11th**
UNIT 4: Ignition System Service	**TIMEFRAME:** 3–4 Weeks

COMMON CORE/NATIONAL STANDARDS:

1401	Identify, remove, service, and replace battery ignition system components.
1402	Identify, remove, service, and replace electronic ignition system components.
	RESERVED (1403)
1404	Check and set ignition timing/air gap.
	RESERVED (1405)
1406	Test an ignition system using a spark tester.
1407	Inspect the engine for a sheared flywheel key.
1408	Remove, inspect, and replace points and condenser.
	RESERVED (1409)
1410	Replace a spark plug terminal and boot.
1411	Test a solid-state, transistor-controlled discharge system.

ELA:
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Career Education:
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3.2.12. A. Evaluate the nature of scientific and technological knowledge.
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UNIT OBJECTIVES (SWBATS):

- Identify components of ignition systems (e.g., spark plug, coil, flywheel, magneto).
- Diagnose common ignition system issues (e.g., no spark, weak spark, misfiring).
- Perform maintenance tasks including spark plug replacement and gap adjustment.
- Interpret ignition system diagrams and manufacturer specifications.
- Test ignition systems using multimeters and spark testers.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Hands-on labs: inspect, test, and replace ignition components.
- Use of multimeters and spark testers to diagnose faults.
- Technical reading of service manuals and wiring diagrams.
- Group discussions on ignition system types (magneto vs. electronic).
- Interactive simulations of ignition timing and spark generation.

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- **Diagnostic**: Pre-assessment of ignition system terminology and function.
- **Formative**: Daily lab performance and troubleshooting logs.
- **Benchmark**: Mid-unit ignition system inspection and service report.
- **Summative**: Final hands-on assessment and written analysis of ignition system service.

DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):

- **Acceleration**: Explore advanced ignition systems (e.g., CDI, electronic ignition).
- **Enrichment**: Research project on ignition system innovations or spark optimization.
- Scaffolded instruction using diagrams, guided notes, and peer collaboration.

RESOURCES (Technology Based Resources, Text Resources, etc.):

- **Technology-Based**:
- Ignition system simulation software
- Manufacturer training videos
- QR-linked interactive wiring diagrams
- **Text Resources**:
- Small engine ignition system manuals
- CTE curriculum guides
- Technical specification sheets

- **KEY VOCABULARY:**
- Spark Plug
- Magneto
- Flywheel
- Coil
- Ignition Timing
- CDI (Capacitor Discharge Ignition)
- Resistance
- Voltage
- Gap Gauge
- Multimeter

Wallenpaupack Area School District Curriculum	
COURSE: OPE 1	**GRADE/S: 11th**
UNIT 5: Engine Disassembly and Inspection	**TIMEFRAME:** 3–4 Weeks

PA COMMON CORE/NATIONAL STANDARDS:

301	Identify the methods of heat transfer and the purpose of a cooling system.
302	Perform a cooling system flush on a liquid cooled engine.
303	Remove, service and replace a water pump, hoses, and thermostat.
304	Identify the components of a liquid cooled engine.
305	Pressure-test a liquid-cooled cooling system.
306	Determine causes of engine overheating.
307	Inspect the cooling system for debris, leaks, and damage.
501	Identify problems that can occur from operating engines with a removed or damaged exhaust system.
503	Remove, service, and replace a spark arrestor screen.
504	Identify exhaust system components and their functions.
505	Explain the function of a single stage catalyst (catalytic converters).
507	Remove, service, and replace an exhaust system.

601	Read a standard and a metric ruler.
602	Read and use a standard and metric micrometer.
603	Read and use a standard and metric dial indicator.
604	Use a standard and metric torque wrench.
605	Use a standard/metric dial caliper.
606	Calculate displacement and area.
607	Calculate work, power, torque, and horsepower.

801	Identify, select, and install various fasteners according to specifications.
802	Replace damaged internal threads using a thread repair system.
803	Repair damaged threads, using a tap and die, chaser, or thread file.
804	Use a thread extraction tool to remove a broken fastener.
805	Torque fasteners according to manufacturer specifications.

1201	List engine failure categories.
1202	Identify insufficient lubrication failures.
1203	Identify fuel system failures.
1204	Identify cooling system failures.
1205	Identify detonation and pre-ignition failures.
1207	Identify the effects of over speeding.
1208	Identify the signature breakage of a connecting rod.

1209	Identify exhaust port piston scoring and large end bearings failure on a 2-stroke cycle engine.
1210	Identify the effects of excessing vibration on engine block and mounting base.

ELA:
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CC.1.2.11–12.J Acquire and use accurately general academic and domain specific words and phrases, sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Math:
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Career Education:
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3.2.12. A. Evaluate the nature of scientific and technological knowledge.
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UNIT OBJECTIVES (SWBATS):

- Identify and describe major engine components and their functions.
- Safely disassemble and inspect a 2-stroke or 4-stroke engine.
- Measure and evaluate wear, damage, and tolerances.
- Document inspection results and recommend service actions.
- Reassemble engine components following manufacturer specifications.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Hands-on engine teardown and reassembly labs.
- Guided inspection using service checklists and micrometers/calipers.
- Technical reading of service manuals and exploded diagrams.
- Group discussions on wear patterns and failure analysis.
- Math integration: calculating tolerances and compression ratios.

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- **Diagnostic**: Pre-assessment on engine component identification.
- **Formative**: Daily lab performance and inspection logs.
- **Benchmark**: Mid-unit inspection report and component analysis.
- **Summative**: Final hands-on teardown and reassembly project with written evaluation.

DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):

- **Acceleration**: Advanced students may analyze engine failure scenarios or explore performance upgrades.
- **Enrichment**: Research project on engine design innovations or materials used in high-performance engines.
- Scaffolded instruction using visual aids, guided notes, and peer collaboration.

RESOURCES (Technology Based Resources, Text Resources, etc.):

- **Technology-Based**:
- Engine teardown simulation software
- Manufacturer training videos
- QR-linked interactive diagrams
- **Text Resources**:
- Small engine service manuals
- CTE curriculum guides
- Technical specification sheets

- **KEY VOCABULARY:**
- Cylinder
- Piston
- Crankshaft
- Connecting Rod
- Valve
- Camshaft
- Tolerance
- Wear Pattern
- Compression Ratio
- Micrometer / Caliper

Wallenpaupack Area School District Curriculum	
COURSE: OPE 1	**GRADE/S: 11th**
UNIT 6: Manual Starter Systems Service	**TIMEFRAME:** 3–4 Weeks

PA COMMON CORE/NATIONAL STANDARDS:

1301	Disassemble, identify, and describe the parts of a recoil starting system.
	RESERVED (1302)
1303	Replace a starter spring, pulley, and starter rope.

ELA:
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CC.1.2.11–12.J Acquire and use accurately general academic and domain specific words and phrases, sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Math:
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3.2.12. A. Evaluate the nature of scientific and technological knowledge.
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UNIT OBJECTIVES (SWBATS):

- Identify components of manual starting systems (e.g., recoil spring, pulley, rope, pawl).
- Safely disassemble, inspect, and reassemble manual starting mechanisms.
- Diagnose common issues such as rope wear, spring failure, and engagement problems.
- Measure and adjust rope length and spring tension according to specifications.
- Interpret technical diagrams and service procedures.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Hands-on labs: disassemble and reassemble recoil starters.
- Rope replacement and spring tension adjustment exercises.
- Technical reading of service manuals and exploded diagrams.
- Group troubleshooting scenarios and peer-led demonstrations.
- Math integration: calculating rope length and spring preload.

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- **Diagnostic**: Pre-assessment of manual starting system terminology and function.
- **Formative**: Daily lab performance and troubleshooting logs.
- **Benchmark**: Mid-unit service report and component inspection.
- **Summative**: Final hands-on assessment and written analysis of manual starting system service.

DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):

- **Acceleration**: Explore alternative starting systems (e.g., electric start, decompression systems).
- **Enrichment**: Research project on ergonomic design improvements in manual starters.
- Scaffolded instruction using visual aids, guided notes, and peer collaboration.

RESOURCES (Technology Based Resources, Text Resources, etc.):

- **Technology-Based**:
- Starter system simulation software
- Manufacturer training videos
- QR-linked interactive diagrams
- **Text Resources**:
- Small engine service manuals
- CTE curriculum guides
- Technical specification sheets

- **KEY VOCABULARY:**
- Recoil Starter
- Pulley
- Rope
- Spring Tension
- Pawl
- Engagement Mechanism
- Starter Housing
- Torque
- Handle
- Wear

Wallenpaupack Area School District Curriculum	
COURSE: OPE 1	**GRADE/S: 11th**
UNIT 7: Electrical System Service	**TIMEFRAME:** 3–4 Weeks

PA COMMON CORE/NATIONAL STANDARDS:

202	Interpret electrical circuit and wiring diagrams.
203	Use a meter to measure resistance, continuity, amperage, and voltage.
204	Solve problems using Ohm's law.
205	Follow procedures for battery disposal.
206	Construct and test series and parallel circuits.
207	Identify electrical terminals and connectors.
208	Perform a diode test.
212	Inspect, test, and replace fusible links, fuses and circuit breakers.
213	Identify American Wire Gauge (AWG) wiring codes.
215	Solder a current carrying wire.

ELA:
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Know and use the ongoing scientific processes to continually improve and better understand how things work.

UNIT OBJECTIVES (SWBATS):

- Identify components of electrical systems in outdoor power equipment (e.g., switches, wiring, regulators).
- Diagnose common electrical issues such as shorts, open circuits, and faulty connections.
- Safely use multimeters and other diagnostic tools.
- Interpret wiring diagrams and manufacturer specifications.
- Perform repairs and replacement of electrical components.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Hands-on labs: test and replace electrical components.
- Use of multimeters for voltage, resistance, and continuity checks.
- Technical reading of wiring diagrams and service manuals.
- Group troubleshooting scenarios and peer-led demonstrations.
- Math integration: calculating resistance and voltage drops.

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- **Diagnostic**: Pre-assessment of electrical system terminology and function.
- **Formative**: Daily lab performance and troubleshooting logs.
- **Benchmark**: Mid-unit electrical system inspection and service report.
- **Summative**: Final hands-on assessment and written analysis of electrical system service.

DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):

- **Acceleration**: Explore advanced electrical systems (e.g., electronic ignition, battery charging systems).
- **Enrichment**: Research project on innovations in electrical systems or energy efficiency.
- Scaffolded instruction using diagrams, guided notes, and peer collaboration.

RESOURCES (Technology Based Resources, Text Resources, etc.):

- **Technology-Based**:
- Electrical system simulation software
- Manufacturer training videos
- QR-linked interactive wiring diagrams
- **Text Resources**:
- Small engine electrical system manuals
- CTE curriculum guides
- Technical specification sheets

- **KEY VOCABULARY:**
- Voltage
- Resistance
- Current
- Multimeter
- Circuit
- Regulator
- Ground
- Continuity
- Fuse
- Wiring Diagram

Wallenpaupack Area School District Curriculum	
COURSE: OPE 1	**GRADE/S: 11th**
UNIT 8: Drive Systems	**TIMEFRAME:** 3–4 Weeks

PA COMMON CORE/NATIONAL STANDARDS:

1901	Inspect and service or replace belts and tensioning devices.
1902	Inspect and service or replace centrifugal clutches.
1903	Inspect and service or replace clutch discs.
1904	Inspect and service or replace sprockets and chains.
1905	Inspect and service or replace an electric power take-off.
1906	Inspect and service or replace universal joints.
1907	Disassemble, service and reassemble gearboxes and components
1908	Disassemble, service and reassemble transaxles.
1909	Disassemble, service and reassemble hydrostatic drives.
1910	Change hydraulic fluid and filter.

ELA:
CC.1.2.11–12.F Evaluate how words and phrases shape meaning and tone in texts.
CC.1.2.11–12.J Acquire and use accurately general academic and domain specific words and phrases, sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Math:
CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.

CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.

Career Education:
13.2.11.D Analyze, revise, and apply an individualized career portfolio to chosen career path.
13.3.11.A Evaluate personal attitudes and work habits that support career retention and advancement.

Science:
3.1.12. A. Apply concepts of systems, subsystems, feedback, and control to solve complex technological problems.
Apply knowledge of control systems concept by designing and modeling control systems that solve specific problems.
Apply systems analysis to predict results.
Analyze and describe the function, interaction and relationship among subsystems and the system itself.
Compare and contrast several systems that could be applied to solve a single problem.

Evaluate the causes of a system's inefficiency.

3.2.12. A. Evaluate the nature of scientific and technological knowledge.
Know and use the ongoing scientific processes to continually improve and better understand how things work.

UNIT OBJECTIVES (SWBATS):

- Identify components of drive systems (e.g., belts, pulleys, gears, clutches).
- Diagnose common drive system issues such as slippage, misalignment, and wear.
- Perform maintenance tasks including belt replacement, tension adjustment, and lubrication.
- Interpret drive system diagrams and manufacturer specifications.
- Calculate gear ratios and analyze torque transmission.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Hands-on labs: inspect, adjust, and replace drive system components.
- Gear ratio and torque calculation exercises.
- Technical reading of service manuals and exploded diagrams.
- Group troubleshooting scenarios and peer-led demonstrations.
- Interactive simulations of drive system operation.

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- **Diagnostic**: Pre-assessment on drive system terminology and function.
- **Formative**: Daily lab performance and troubleshooting logs.
- **Benchmark**: Mid-unit drive system inspection and service report.
- **Summative**: Final hands-on assessment and written analysis of drive system service.

DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):

- **Acceleration**: Explore advanced drive systems (e.g., hydrostatic, variable speed).
- **Enrichment**: Research project on innovations in drive systems or efficiency improvements.
- Scaffolded instruction using diagrams, guided notes, and peer collaboration.

RESOURCES (Technology Based Resources, Text Resources, etc.):

- **Technology-Based**:
- Drive system simulation software
- Manufacturer training videos
- QR-linked interactive diagrams
- **Text Resources**:
- Small engine and equipment service manuals
- CTE curriculum guides
- Technical specification sheets

- **KEY VOCABULARY:**

- Belt
- Pulley
- Gear
- Clutch
- Transmission
- Torque
- Gear Ratio
- Tension
- Alignment
- Drive Shaft