

**Course:** Agriculture Mechanics/Small Engines

**Instructor:** Carolyn Wright

Unit	Time Frame	Learning Target (s) / Objective (s)	Standard (s)	Vocabulary	Assessments
Safety & Expectations (SGE Lesson 1.1 & 1.2)	September	Develop and keep an AgriScience Notebook to record and store information, Identify workplace hazards and the root cause of accidents, Develop a standard set of safety requirements for an agricultural mechanics shop, Assess a shop to determine if safety standards are being met and make recommendations for improvements, Identify trpes of PPE and their uses in the shop, Prepare an emergency first aid booklet, Identify Near Misses and complete and example near miss report, Describe and identify employability sills that industry employers expect of employees, Use SDS forms to determine the proper use and cleanup of chemicals used in the course, Identify the safety hazards found in the internal motions of equipment.	CRP.01.01, CRP.01.02, CRP.01.03, CRP.02.01., CRP.02.02, CRP.04.02, CRP.05.01, CRP.06.02, CRP.08.01, CRP.08.02, AG 1.1, AG 3.1-3.7, AG-PST 2.1, AG-PST 2.3	Accident, Accident report, Danger, First Aid, Hazardous material, Health hazard, Injury, Lockout/tag-out, OSHA, PPE, Root cause, Safety cabinet, Safety can, Safety Data Sheet (SDS), Safetly glasses, Underwriters Laboratory Inc, Ventilte, Alcohol, Bending, Cutting, Illustrated parts list, In-running nip points, Interpersonal skills, Near miss, Parts number, Points of Operation, Power Source, Power Transmission, Punching, Reciprocating, Reference number, Rotating, Service Manuals, Shearing, Transversing	Activity 1.1.2 Safety Contract, Project: Safety Standards Checklist & Evaluation, Activity 1.1.5 PPE Purpose and Hazards, Activity 1.1.6 Plan of Action, Activity 1.2.1 Near Miss Report, Activity 1.2.2 Technical Employability, Activity 1.2.3 SDS Protocols, Project: Safety Analysis of Machines (Small & Large)

<p>Agricultural Equipment (AEMT Lesson 1.1 &amp; 1.2)</p>	<p>September/October</p>	<p>Identify and describe the equipment used in the local area to produce and harvest crops; Organize notebooks to record coursework and projects; Practice recording assembly and disassembly procedures in a logbook; Measure components using a dial caliper, dial indicator, torque wrench, and combination square; Use a micrometer to make precise measurements; Identify bolt size, type, and grade; Disassemble and identify the components of a universal joint; Identify types of belts, chains, and gears on a piece of equipment; Identify the safety hazards found in internal motions of equipment; Identify the parts of the six-step diagnostic process during a guest technician presentation; Identify interpersonal skill desired by ag equipment dealers; Create a picklist for equipment repair using a digital service manual; Test for voltage, resistance, and continuity in an electrical component using a digital multimeter; Write a work/repair order using technical writing; Write a work/repair order for a universal joint repair; Diagnose a failed universal joint and identify the root cause using the Five</p>	<p>CRP.01.01, CRP.01.02, CRP.02.01, CRP.02.02, CRP.04.02, CRP.06.01, CRP.06.02, CRP.08.02, CRP.09.01, CRP.09.02, CRP.10.03, CRP.11.01, AG 2.1, AG 2.3, AG 3.1, AG 3.6, AG 3.7, AG 5.1, AG-PST 1.3, AG-PST 2.1, AG-PST 2.2, AG-PST 2.3, AG-PST 3.2, AG-BIZ 2.2, RST.11-12.1, RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7, RST.11-12.8, RST.11-12.9, RST.11-12.10,</p>	<p>Bearing, Bearing cup, Bending, Bevel gear, Cam gear, Combine, Cross shaft, Dial caliper, Drive gear, Drive pulley, Driveshaft, Driven gear, Driven pulley, Drivetrain, Flat-head screwdriver, Forage harvester, Gear, Guard, Grease seal, Grease zerk, Hay baler, Implement, In-running nip points, Logbook, Micrometer, Mower, Nonsynchronous drive, Operating controls, Planter, Point of operation, Power take-off, Punching, Race, Reciprocating, Retaining ring, Rotating, RPM, Shearing, Sprocket, Synchronous drive, Technician, Tillage, Timing belt, Torque, Torque wrench, ractor, Transversing, U-joint, V-belt, Yoke, Aftermarket, Ampere, Cause, Circ cup, Closed circuit, Confirm, Continuity, Complaint, Components, Component failure, Current, Diagnostic process, Digital multimeter, Five Whys, Illustrated parts list,</p>	<p>Activity: Local Equipment, Activity: Technical Records, Activity: Bolt Sizes &amp; Gauges, Activity: Mic'd Up, Activity: Universal Connections, Activity: Chains &amp; Belts, Activity: Field Experience, Activity: PowerPortal - Pick List, Activity: Digital Multimeter Op, Project: Communicating Services</p>
<p>Welding: Basic Intro</p>	<p>October</p>	<p>Guest presenter/Instructor</p>			

<p>Drive Systems: Drive Train Components (AEMT Lesson 2.1)</p>	<p>November</p>	<p>Construct a drive train and measure speed; Measure a drive train's torque; Identify clutch systems &amp; components present on agricultural equipment; Adjust and test the settings for an electromagnet clutch; Identify and select bearing types used in drive train systems; Disassemble a gearbox, identify components and inspect for wear and backlash; Construct a drive train modeling agricultural equipment.</p>	<p>CRP.02.01, CRP.02.02, CRP.04.02, AG-PST 1.2, AG-PST 1.3, AG-PST 1.4, AG- PST 2.1, AG-PST 2.2, AG-PST 3.4, AG-PST 3.6, ETS1.B: Developing Possible Solutions, RST.11-12.4, RST.11-12.7, RST.11-12.9, RST.11-12.10, WHST.11- 12.2.A/B/E, WHST.11-12.4, WHST.11-12.7, WHST.11-12.9, WHST.11-12.10</p>	<p>Angular load, Antifriction bearing, Axial load, Ball-bearing, Bearing, Bore, Bushing, Cage, Clutch, Clutch disc, Clutch shaft, Compound gears, Electromagnet clutch, Feeler gauge, Flywheel, Friction bearing, Friction clutch, Friction plate, Gear ratio, Gear reduction, Gearbox, Helical gear, Herringbone gear, Idler gear, Journal, Pressure plate, Pinion gear, Rack gear, Radial load, Roller bearing, Sealed bearing, Single-pole switch, Spur gear, Tapered roller bearing, Telescoping gauge, Torque, Transmission, Worm gear</p>	<p>Activity: Manual Transmission, Activity: Clutch Performance, Activity: Speed &amp; Torque, Activity: Bearing Replacement, Project: Machine Gears, Activity: Worn Gears</p>
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<p>Drive Systems: Final Drives (AEMT Lesson 2.2)</p>	<p>December</p>	<p>Assemble a model of a differential system; Simulate planetary gear settings and observe the input and output speeds; Disassemble and adjust tapered bearings on a wheel hub; Identify and select tires for a tractor; Determine ballast requirements for specific equipment applications; Troubleshoot and complete a work/repair order for a broken drive train.</p>	<p>CRP.02.02, AG-PST 1.3, AG-PST 2.1, AG-PST 2.2, AG-PST 2.3, AG-PST 3.2, RST.11-12.3, RST.11-12.4, RST.11-12.4, RST.11-12.9, RST.11-12.10, WHST.11-12.10</p>	<p>Abrasive wear, Adhesive wear, Ballast, Ballasting, Bead, Bias-ply, Corrosion, DOT tire code, Differential, Differential carrier, Direct drive, Failure analysis, Fracture, Load index, Overdrive mode, Pinion gear, Planetary carrier, Planetary gear set, Plies, Ply rating, Preload, Radial-ply, Ring gear, Side gear, Sidewall, Spalling, Speed rating, Spider gear, Sun gear, Tread, Torque multiplying, Wheel ballast, Wheel slip</p>	<p>Activity: Differential Approach, Activity: Planetary Power, Activity: Tapered Bearing, Activity: Find a Tire, Activity: Optimizing Performance, Project: Drive Train Repair</p>
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Electrical Systems (AEMT Lesson 4.1)	December	Construct series, parallel, and series-parallel circuits; Calculate total resistance in series, parallel, and series-parallel circuits; Test a diode using a digital multimeter; Construct circuits using silicon diodes; Construct circuits using Zener diodes; Rectify AC voltage to power an LED; Troubleshoot a tractor's charging system using a digital multimeter; Model a rheostat using a graphite pencil; Use a potentiometer to change the voltage in a circuit.	CRP.01.01, CRP.02.02, AG-PST 1.2, AG-PST 1.3, AG-PST 3.6, PS1.A, PS3, PSE.A, RST.11-12.1, RST.11-12.4, RST.11-12.9, RST.11-12.10, WHST.11-12.2, WJST.11-12.2.E, WHST.11-12.9, WHST.11-12.10	AC voltage test, Alternating current, Alternator, Ampere, Anode, Bridge rectifier, Cathode, Current, Diode, Direct current, Forward bias, Opened, Parallel circuit, Potentiometer, Rectified, Reverse bias, Rheostat, Schematic, Series circuit, Series-parallel circuit, Serpentine belt, Short, Stator, Thermistor, Zener diode	Activity: Types of Circuits, Activity: Directional Flow, Activity: Charging System, Activity: Charging Analysis, Activity: Variable Resistor
Electrical Controls (AEMT Lesson 4.2)	January	Describe a cranking system using an electrical schematic; Test the continuity of an ignition key switch; Assemble a shutdown circuit using a wiring schematic; Identify common terminals used on relays; Assemble a circuit using a relay; Design and construct a circuit to control motor speed and direction; Construct and troubleshoot a transducer.	CRP.01.01, CRP.02.02, AG-ENV 1.3, AG-PST 1.2, AG-PST 1.3, AG-PST 1.4, AG-PST 5.1, AG-PST 5.2, AG-PST 5.3, PS1.A, PS3, PS3.A, RST.11-12.1, RST.11-12.4, RST.11-12.9, RST.11-12.10, WHST.11-12.2, WHST.11-12.2.E, WHST.11-12.9, WHST.11-12.10	Analog, Control panel, Digital, Electromagnet, Fuel solenoid, Fuse, High-side, Ignition, Indicator light, Key switch, Load, Low-side, Magneto, Normally closed, Normally open, Relay, Sensor, Shutdown circuit, Solenoid, Source, Starter, Starter solenoid, Starting circuit, Transducer	Activity: Schematic Inspection, Activity: Starting Circuit, Activity: Shutdown Circuit, Activity: Relays, Project: Sensing Data

<p>Electrical Analysis (AEMT Lesson 4.3)</p>	<p>January</p>	<p>Calculate voltage drop in a circuit; Troubleshoot voltage drops with a digital multimeter; Diagnose parasitic battery drain with a digital multimeter; Construct an ignition/shutdown circuit using cables and connectors; Troubleshoot an ignition/shutdown circuit using a digital multimeter and a schematic; Modify a sprayer to include electrical and GPS controls; Develop a troubleshooting an maintenance plan for a GPS sprayer.</p>	<p>CRP.01.01, CRP.02.02, AG-ENV 1.3, AG-PST 1.2, AG-PST 1.3, AG-PST 1.4, Ag-PST 5.1, AG-PST 5.2, AG-PST 5.3, PS3.A, RST.11-12.1, RST.11-12.4, RST.11-12.9, RST.11-12.10</p>	<p>Crimp, Current draw, Female connector, Heat shrink, Male connector, Parasitic battery drain, Quick disconnects, Ring terminal, Solder, Soldering, Voltage drop, Wire strippers</p>	<p>Activity: Voltage Drop, Project: Troubleshooting Drops, Activity: Current Draw, Project: Checking Connections</p>
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<p>Diesel Systems (AEMT 5.1 &amp; 5.2)</p>	<p>February</p>	<p>Identify similarities and differences between small gasoline and diesel engines; Identify the high and low-pressure components of a fuel system; Flare and assemble a fuel line; Inspect a fuel injector for faults; Inspect and identify the components of a turbocharger and air filter; Measure the urea content in diesel exhaust fluid samples; Change oil and oil filter using OEM specifications; Inspect a cooling system using industry equipment; Model a cooling system to cool the engine coolant; Determine the cause of broken engine components and complete a work repair order; Diagnose faults in a CAN bus model using a DMM; Identify how a circuit fault in CAN bus impacts an 8-bit signal; Simulate CAN bus data in response to sensor data; Inspect an oil pressure transducer for faults; Develop a flowchart of CAN bus operations within fuel and intake systems.</p>	<p>CRP.01.01, CRP.02.01, CRP.04.01, CRP.04.02, AG-PST 1.1, AG-PST 1.2, AG-PST 2.1, AG-PST 3.1, AG-PST 3.6, AG-PST 5.1, AG-PST 5.2, ETS1.B, RST.11-12.3, RST.11-12.4, RST.11-12.1, WHST.11-12.7, WHST.11-12.9</p>	<p>Air cleaner, Atomization, Bleed, Bleed screws, Camshaft, Combustion, Compression event, Compressor, Cooling fins, Cooling system, Crankshaft, Crude oil, Diesel exhaust fluid, Diesel, Engine, Exhaust, Exhaust event, Exhaust system, Flashpoint, Fuel Injector, Fuel system, Gasoline, Glow plug, Hydrocarbon, Ignition system, Impeller, Injection pump, Intake manifold, Lift pump, Oil filter, Piston, Radiator, Refractometer, Return line, Thermostat, Turbine, Turbocharger, Valve, Wastegate, Water jacket, Water pump, 8-bit, Body control module (BCM), CAN bus, CAN_H, CAN_L, Crankshaft position transducer, Data link connector (DLC), Electronic control unit (ECU), Fuel temperature transducer, Manifold absolute pressure (MAP), Mass airflow (MAF), Powertrain control module (PCM), Scan tool, Terminating</p>	<p>Activity: Functional Differences, Activity: Lubrication and Cooling, Activity: Clean Air, Project: Engine Failure, Activity: CAN Bus Basics, Project: Essential Components</p>
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<p>Engine Operation (SGE Lessons 1.2.5, 1.2.6, &amp; 2.1)</p>	<p>March</p>	<p>Complete a Tool Operation Template and Equipment Safety Checklist for a small engine, Safely operate an engine, Locate key information using a digital service manual, Develop a storyboard to identify inputs, processes, and outputs in a four-stroke cycle small engine, Use the flow chart with the leakdown tester to identify the current stroke of an engine, Define small engine systems and record the inputs and outputs of each system, Record the energies transferred throughout the systems in an engine, Measure the thermal energy transferred in an engine, Test an engine's electrical and compression system to ensure proper working order, Identify diagnostic tests for finding an ignition or compression problem in an engine.</p>	<p>CRP.01.01, CRP.02.02, AG-PST 1.2, AG-PST 3.1</p>	<p>Air cleaner, Armature, Blower housing, Bottom dead center, Cam gear, Cam lobe, Cam shaft, Carburetor, Charge, Chemical energy, Choke plate, Combustion, Compression event, Conduction, Connecting rod, Convection, Cooling fin, Crankcase, Crankgear, Crankshaft, Cylinder head, Cylinder leakdown test, Cylinder leakdown tester, Engine block, Exhaust, Exhaust event, Exhaust valve, Flywheel, Fiction, Fuel tank, Governor lever, Governor system, Head gasket, Ignition event, Ignition Tester, Inputs, Intake event, Intake valve, Kinetic energy, Lubrication System, Magneto, Mechanical Energy, Muffler, Oil dipstick, Oil sling, Output, Piston, Piston ring, Potential energy, Power event, Primer bulb, Process, Push rods, Radiation, Rewind starter, Rocker arm, Shroud, Spark plug, Spark plug lead, Tappet, Thermal energy,</p>	<p>Activity: Machine Safety &amp; Op, Activity: PowerPortal Navigation, Activity: Internal Combustion, Activity: Engine Systems, Activity: Systems Test, Activity: Engine Energy</p>
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<p>Engine Disassembly (SGE Lesson 2.2)</p>	<p>March/April</p>	<p>Document and organize the disassembly of a small engine, Construct a prototype of a carburetor, Improve a prototype of a carburetor to produce the optimum air-fuel ratio, Diagram how the governor adjusts small engine speed, Draw a schematic of the electrical system in a small engine, Measure and adjust valve clearances for a small engine, Identify types of metals found in an engine and the purpose of each, Diagram and calculate the gear ratios and speeds in a small engine</p>	<p>AG-PST 1.2, AG-PST 1.4, AG-PST 3.1, AG-PST 3.5, AG-PST 3.6</p>	<p>Aluminum, Bernoulli's principle, Bowl vent, Breaker bar, Cast iron, Clearance, Compression ring, Cylinder bore, Dial indicator, Emulsion tube, Feeler gauge, Ferrous metal, Gasket, Gear, Gear puller, Gear ratio, Governed speed, Governor spring, Ground, High speed adjustment, Idle passage, Mechanical governor system, Mechanical switch, Nonferrous metal, Oil ring, Reverse engineer, Ring expander, Rod cap, Specification, Timing gear, Torque, Torque wrench, Valve seat, Zinc, Venturi, Wiper ring</p>	<p>Activity: Sequential Order, Activity: Carburetor Function, Project: Fuel Efficiency, Activity: Systems Controls, Activity: Machine Specifications, Activity: Functional Components</p>
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<p>Engine Assembly (SGE Lesson 2.3)</p>	<p>April</p>	<p>Locate part standard and reject sizes in a repair manual, Measure the wear on a crankshaft and find the specification for replacement, Identify wear points in an engine, Describe the systems in place to reduce wear, Reassemble a small engine using correct torque and sequencing of bolts, spacing of valves, and spacing of armature, Set the governed speed of a small engine.</p>	<p>CRP.01.01, CRP.02.02, Ag-PST 1.2, AG-PST 2.2, AG-PST 2.3, AG-PST 3.1</p>	<p>Antifriction bearing, Asperities, Axial load, Bearing, Bushing, Crankpin journal, Dial caliper, Friction bearing, Grades, Idling, Journal, Mag journal, Micrometer, Metric, Out-of-round, Overheating, PTO, Precision, PTO journal, Radial load, Revolutions per minute (RPM), Ring compressor, Unified Course (UNC), Unified Fine (UNF), Telescoping gauge, Thread, Threads per inch (TPI), Top no-load speed, Wide-open-throttle (WOT)</p>	<p>Review: Bolt Size &amp; Gauge &amp; Micrometer Use, Activity: Reject Sizes, Activity: Bearing Lubrication, Activity: Torque &amp; Sequence, Activity: Start Your Engines</p>
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Diagnostic Process (SGE Lesson 3.1)	May	Use an electronic service manual to find and identify part numbers and costs, Create a service plan for a small engine, Identify the parts of the six-step diagnostic process during a guest technician presentation, Use the diagnostic process to identify faults in a small engine, Write a Work/Repair Order using technical writing.	CRP.02.02, CRP.04.02, AG-PST 2.2, AG-PST 3.1	Abrasive ingestion, Abrasive particles, Abrasive wear, Cause, Confirm, Complaint, Components, Component failure, Diagnostic process, Engine failure, Failure analysis, Key part, Labor, Maintenance, Parts number, Service replacement engine, Scoring, Servicing, Symptom, Work/Repair Order	Activity: Replacement Parts, Activity: Field Experience, Project: Communication Services, Problem: Engine Service
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\* All activities and projects incorporate writing as students are expected to write responses to analysis questions/conclusion questions using complete sentences. St technician would use.

### Program Materials / Resources

Binders, Notebooks, Dividers, Clipboard, PPE, Pencil, Project 1.2.4 Evaluation Rubric, Equipment Safety Checklist, Notebook, Examples of outdoor power equipment, SDS forms, C-clamps, Alcohol tester, 250ml Beaker, Dish soap, Gasoline from pump, Gasoline engineered, Liquid flammable disposal container, Nitrile gloves, Oil absorbent, Shop towels, Shop sink, Safety Agreement, Emplayability Evaluation Rubric, Activity 1.2.1 Incident Cards, Near Miss Report, Paper, Colored pencils, Scissors, Earplugs, 10 Ex work stations, Face Shield, Fire-resistant shop coat, Hair ties, Hard hat, Leather chaps, Leather gloves, Respiration mask, Rubber gloves, Welding helmet, Work boots/leather closed toed shoes, Samll Gas Engines Textbook, iPad, Safety Standards Template, Project 1.1.3 Setting the Standard, Project 1.1.4 Evaluation Rubric, Seven Common Accident Causes

Heavy Equipment Power Trains and Systems textbook, Combination Square, Combination wrench 1/2", Dial caliper 6"/150mm, Dial indicator, Four-bar linkages, Glue stick, Logbook, PPE, Socket 3/8" drive 1/2", Socket wrench 3/8" drive, Tab divider, Tab label insert, Torque wrench in-lb 3/8" drive, Binder (2"), Assorted bolts, Clipboard, Depth micrometer, Inside micrometer, Machine components, Outside micrometer 0-1", Outside micrometer 1-2", Outside micrometer 2-3", Ball Joint service kit, Ball-peen hammer, Flat-head screwdriver, Grease, Grease gun, Marker/pen, Needle nose pliers, Paper plate, Snap ring pliers, U-joint & service manual, Workstations w/ vise, Chains, Equipment service manual, Equipment w/ V-belts & chains, Pulley for V-belt, Sprocket, String, Tape measure, V-belts, iPad/laptop, Battery case D size, D Batteries, 600ml Beaker, Electrical components, DMM, Headphones, Water pump, Wire with alligator clips (black and red), 250ml Graduated cylinder, Hot glue gun & sticks, Plastic hose 1/4" I.D. 12"-clear, Pliers

Welders, Welding helmets, Welding jackets, metal, Welding rods

12V Battery, Breadboard pin wire male to female (black and red), Flat bearing, Gear 12 tooth, Gear 36 tooth, Gear 60 tooth, Gear 60 tooth extra strength, 3/32" Hex wrench, 5/64" Hex wrench, Masking tape, Motor clutch, Motor 2 wire VEX 393, Nut #8-32 keps, Plastic storage containers (toolbox size), PPE, Screw #6-32 x 1/2", Screw #8-32 x 1/4", Shaft collar, Shaft 11mm, Shaft 12" square, Shaft 4" square, Spacers 8mm, Standoff 3", Steel angle 2x2x25, Steel rail 2x1x25, Wheel 4", Wrench/nut driver 1/4", Clutch disc, Dowel 6" x 1" diameter, Electromagnetic clutch & manual, Feeler gauge, 10A Fuse, Sandpaper disc (120g, 200g, 40g- 6"), Socket extension 3/8" drive, Socket wrench 3/8" drive, Socket 9/16" 3/8" drive, Switch single pole single throw, Washers 1", Wire with alligaor clips (black and red), Calculator, 9oz cups, Electronic balance, Ruler, String, Transmission model, Ball Bearing, Friction Bearing, Roller Bearing, Cleaning fluid, Dial caliper 6"/150mm, Nitrile gloves, Shop towels, Telescoping gauge, Combination Square, Hacksaw, Metal chop saw, Metal file, Brass drift punch, Chisel, Dial indicator, Gearbox, Paint pen, Seal installer

Assembled transmission, Battery 12V, Bevel gear, Differential case, 84 tooth Gear, 5/64" Hex wrench, PPE, Shaft collar, Shaft 12" & 4" Square, Switch single pole single throw, 4" Wheel, Wire with alligator clips (Black & Red), Ball peen hammer, Brake cleaner, Brass drift punch, Chisel, Cotter pin, Dial caliper 6"/150mm, Dial indicator, Ear plugs, Grease gun, Hub user manual, Lithium grease, Nitrile gloves, Pry bar, Seal replacement, Seal/bearing driver, Shop towels, Slip joint pliers, Socket 38mm 1/2" drive, Socket wrench 1/2" drive, Tapered punch, Torque wrench 5-80ft-lb 1/2" drive, Wheel hub/spindle, Woodblock 6"-2x4, Workbench w/ vise, Equipment with tires, Electronic balance, Eye hook, Masking tape, Pea gravel, 64oz plastic container, Tape measurer, Transmitter, Washers 1", Electromagnetic clutch, Feeler gauge, 10A Fuse, Misaligned shaft on worn bearings, Misaligned sprockets with a tight chain, Two pulleys w/ loose and tight belts, Two sprockets with loose chain, Wheel hub w/ seized bearing & worn bearing, Worn partially deflated tire on a wheel

Basic electrical training board, Battery charger 12V, Battery 12V, Calculator, DMM, 10A Fuse, Resistor 100 Ohm, Wire w/ alligator clips, Ignition Systems Service Manual, LED bulb 10mm, Silicon diode failed, Silicon diode new, AC mini-hand motor, Breadboard pin wire male to male, KidWind Output Power Board, Sener diode 2V rating, Tractor, Clipboard, Ear plugs, Battery case D size, D Batteries, Electrical tape, Graphite pencil 6B, Potentiometer 10 Ohm

Basic electrical training board, Cranking circuit schematic, John Deere Gator Service Manual, Markers, Battery charger 12V, 12V Battery, DMM, Fuse 7.5A & 10A, Key, Masking tape, Wire w/ alligator clips, C-clamp, Funnel, Highlighter, Magneto, Oil 30W, Small Engine OHV, Socket wrench 1/4" drive, Socket 8mm 1/4" drive, Spark plug, Shop towels, Battery 9V, Relay single pole single throw N.C., Relay single pole single throw N.O., Button switch N.C SPST, DC motor brushed 12V, LED bulb 10mm, Posterboard, Potentiometer 10 KiloOhms, Relay single pole double throw N.C., Scissors, Switch single pole single throw, Breadboard pin wire male to male, Colored pencils, 3oz Cup, Device with timer, Duct tape, Electrical tape, Flow meter, 60ml Syringe, Wire stripper

Basic Electrical Training Board, 12V Battery, Calculator, DMM, 10A Fuse, Wire w/ alligator clips, Baking soda, Battery post terminal cleaner, 600ml Beaker, Dielectric grease, Electrical tape, Electrical testing Voltage Drop DVD, Equipment for students to test (tractor, lawnmower, etc.), Nitrile gloves, Philips screwdriver #2, Complaint cards 4.3.2, Service manual New Regent, Socket wrench 1/4" drive, Socket 1/2" 1/4" drive, Socket 10mm 1/4" drive, Socket 7/16" 1/4" drive, Solenoid faulty, Steel wool, Fuse puller, Electric Hook Up Wire Kit 16 gauge 100ft, Electrical connectors 16 ga, Electrical fluz, Electrical solder, Heat gun, Heat shrink 1/4" x 4", Soldering iron helping hands, Soldering iron with stand, Wire crimper 12-16 ga, Wire stripper, Battery adapter 9V, Battery 9V, Breadboard pin male to male, Digital control unit, Female union 5/16" x 1/8", FIMCO 30 Gallon Trailer Sprayer, LabQuest, LED bulb 10mm, Motion sensor, Plywood 4'x8', Pressure 400 sensor, Relay single pole single throw N.C, Sprayer supplies, Teflon tape

Highlighters, PowerPortal, Automatic transmission fluid, Bosch diesel fuel injector, Diesel fuel injector pressure tester, Diesel fuel gallon, Double flaring tool kit, Face shield, Fuel line steel 12" x 1/4", Metric wrench set, Nitrile gloves, Shop towels, Steel fuel line cutter, Steel fuel line compression union, Tractor user manuals, Tractor with diesel engine, Beaker 250ml, Beaker 600ml 3oz cup, Distilled water, Engine coolant, Engine oil, Funnel, Hot plate, Needle nose pliers, Nylon string, OEM specs for tractor, Oil drip pan, Oil filter, Oil filter wrench, Plastic pipet 1ml, Refractometer kit, Ring stand, Ring 10cm, Socket set 6pt 3/8" drive, Socket wrench 3/8" drive, Thermometer, Thermostat used, Torque wrench in-lb 3/8" drive, Tractor, 12V Battery, Bicycle Pump, Erlenmeyer flask 1L, Flashlight, IR thermometer, Lab tape, Plastic cup 16oz, Plastic coupler 1/8" O.D., Plastic tubing 1'x1/8" I.D., Postivit displacement pump 12V, Radiator, Rubber stopper, Water pump belt and gear driven, Water tank, Wire with alligator clips, Air filter, Box wrench set, DEF samples, Turbocharger, Piston with broken ring, Starter solenoid, Breadboard pin wire female to female, Breadboard, CAN Bus Template, DMM, Electrical wires, Staple gun, #2 Phillips screwdriver, Plywood 1/2" thick, Resistor 120 Ohms, Ring

Activity 2.1.1 Engine Event Cards, Colored pencils, Glue Stick, Posterboard, Scissors, Pencil, Notebook, Small Gas Engines textbook, Small engine cutaway, Activity 2.1.2 Engine Systems Cards, Permanent marker fine tip, Small Engine, Masking tape, Briggs and Stratton OHV Repair Manual, Briggs & Stratton Numerical Key, C-clamps, Socket 5/8" spark plug 3/8" drive, Socket 7/16" 3/8" drive, Socket 10mm 3/8" drive, Socket wrench 3/8" drive, Torque wrench 3/8" drive in-lb beam, Compressed air, Cylinder leakdown tester w/ clamp & 10mm bolt, DMM, Ignition tester, Spark plug gauge, Baster, 250ml Beaker, Timer, Funnel, IR thermometer, Oil SAE 30W bottle, Vernier Go Direct Temp sensor, Wrench 10mm, PPE, Dish Soap, Gasoline, Shop sink, Shop Towels, Oil absorbent, Oil drain pan, PowerPortal

Briggs & Stratton OHV Repair Manual, Fuel line pry tool, Permanent marker, 25 Gallon Plastic Bags, Pliers, Small engine, Socket (5/8" spark plug, 3/8" drive), Socket 8mm 10mm 12mm 13mm 3/8" drive, Socket wrench 3/8" drive, Sotrage tote, Masking tape, Safety glasses, Barb hose fitting 1/8" hose x 1/4" NPFT, Carburetor from small engine, plastic container w/ lid 1/2 cup, Plastic tubing 3"x1/8" ID, Pressure gauge with vacuum readings, Syringe, Nitrile gloves, Drill, Drill bit 1/4", Food coloring (red), Plumber's putty, Wrench 5/8", Water, Graduated cylinder 10ml, Carburetor protoype from Act 2.2.2, Carburetor Function, Index Card, Notebook, MSA Engineering Report Template & Rubric, Pencil, Clear carburetor demo kit, Highlighter, UV light, Tools and Construction supplies, DMM, Feeler gauge SAE, Extension bar 3/8" drive, Leather gloves, Dial indicator w/ stand, Torque wrench 1/2" ft-lb click, Breaker bar 1/2" drive, Flywheel strap, Gear puller 8", Magnet, Ring Expander, Shop towels

Dial Caliper 6"/150mm, Heavy Equipment Power Trains and Systems textbook, Clipboard, Pencil, Notebook, 20 Bolts (assorted type, size, thread, grades); Depth micrometer, 15 Machine components, Outside micrometer 0-1", Outside micrometer 1-2", Outside micrometer 2-3", Telescoping gauge set, Advanced Product Service Information, Briggs & Stratton OHV Repair Manual, Calculator, Oil SAE 30W - bottle, Ring Compressor, Small Engine disassembled, Storage tote with disassembled parts, Oil absorbent, Shop towels, Safety glasses, Feeler gauge, Flywheel strap, Ruler, Socket (5/8" spark plug, 3/8" drive), Socket 8mm, 10mm, 12mm, 13mm 3/8" drive, Socket 21mm 1/2" drive, Torque wrench (1/2" drive ft-lb click, 3/8" drive in-lb beam), Wrench (10mm, 14mm), Gasket-crankcase and head, C-clamps, Funnel, Paper clip, Permanent marker, Pliers - slip joint, Tachometer - digital, Tang bender, Vernier Go Direct force and acceleration sensor, Earplugs, Gasoline, Oil drain pan

Briggs and Stratton Numerical Key, Calculator, iPad, Pencil, Notebook, Clipboard, PPE, Employability Evaluation Rubric, Briggs & Stratton OHV Repair Manual, C-Clamps, Project 3.1.3 Complaint Card, Small Engine, Various diagnostic tools, Various hand tools, PPE, Work/Repair Order Template & Rubric, Guide for Assessing Problems, Major Engine Failure Analysis

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