WGSD Curriculum
Industrial Technology Department

Course: Automotive Technology
Grade Level: 11-12
LG 1 Shop Safety

<table>
<tr><td colspan="2">High Priority Standards

MoDese Performance Indicators for Automotive Technology:
Introduction to Automotive Technology
1. Basic personal safety
2. 2. Ladder and tool safety
.</td></tr>
<tr><td>Learning Goal

Students will be able to keep themselves safe in a working shop environment.</td><td>Proficiency Scale

Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Demonstrating safe work habits, handling of hazardous materials, safe use of lifting/hoisting devices, and power and hand tools.
• Complying with all personal and environmental safety regulations that apply to the shop environment.

Level 2: Student demonstrates he/she is nearing proficiency by:
• Recognizing and recalling specific vocabulary, such as: combination wrench, screwdriver, pliers, hammer, socket, ratchet, punch, chisel, fire extinguisher (A,B,C,D), drill motor, drill bit, grinder, safety glasses, lift, jack, jack stand, impact wrench, blowgun, solvent, acid, caustic, brake parts cleaner, flammable, earplugs, carbon monoxide, OSHA, vise, micrometer, carburetor cleaner,</td></tr>
</table>

	lithium, penetrant, mineral spirits, thinner, reducer, catalyst.
	• Performing processes such as:
	  o Identifying safe ways to use hand and power tools.
	  o Identifying and describing the situations that call for protective equipment.
	  o Knowing that regulations from all levels of government exist for shop environments.
	  o Using personal protective equipment in the shop environment (i.e., clothing and safety glasses).
	  o Identifying and describing how fire protection equipment is used.
	  o Identifying chemicals used to clean and maintain automotive parts.
	
	Level 1: Student demonstrates a limited understanding or skill with the learning goal.

Learning Targets

The student knows how to:

- Demonstrate the safe use of hand tools.
- Demonstrate the safe use of power tools.
- Practice the safe use of personal protective equipment (ie. clothing and safety glasses).
- Describe how to use fire protection equipment safely.
- Demonstrate the safe use of shop equipment.
- Describe how to use chemicals safely.

WGSD Curriculum
Industrial Technology Department

Course: Automotive Technology
Grade Level: 11-12
LG 2 Shop Skills

<table>
<tr><th colspan="2">High Priority Standards</th></tr>
<tr><td colspan="2">MoDese Performance Indicators for Automotive Technology
3. Lab Procedures
6. Engine/Product Identification

Missouri Learning Standards
ELA: Reading in Science and Technical areas 11-12.4
Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context (service manuals, parts lists, work orders).</td></tr>
<tr><th>Learning Goal</th><th>Proficiency Scale</th></tr>
<tr><td>The student will be able to apply the skills needed to work in a shop environment.</td><td>Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Conducting specified searches to locate vehicle and service information.
• Completing work order and estimates and communicating results with the customer.

Level 2: Student demonstrates he/she is nearing proficiency by:
● Recognizing and recalling specific vocabulary, such as: make, manufacture, model, body style, chassis, work order, service manual, serial number, ytpe</td></tr>
</table>

	number, code number, CO, CO2, HC, NOx, parts manual, flywheel brake • Performing processes such as: o Identifying attitudes and skills that contribute to a positive shop environment. o Identifying what vehicle and service information needs to be researched. o Identifying make, model, year, and chassis of vehicles needing service. Level 1: Student demonstrates a limited understanding or skill with the learning goal.

Learning Targets

The student knows how to:

- Identify make and model of vehicles to facilitate accurate research into needed information.
- Research applicable vehicle and service information.
- Develop and maintain a code of professional ethics.
- Demonstrate effective communication skills.
- Complete work and order estimates.

WGSD Curriculum
Industrial Technology Department

Course: Automotive Technology
Grade Level: 11-12
LG 3 Tools and Fasteners

<table>
<tr><th colspan="2">High Priority Standards</th></tr>
<tr><td colspan="2">MoDese Performance Indicators for Automotive Technology
4. Tools and Equipment
5. Fasteners</td></tr>
<tr><th>Learning Goal</th><th>Proficiency Scale</th></tr>
<tr><td>Students will understand proper use and identification of tools, equipment, and fasteners.</td><td>Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Applying proper use and care of all tools used in the auto shop such as hand tools, precision measuring tools, power tools, and diagnostic tools.
• Determining torque value and technique for fasteners.
• Applying gaskets and sealants as needed for a completed job.

Level 2: Student demonstrates he/she is nearing proficiency by:
• Recognizing and recalling specific vocabulary, such as: combination wrench, flare nut wrench, ratchet, socket, extension, universal, screwdrivers, hammers, pliers, torque wrench, snap ring pliers, punches, chisels, pullers, vise, micrometer, dial indictor, bore gauge, telescoping gauge, caliper, square, drill, impact wrench, grinder, tap, die, test light, DVOM, screw, bolt, nut, lock</td></tr>
</table>

	washer, flat washer, fastener grade, pitch, gasket, RTV, thread sealant.
	• Performing processes such as:
	  o Identifying all industry related tools and fasteners.
	  o Measuring bolts and threads.
	  o Identifying gaskets and sealants for various applications.
	
	Level 1: Student demonstrates a limited understanding or skill with the learning goal.

WGSD Curriculum
Industrial Technology Department

Course: Automotive Technology
Grade Level: 11-12
LG 4 Four Stroke cycle engines

<table>
<tr><td colspan="2">High Priority Standards

MoDese Performance Indicators for Automotive Technology
7. Four-stroke Cycle Engines</td></tr>
<tr><td>Learning Goal

Students will understand four-stroke cycle engine theory and construction.</td><td>Proficiency Scale

Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Explaining the operating cycle of the four-stroke cycle engine.
• Disassembling and reassembling a four-stroke cycle engine.
•
Level 2: Student demonstrates he/she is nearing proficiency by:
• Recognizing and recalling specific vocabulary, such as: four-stroke cycle, block, cylinder head, crankshaft, camshaft, connecting rod, piston, piston rings, piston (wrist) pin, lifters, valves, valve springs, valve spring retainer, crankcase cover, oil pump, flywheel, carburetor, muffler, air filter.
• Performing processes such as:
o Inspecting and servicing cylinders, pistons, rings, connecting rods, valve train assemblies, crankshaft assemblies.
o Identifying the difference between L-head and overhead valve trains.
o Testing compression.</td></tr>
</table>

	Level 1: Student demonstrates a limited understanding or skill with the learning goal.

WGSD Curriculum
Industrial Technology Department

Course: Automotive Technology
Grade Level: 11-12
LG 5 Trouble Shooting and Failure Analysis

<table>
<tr><td colspan="2">High Priority Standards

MoDese Standards for Industrial Automotive Technology
10. Troubleshooting
23. Failure Analysis</td></tr>
<tr><td>Learning Goal
Students will understand troubleshooting as a systematic approach to identify failures.</td><td>Proficiency Scale

Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Examining the faulty systems and components to determine what repairs are needed.
• Performing specific tests to make an accurate diagnosis.
• Making repairs and retesting to verify repairs.

Level 2: Student demonstrates he/she is nearing proficiency by:
• Recognizing and recalling specific vocabulary, such as: service manual, specifications, symptoms, systems, verify complaint, verify repairs, fuel, fuel system, ignition system, lubrications, contamination, spark plug, flywheel key, vacuum, abrasive, overheating, vibration.
• Performing processes such as:
o Identifying the effects of things that can cause engine damage or failure, such as abrasive ingestion, insufficient lubrication, and overheating.
o Identifying engine systems and components.

Level 1: Student demonstrates a limited understanding or skill with the learning goal.</td></tr>
</table>

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Industrial Technology Department

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Course: Automotive Technology
Grade Level: 11-12
LG 6 Fuel systems

<table>
<tr><td colspan="2">High Priority Standards

MoDese Performance Indicators for Automotive Technology
11. Fuel Systems.
12.Governor System</td></tr>
<tr><td>Learning Goal

Students will understand operational components of carburetor fuel systems.</td><td>Proficiency Scale

Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Explaining all types of fuel system components and their relationship to each other and the rest of the engine.
• Explain the governor system and the purpose of it as part of the engine.
• Testing, repairing/replacing components of the fuel system such as diaphragm-type carburetor, fuel filters and strainers, fuel tank, shut-off valve, fuel lines and hoses, mechanical governor systems and linkages, and float-type carburetor.
Level 2: Student demonstrates he/she is nearing proficiency by:
• Recognizing and recalling specific vocabulary, such as: carburetor, fuel filter, fuel pump, fuel hose/pipe, fuel tank, air filter, gasoline, octane, diaphragm, gravity, governor, air vane, centrifugal force, RPM, rich fuel mixture, lean fuel mixture, CARB, EPA, idle, cold start, hot start, acceleration, vacuum, Venturi principle, choke, float, primer.</td></tr>
</table>

	• Performing processes such as:
	  o Identifying the types and grades of gasoline used in power equipment.
	  o Servicing air cleaners and fuel filters.
	  o Adjusting engine RPM's.
	  o Disposing of contaminated fuel per EPA regulations.
	
	Level 1: Student demonstrates a limited understanding or skill with the learning goal.

WGSD Curriculum
Industrial Technology Department

Course: Automotive Technology
Grade Level: 11-12
LG 7 Electrical Starting and Charging

<table>
<tr><th colspan="2">High Priority Standards

MoDese Performance Indicators for Automotive Technology
13. Electrical Systems
14. Ignition Systems</th></tr>
<tr><th>Learning Goal</th><th>Proficiency Scale</th></tr>
<tr><td>Students will understand components and operation of electrical and starting systems.</td><td>Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Explaining basic electrical theory.
• Explaining battery storage theory and operation.
• Explaining different types of circuit failures and how to repair them.
• Interpreting electrical meter readings.
• Testing, repairing, and/or replacing charging and ignitions system components.
• Explaining the theory of operation of the ignitions system.

Level 2: Student demonstrates he/she is nearing proficiency by:
• Recognizing and recalling specific vocabulary, such as: conductor, insulator, circuit, volts, ohms, coil, electrode, ignition, battery, transformer, magneto, gap, DVOM, fuse, fusible link, continuity, gauge, switch, alternator, corrosion, resistance, plate, sulfating, sulfuric acid, hydrogen gas, multi-meter, starter,</td></tr>
</table>

	solenoid, flywheel. • Performing processes such as: o Identifying terminals and connectors. o Identifying electrical wire sizes. o Determining battery state of charge. o Removing and servicing spark plugs. o Removing, cleaning, and replacing batteries. Level 1: Student demonstrates a limited understanding or skill with the learning goal.

Course: Automotive Technology

WGSD Curriculum
Industrial Technology Department

Grade Level: 11-12
LG 8 Lubrication

<table>
<tr><th colspan="2">High Priority Standards

MoDese Performance Indicators for Automotive Technology
15. Lubrication Sytems.</th></tr>
<tr><th>Learning Goal</th><th>Proficiency Scale</th></tr>
<tr><td>Students will understand lubrication systems and service.</td><td>Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Explaining the importance of lubrication in automotive systems.
• Troubleshooting lubrication systems and describing needed repairs.

Level 2: Student demonstrates he/she is nearing proficiency by:
● Recognizing and recalling specific vocabulary, such as: friction, lubrication, oil, API, SAE, viscosity, multiviscosity, detergent/disoersants, splash system, pressure system, pump, dipper, oil filter, bypass, babbit, cooling, foam, corrosion, insert, screen, bearing, antifriction bearing, friction bearing, dipstick, sight glass, seal.
• Performing processes such as:
o Identifying common oil contaminants.
o Changing engine oil and filter.
o Selecting the proper oil.
o Servicing the crankcase breather.

Level 1: Student demonstrates a limited understanding or skill with the learning goal.</td></tr>
</table>

Course: Automotive Technology

WGSD Curriculum
Industrial Technology Department

Grade Level: 11-12
LG 9 Cooling

<table>
<tr><td colspan="2">High Priority Standards

MoDese Performance Indicators for Automotive Technology
16. Cooling Systems</td></tr>
<tr><td>Learning Goal

Students will understand liquid cooled and air cooled systems used in small engines.</td><td>Proficiency Scale

Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Explaining the purpose of a cooling system and the major causes of engine overheating.
• Explaining cooling related service procedures performed on both liquid and air cooled engines.

Level 2: Student demonstrates he/she is nearing proficiency by:
• Recognizing and recalling specific vocabulary, such as: conduction, convection, cooling fins, water jacket, antifreeze, pump, thermostat, radiator, tubes, hose neck, petcock, pressure cap, air lock, operating temperature, fan.
• Performing processes such as:
o Identifying the purpose of thermostats, water pumps, and antifreeze.
o Removing and replacing water pump and fan drive belt, thermostat, and radiator.

Level 1: Student demonstrates a limited understanding or skill with the learning goal.</td></tr>
</table>

Course: Automotive Technology

WGSD Curriculum
Industrial Technology Department

Grade Level: 11-12
LG 10 Exhaust and Emissions

<table>
<tr><th colspan="2">High Priority Standards</th></tr>
<tr><td colspan="2">MoDese Performance Indicators for Automotive Technology
9. Emissions
17. Exhaust Systems</td></tr>
<tr><th>Learning Goal</th><th>Proficiency Scale</th></tr>
<tr><td>Students will understand the exhaust system and emission controls on automotive engines.</td><td>Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
• Explaining the consequences of noncompliance with emission standards.
• Describing the function of the automotive exhaust system.
• Servicing and/or replacing a four-stroke cycle exhaust system.

Level 2: Student demonstrates he/she is nearing proficiency by:
● Recognizing and recalling specific vocabulary, such as: muffler, decibel, pope, clamp, hangar, isolator, heat shield, spark arrestor, catalytic converter, CO, CO2, HC, NOx, valve guide, piston rings, vacuums, rich, lean, back pressure, overlap, scavange, EPA, CARB.
• Performing processes such as:
o Identifying service cleaning procedures for exhaust ports.
o Identifying types of emissions.

Level 1: Student demonstrates a limited understanding or skill with the learning goal.</td></tr>
</table>

WGSD Curriculum
Industrial Technology Department

WGSD Curriculum
Industrial Technology Department

Course: Automotive Technology
Grade Level: 11-12
LG 11 Maintenance

<table>
<tr><td colspan="2">High Priority Standards

MoDese Performance Indicators for Automotive Technology
22.</td></tr>
<tr><td>Learning Goal

Students will be able to perform normal automotive maintenance.</td><td>Proficiency Scale

Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal.

Level 3: Student demonstrates mastery with the learning goal as evidenced by:
•
Level 2: Student demonstrates he/she is nearing proficiency by:
• Recognizing and recalling specific vocabulary, such as: blade, belt, pulley, set screw, air filter, oil, points and condenser, cable/linkages, lubricate, spark plug, fuel filter, air pressure.
• Performing processes such as:

Level 1: Student demonstrates a limited understanding or skill with the learning goal.</td></tr>
</table>

WGSD Curriculum
Industrial Technology Department

Course: Home Maintenance
Grade Level: 10-12
LG 1 Safety

High Priority Standards

MoDese Career Profiles: Building Maintenance

1. Orientation to building maintenance.

1.2. Identify safe work site procedures/practices, including fall protection and confined spaces.

1.3. Identify emergency first aid procedures, including MSDS (material safety data sheets).

Learning Goal	Proficiency Scale
Students will understand the importance of safety procedures in the construction crafts.	Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal. Level 3: Student demonstrates mastery with the learning goal as evidenced by: • Explaining the role of OSHA in job-site safety. • Explaining fall protection, and ladder, stair, and scaffold procedures. • Explaining the use of hazard communications and material safety data sheets. Level 2: Student demonstrates he/she is nearing proficiency by: • Recognizing and recalling specific vocabulary, such as: HazCom, MSDS, OSHA. • Performing processes such as: o Identifying causes of accidents. o Demonstrating use and care of personal protective equipment. o Identifying struck-by and caught in-between safety hazards. Level 1: Student demonstrates a limited understanding or skill with the learning goal.

WGSD Curriculum
Industrial Technology Department

Course: Home Maintenance
Grade Level: 10-12
LG 2 Working With Wood

High Priority Standards	
MoDese Career Profiles: Carpentry Building Materials, Fasteners, and Adhesives 2. State the uses of various types of hardwoods and softwoods. 3. Identify the different grades and markings of wood building materials. 6. State the uses of various types of engineered lumber. 7. Calculate the quantities of lumber and wood products using industry-standard methods. 8. Describe the fasteners, anchors, and adhesives used in construction work and explain their uses.	
Learning Goal	**Proficiency Scale**
Student will be able to build with wood.	Level 4: Student demonstrates an in-depth inference or advanced application or innovates with the learning goal. Level 3: Student demonstrates mastery with the learning goal as evidenced by: • Explaining the use of fasteners, anchors, and adhesives and the best application for each. • Differentiating grades and types of lumber and best application for each. Level 2: Student demonstrates he/she is nearing proficiency by: • Recognizing and recalling specific vocabulary, such as: hardwood, softwood, grades, markings, engineered wood. • Performing processes such as: o Identifying woods and engineered woods

	○ Describing best methods of storing and handling building materials Level 1: Student demonstrates a limited understanding or skill with the learning goal.