

WGSD Curriculum  
Industrial Technology Department

**Course: Simplified Automotive Maintenance**

**Grade Level: 10-12**

**LG 1 Shop Safety**

**High Priority Standards**

**MoDese Performance Indicators for Automotive Technology:**

**Introduction to Automotive Technology**

**A. Safety**

<b>Learning Goal</b>	<b>Proficiency Scale</b>
Students will be able to keep themselves safe in a working shop environment.	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: <ul style="list-style-type: none"><li>• Applying safety skills when using hand and power tools in all situations.</li><li>• Complying with all personal and environmental safety regulations that apply to the shop environment.</li></ul> Level 2: Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none"><li>• 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.</li><li>• Performing processes such as:<ul style="list-style-type: none"><li>○ Identifying safe ways to use hand and power tools.</li><li>○ Identifying and describing the situations that call for protective</li></ul></li></ul>

WGSD Curriculum  
Industrial Technology Department

	<p>equipment.</p> <ul style="list-style-type: none"><li>○ Knowing that regulations from all levels of government exist for shop environments.</li><li>○ Using personal protective equipment in the shop environment (i.e., clothing and safety glasses).</li><li>○ Identifying and describing how fire protection equipment is used.</li></ul> <p>Level 1: Student demonstrates a limited understanding or skill with the learning goal.</p>
<p style="text-align: center;"><b>Learning Targets</b></p> <p><b>Students know how to:</b></p> <ul style="list-style-type: none"><li>● Demonstrate the safe use of hand tools.</li><li>● Demonstrate the safe use of power tools.</li><li>● Practice the safe use of personal protective equipment (ie., clothing and safety glasses).</li><li>● Describe how to use fire protection equipment safely.</li><li>● Demonstrate the safe use of shop equipment.</li></ul>	

WGSD Curriculum  
Industrial Technology Department

**Course: Simplified Automotive Maintenance**

**Grade Level: 10 -12**

**LG 2 Career Skills**

**High Priority Standards**

**MoDese Performance Indicators for Automotive Technology**

**Introduction to Automotive Technology**

- B. Shop Operation
- C. Employability Skills
- D. Leadership Competencies

**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 relevant to *grades 11–12 texts and topics*.

**Learning Goal**

The student will be able to apply the skills needed to work in a shop environment.

**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:
- Conducting specified searches to locate vehicle and service information.
  - Maintaining a good work ethic (i.e., relations with others, dependability, attitude, and personal hygiene).
  - Displaying the skills of teamwork, etiquette and courtesy in the shop environment.

WGSD Curriculum  
Industrial Technology Department

Level 2: Student demonstrates he/she is nearing proficiency by:

- Recognizing and recalling specific vocabulary, such as: make, manufacture, model, body style, chassis, ethics, responsibility, respect, attitude, teamwork.
- Performing processes such as:
  - Identifying attitudes and skills that contribute to a positive shop environment.
  - Identifying what vehicle and service information needs to be researched.
  - 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**

**Students know how to:**

- Identify make and model of vehicles to facilitate accurate research into needed information.
- Research applicable vehicle and service information.
- Demonstrate a good work ethic (i.e., relations with others, dependability, attitude, and personal hygiene).
- Demonstrate teamwork.
- Demonstrate etiquette and courtesy.
- Develop and maintain a code of professional ethics.

WGSD Curriculum  
Industrial Technology Department

WGSD Curriculum  
Industrial Technology Department

**Course: Simplified Automotive Maintenance**

**Grade Level: 10 -12**

**LG 3 Steering and Suspension**

**High Priority Standards**

**MoDese Performance Indicators for Automotive Technology**

**Introduction to Automotive Technology**

IV. Steering and Suspension

- A. General suspension and steering systems diagnosis.
- B. Steering systems diagnosis and repair.
- C. Suspension systems diagnosis and repair.
- D. Related suspension and steering service.
- E. Wheel Alignment.
- F. Wheel and tires.

**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. (Finding and using vehicle service records and service manuals and bulletins).

<b>Learning Goal</b>	<b>Proficiency Scale</b>
Students will be able to inspect and diagnosis issues in vehicle steering systems.	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: <ul style="list-style-type: none"><li>• Interpreting necessary information to determine repair actions in suspension and steering systems in accordance with industry standards.</li><li>• Diagnosing problems in power steering components and fluids in accordance</li></ul>

WGSD Curriculum  
Industrial Technology Department

	<p>with industry standards.</p> <ul style="list-style-type: none"><li>● Diagnosing problems in suspension system joints, balls, coil springs, stabilizer bars, bushings and brackets in accordance with industry standards.</li><li>● Diagnosing problems in shock absorbers, wheel bearings and other components of suspension and steering mechanisms.</li></ul> <p>Level 2: Student demonstrates he/she is nearing proficiency by:</p> <ul style="list-style-type: none"><li>● Recognizing and recalling specific vocabulary, such as: spring, ball joint, tie-rod, drag (center), link, idler arm, pitman arm, control arm, stabilizer bar, bushing, belt, pump, hose, power steering fluid, shock absorber, McPhearson strut, zerk fitting .</li><li>● Performing processes such as:<ul style="list-style-type: none"><li>○ Identifying correct service information and vehicle service bulletins.</li><li>○ Describing needed repair actions for suspension and steering systems.</li><li>○ Performing routine maintenance on automotive steering and suspension systems.</li></ul></li></ul> <p>Level 1: Student demonstrates a limited understanding or skill with the learning goal.</p>
--	---

**Learning Targets**

**Students know how to:**

- Identify and interpret suspension and steering system concerns; determine necessary action.
- Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins.
- Identify power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns.
- Identify power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns.
- Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.

WGSD Curriculum  
Industrial Technology Department

- Determine proper power steering fluid type; inspect fluid level and condition.
- Fill power steering system.
- Identify power steering fluid leakage; determine necessary action.
- Remove, inspect, replace, and adjust power steering pump belt.
- Check power steering pulley and belt alignment.
- Inspect pitman arm, relay (center link/intermediate) rod, idler arm mountings, and steering linkage.
- Inspect upper and/or lower ball joints.
- Inspect steering knuckle assemblies.
- Inspect short and long arm suspension system coil springs.
- Inspect suspension system torsion bars; inspect mounts.
- Inspect stabilizer bar bushings, brackets, and links.
- Inspect strut cartridge or assembly and strut coil spring.
- Inspect shock absorbers.
- Inspect front and rear wheel bearings.
- Lubricate suspension and steering systems.



WGSD Curriculum  
Industrial Technology Department

**Course: Simplified Automotive Maintenance**

**Grade Level: 10 -12**

**LG 4 Wheels and Tires**

**High Priority Standards**

**MoDese Performance Indicators for Automotive Technology**

**Introduction to Automotive Technology**

IV: Steering and Suspension

E. Wheel Alignment Diagnosis, Adjustment, and Repair.

F. Wheel and Tire Diagnosis and Repair.

<b>Learning Goal</b>	<b>Proficiency Scale</b>
Students will be able to maintain safe operation of automotive wheel and tire systems.	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: <ul style="list-style-type: none"><li>• Diagnosing problems with wheels and tires.</li><li>• Maintaining tires and wheels to meet road safety regulations.</li><li>• Inspecting, balancing, repairing and replacing tire and wheel components.</li></ul> Level 2: Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none"><li>• Recognizing and recalling specific vocabulary, such as: wander, drift, pull, caster, camber, toe, air pressure, normal wear, abnormal wear, torque wrench, wheel fastener, section width, aspect ratio, bead, bead seat, steel belt, ply, valve stem, wheel weight, patch, plug.</li><li>• Performing processes such as:</li></ul>

WGSD Curriculum  
Industrial Technology Department

- Describing potential problems with wheels and tires.
- Checking air pressure.
- Assisting with tire dismount and remount, wheel balancing and tire assembly, and reinstalling wheels.

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

**Learning Targets**

**Students know how to:**

- Diagnose vehicle wander, drift, and pull.
- Perform pre-alignment inspection.
- Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action.
- Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.
- Rotate tires according to manufacturer's recommendations.
- Diagnose tire pull problems; determine necessary action.
- Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly.
- Reinstall wheel; torque lug nuts.
- Inspect tire and wheel assembly for air loss; perform necessary action.
- Repair tire using internal patch.

WGSD Curriculum  
Industrial Technology Department

**Course: Simplified Automotive Maintenance**

**Grade Level: 10 -12**

**LG 5 Brakes**

**High Priority Standards**

**MoDese Standards for Industrial Automotive Technology**

**Introduction to Automotive Technology**

V. Brakes

- A. General brake systems diagnosis and evaluation in accordance with industry standards.
- B. Hydraulic system diagnosis and repair.
- C. Drum brake system and diagnosis and repair.
- D. Disc brake system diagnosis and repair.
- F. Miscellaneous diagnosis and repair.
- G. Electronic brake and traction control systems.

**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. (Interpreting technical documentation related to repairs.)

<b>Learning Goal</b>	<b>Proficiency Scale</b>
Students will be able to evaluate and diagnose problems with automotive brake systems.	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: <ul style="list-style-type: none"><li>• Interpreting general brake system concerns.</li><li>• Locating and interpreting vehicle and major component identification numbers</li></ul>

WGSD Curriculum  
Industrial Technology Department

	<p>using diagrams, schematics, and online resources.</p> <ul style="list-style-type: none"><li>• Interpreting hydraulic, drum, and disc brake systems problems.</li><li>• Performing routine maintenance all brake systems.</li><li>• Interpreting electronic brake system concerns.</li></ul> <p>Level 2: Student demonstrates he/she is nearing proficiency by:</p> <ul style="list-style-type: none"><li>• Recognizing and recalling specific vocabulary, such as: shimmy, pulsation, grinding, diagram, part number, pads, rotor, caliper, hose, pipe, shoe, drum, wheel cylinder, master cylinder, combination valve, proportioning valve, metering valve, brake fluid, DOT (Department of Transportation), brake cable, bearing, ABS, traction control, vehicle stability control.</li><li>• Performing processes such as:<ul style="list-style-type: none"><li>○ Identifying brake system concerns.</li><li>○ Locating ID numbers for parts needed.</li><li>○ Describing different types of brakes and brake systems found in automobiles.</li></ul></li></ul> <p>Level 1: Student demonstrates a limited understanding or skill with the learning goal.</p>
--	---

WGSD Curriculum  
Industrial Technology Department

**Learning Targets**

**Students know how to:**

- Identify and interpret brake system concerns and determine necessary action.
- Locate and interpret vehicle and major component identification numbers to find parts.
- Check master cylinder for external leaks.
- Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports, determine necessary action.
- Select, handle, store, and fill brake fluids to proper level.
- Identify poor stopping, noise, vibrations, pulling, grabbing, dragging or pedal pulsation concerns.
- Remove, clean, inspect, and measure brake drums; determine necessary action.
- Refinish brake drum; measure final drum diameter.
- Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, and other related brake hardware, and backing support plates; lubricate and reassemble.
- Inspect wheel cylinders.
- Install wheel, torque lug nuts, and make final checks and adjustments.
- Remove caliper assemble; inspect for leaks and damage to caliper housing.
- Clean and inspect caliper mounting and slide/pins for operation, wear, and damage; determine necessary action.
- Remove, inspect, and replace pads and retaining hardware; determine necessary action.
- Remove and reinstall rotor.
- Refinish rotor off vehicle, measure final rotor thickness.
- Check brake pad wear indicator system operation; determine necessary action.
- Check operation of brake stop light systems.
- Identify and inspect electronic brake control system components.
- Identify poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with electronic brake control system.
- Identify traction control/vehicle stability control system components.

WGSD Curriculum  
Industrial Technology Department

**Course: Simplified Automotive Maintenance**

**Grade Level: 10 -12**

**LG 6 Charging Systems**

**High Priority Standards**

**MoDese Performance Indicators for Automotive Technology**

Automotive Technology

VI. Electrical/Electronic Systems

- A. General Electrical System Diagnosis.
- B. Battery Diagnosis and Service.
- C. Starting System Diagnosis and Repair.
- D. Charging System Diagnosis and Repair.
- E. Lighting System Diagnosis and Repair.

<b>Learning Goal</b>	<b>Proficiency Scale</b>
Students will be able to maintain safe operation of automotive starting and charging systems.	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: <ul style="list-style-type: none"><li>• Inspecting, testing, and maintaining all the following automotive systems:<ul style="list-style-type: none"><li>○ General electrical system components.</li><li>○ Battery and battery systems.</li><li>○ Starting systems.</li><li>○ Charging systems.</li><li>○ Lighting systems.</li></ul></li></ul> Level 2: Student demonstrates he/she is nearing proficiency by:

WGSD Curriculum  
Industrial Technology Department

- Recognizing and recalling specific vocabulary, such as: battery, alternator, cable wire, conductor, insulator, belt, volts, fuse, switch, bulb, motor, crimp, heat shrink, solder, discharge, acid, short, open, pulley, tensioner, jumper cable, booster pack, cold cranking amps, cranking amps.
- Performing processes such as:
  - Identifying major components of the systems listed in level 3.
  - Using meters and circuit testers accurately.
  - Safely connecting and charging a low battery.

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

**Learning Targets**

**Students know how to:**

- Identify and interpret electrical/electronic systems concern and determine necessary action.
- Locate and interpret vehicle and major component identification numbers.
- Demonstrate proper use of a digital multi-meter (DMM).
- Check electrical circuits with a test light.
- Inspect and test fusible links, circuit breakers, and fuses.
- Inspect and test wires of electrical/electronic circuits.
- Remove and replace terminal end from connector; replace connectors and terminal ends.
- Repair wiring harness.
- Perform solder repair of electrical wiring.
- Perform battery state-of-charge test and determine necessary action.
- Perform battery capacity test and confirm proper battery capacity for vehicle application.
- Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs.
- Perform battery charge.
- Start vehicle using jumper cables or an auxiliary power supply.

WGSD Curriculum  
Industrial Technology Department

- Perform charging system output test.
- Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment.
- Diagnose the cause of intermittent, dim, or no light operations.
- Inspect, replace, and aim headlights and bulbs.
- Inspect and diagnose incorrect turn signal or hazard light operation.



WGSD Curriculum  
Industrial Technology Department

**Course: Simplified Automotive Maintenance**

**Grade Level: 10 -12**

**LG 7 Engine Performance**

**High Priority Standards**

**MoDese Performance Indicators for Automotive Technology**

Automotive Technology

VIII. Engine Performance

- A. General Engine Diagnosis.
- C. Ignition System Diagnosis and Repair
- D. Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair.
- E. Emissions Control Systems and Diagnosis.
- F. Engine Related Services.

<b>Learning Goal</b>	<b>Proficiency Scale</b>
Students will understand engine performance and drivability.	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: <ul style="list-style-type: none"><li>• Interpreting and evaluating problems, and determining actions for these automotive systems:<ul style="list-style-type: none"><li>○ Computerized engine controls.</li><li>○ Ignition systems.</li><li>○ Fuel, air inductions and exhaust systems.</li><li>○ Emission controls.</li></ul></li><li>• Applying mechanical skills needed to repair diagnosed problems.</li></ul>

WGSD Curriculum  
Industrial Technology Department

	<p>Level 2: Student demonstrates he/she is nearing proficiency by:</p> <ul style="list-style-type: none"><li>● Recognizing and recalling specific vocabulary, such as: drivability, no start, crank, hard start, spark plug, spark plug wire, coil, gasoline, engine oil, thermostat, antifreeze/coolant, radiator, pressure cap, coolant recovery, hose, hose clamp, fuel filter, air filter, oil filter, fuel economy.</li><li>● Performing processes such as:<ul style="list-style-type: none"><li>○ Checking and replacing fuels, lubricants and filters.</li><li>○ Changing oil and oil filters.</li><li>○ Replacing air filters.</li><li>○ Identifying abnormal engine conditions, such as excess noise or exhaust.</li></ul></li></ul> <p>Level 1: Student demonstrates a limited understanding or skill with the learning goal.</p>
--	---

**Learning Targets**

**Students know how to:**

- Identify and interpret engine performance concerns.
- Locate and interpret vehicle and major component identification numbers.
- Inspect engine assembly for fuel, oil, coolant, and other leaks.
- Identify abnormal engine noise or vibration concerns.
- Identify abnormal exhaust color, odor, and sound.
- Verify engine operating temperature.
- Check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses.
- Identify ignition system related problems such as no-starting, hard starting, engine misfire, poor drivability.
- Replace fuel filters.
- Inspect air induction system.
- Replace air filter.

WGSD Curriculum  
Industrial Technology Department

- Inspect and replace cabin air filter.
- Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action.
- Diagnose oil leaks.
- Perform engine oil and filter change.