Identifier	Poplar - Apprentice - Automotive Technology		Introduced	Completed
A AT 1	**SAFETY**			
A AT 1.1.01	General Rules	Identify potential general lab safety hazards.		
A AT 2	**GENERAL LAB PROCEDURES**			
A AT 2.1.01	Tools and Equipment Use	List common tool names.		
A AT 2.2.01	Information	Retrieve vehicle information from the owner's manual.		
A AT 2.2.02	Information	List common sources of service information.		
A AT 2.3.01	Customer Service	Properly clean and detail a vehicle to return to the customer.		
A AT 2.3.02	Customer Service	Explain the purpose of a repair order.		
A AT 2.4.01	Vehicle Service	Identify fluid by color.		
A AT 2.4.02	Vehicle Service	List the essential tasks of a basic vehicle service.		
A AT 3	**ENGINE REPAIR**			
A AT 3.1.01	General	Identify the engine make, configuration and displacement on a specified vehicle.		
A AT 3.1.02	General	Explain the difference between oil viscosities.		
A AT 5	**MANUAL DRIVETRAIN AND AXLES**			
A AT 5.1.01	Drivetrain/Axle Service	Identify and calculate gear ratios.		
A AT 5.1.02	Drivetrain/Axle Service	Identify different transmission and axle lubricants.		
A AT 5.1.03	Drivetrain/Axle Service	Identify transmission and axle components.		
A AT 5.1.04	Drivetrain/Axle Service	Explain power flow.		
A AT 6	**SUSPENSION AND STEERING**			
A AT 6.1.01	Systems Service	Identify primary steering components.		
A AT 6.1.02	Systems Service	Identify primary suspension components.		
A AT 6.2.01	Wheels/ Tires	Explain tire specifications and capacities.		
A AT 6.2.02	Wheels/ Tires	Explain common tire construction and tread patterns.		
A AT 6.2.03	Wheels/ Tires	Identify torque methods and patterns.		
A AT 6.2.04	Wheels/ Tires	Identify different types of wheel construction and materials.		
A AT 6.2.05	Wheels/ Tires	Remove and replace valve stems and caps.		
A AT 7	**BRAKES**			
A AT 7.1.01	Braking Systems	Identify the major components of a brake hydraulic system.		
A AT 7.2.01	Disc Brakes	Compare and contrast disc and drum brake systems.		
A AT 7.2.02	Disc Brakes	Determine the minimum thickness of a rotor.		
A AT 7.2.03	Disc Brakes	Identify respiratory safety concerns when servicing disc brake systems.		
A AT 7.3.01	Drum Brake	Compare and contrast disc and drum brake systems.		
A AT 7.3.02	Drum Brake	Determine maximum diameter of a brake drum.		
A AT 7.3.03	Drum Brake	Identify respiratory safety concerns when servicing drum brake systems.		
A AT 8	**ELECTRICAL/ ELECTRONIC SYSTEMS**			
A AT 8.1.01	Electrical Systems	Explain the principles of Ohm's Law.		
A AT 8.1.02	Electrical Systems	Explain conventional and electron theory.		
A AT 8.2.01	Batteries	Determine battery group size for a designated vehicle.		
A AT 8.2.02	Batteries	Identify battery locations on different vehicles.		
A AT 8.3.01	Start/ Charge Systems	Perform starter bench tests; determine necessary action.		
A AT 9	**HEATING AND AIR CONDITIONING**			
A AT 9.1.01	Systems Knowledge	Explain the refrigerant cycle.		
A AT 9.1.02	Systems Knowledge	Explain the operation of a typical heating system.		
A AT 10	**ENGINE PERFORMANCE**			
A AT 10.1.01	Diagnosis/ Repair	Describe the four-stroke cycle.		
A AT 10.1.02	Diagnosis/ Repair	Describe the operation of rotary engines.		
A AT 10.2.01	Fuel/ Ignition	List different firing orders for four-, six- and eight-cylinder engines.		
A AT 10.2.02	Fuel/ Ignition	Identify different octane requirements for various engines.		
A AT 11	**ALTERNATIVE FUELS AND VEHICLES**			
A AT 11.1.01	Fuels	List major manufactures of alternative fuels.		
A AT 11.1.02	Fuels	Research the Department of Energy Website for alternative fuels.		
A AT 11.2.01	Vehicles	List major manufacturers of alternative and hybrid vehicles.		
A AT 11.2.02	Vehicles	Research the Department of Energy Website for alternative and alternative fuel vehicles.		
A AT 12	**EMPLOYABILITY SKILLS**			
A AT 12.1.01	Problem Solving	Identify the basic steps in the problem-solving process.		
A AT 12.1.02	Problem Solving	Describe the four-step plan to solve a work-related problem.		
A AT 12.1.03	Problem Solving	Identify the difference between opinions and statements of fact.		
A AT 12.2.01	Speak, Write, Listen	Explain the benefits of effective communication in the automotive industry.		
A AT 12.2.02	Speak, Write, Listen	Explain how cultural and physical diversity affect communication.		
A AT 12.2.03	Speak, Write, Listen	Identify applicable medium for conveying messages.		
A AT 12.3.01	Technology	Use an Internet browser to locate specific Websites related to the automotive industry.		
A AT 12.4.01	Leadership and Teamwork	Explain the importance of groups.		
A AT 12.4.02	Leadership and Teamwork	Explain how to organize groups.		
A AT 12.4.03	Leadership and Teamwork	Wear appropriate attire.		
A AT 12.5.01	Ethics	List the important ethics in the workplace.		

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A AT 12.5.02	Ethics	Meet attendance standards.		
A AT 12.5.03	Ethics	Describe an organized workplace.		
A AT 12.5.04	Ethics	Identify appropriate responses to unethical actions.		
A AT 12.6.01	Workplace	List effective time management skills.		
A AT 12.6.02	Workplace	Maintain a clean, organized and safe work area.		
A AT 12.7.01	Career	Locate employment opportunities.		
A AT 12.7.02	Career	Identify job requirements for entry-level positions in the automotive industry.		
A AT 12.7.03	Career	Identify general conditions for employment.		
A AT 12.7.04	Career	Identify educational/training requirements for related automotive fields.		
A AT 12.7.05	Career	Identify the elements of goal setting.		
A AT 12.7.06	Career	Identify automotive related careers.		
A AT 12.7.07	Career	Describe essential job interview skills.		
A AT 12.7.08	Career	Identify the components of a career portfolio.		
A AT 12.8.01	Retention	Describe the importance of a portfolio.		
A AT 12.8.02	Retention	Identify options for lifelong learning.		
A AT 12.8.03	Retention	Identify interpersonal skills needed for job retention.		
A AT 12.8.04	Retention	Identify jobs with opportunity for advancement.		
A AT 12.8.05	Retention	Describe the importance of career planning.		

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J AT 1	**SAFETY**			
J AT 1.1.01	General Rules	Identify general lab safety rules and procedures.		
J AT 1.1.02	General Rules	Demonstrate safe procedures for handling of tools and equipment.		
J AT 1.1.03	General Rules	Demonstrate the proper placement and use of floor jacks and jack stands.		
J AT 1.1.04	General Rules	Demonstrate proper procedures for safe lift operation.		
J AT 1.1.05	General Rules	Demonstrate the proper use of ventilation procedures for working within the lab area.		
J AT 1.1.06	General Rules	Identify marked safety areas.		
J AT 1.1.07	General Rules	Describe the proper use of fire blankets.		
J AT 1.1.08	General Rules	Identify the location and the types of fire extinguishers; demonstrate knowledge of the procedures for using fire extinguishers.		
J AT 1.1.09	General Rules	Identify the location and use of eyewash stations.		
J AT 1.1.10	General Rules	Identify the location of the posted evacuation routes.		
J AT 1.1.11	General Rules	Comply with the required use of safety apparel including safety glasses, gloves and shoes during lab activities.		
J AT 1.1.12	General Rules	Wear appropriate clothing for lab activities.		
J AT 1.1.13	General Rules	Comply with appropriate hairstyles for lab activities.		
J AT 1.1.14	General Rules	Demonstrate knowledge of safety aspects of supplemental restraint systems (SRS) and antilock brake systems (ABS).		
J AT 1.1.15	General Rules	Demonstrate knowledge of material safety data sheets (MSDS).		
J AT 2	**GENERAL LAB PROCEDURES**			
J AT 2.1.01	Tools and Equipment Use	Identify tools and their usage in automotive applications.		
J AT 2.1.02	Tools and Equipment Use	Identify standard and metric designation for tools, fasteners and measurements, including conversions.		
J AT 2.1.03	Tools and Equipment Use	Demonstrate safe handling and proper use of appropriate tools.		
J AT 2.1.04	Tools and Equipment Use	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.		
J AT 2.1.05	Tools and Equipment Use	Demonstrate proper use of measurement tools.		
J AT 2.2.01	Information	Retrieve specified vehicle information using paper and electronic manuals.		
J AT 2.2.02	Information	Retrieve specified vehicle information technical service bulletins (TSBs).		
J AT 2.2.03	Information	Define the purpose and use of the vehicle identification number (VIN), engine numbers and date code.		
J AT 2.2.04	Information	Locate the vehicle identification number on a specified vehicle.		
J AT 2.2.05	Information	Use a vehicle identification number to apply service information.		
J AT 2.3.01	Customer Service	Explain the information needed and the service requested on a repair order.		
J AT 2.3.02	Customer Service	Demonstrate the proper use of fender covers, mats and other protective materials when servicing a vehicle.		
J AT 2.3.03	Customer Service	Demonstrate use of the three Cs (concern, cause, and correction).		
J AT 2.3.04	Customer Service	Review the vehicle service history for a specified make and model.		
J AT 2.3.05	Customer Service	Complete a work order to include customer information and signature, vehicle identification information, customer concerns, related service history, causes and corrections.		
J AT 2.3.06	Customer Service	Ensure the vehicle is prepared to return to the customer per school/company policy (floor mats, steering wheel cover, etc.).		
J AT 2.4.01	Vehicle Service	Check and adjust the engine oil level.		
J AT 2.4.02	Vehicle Service	Check and adjust the engine coolant level.		
J AT 2.4.03	Vehicle Service	Check and adjust the power steering fluid level.		
J AT 2.4.04	Vehicle Service	Check and adjust the brake fluid level.		
J AT 2.4.05	Vehicle Service	Check and adjust the windshield washer fluid level.		
J AT 2.4.06	Vehicle Service	Inspect and replace wiper blades.		
J AT 2.4.07	Vehicle Service	Check and adjust differential/transfer case fluid level.		
J AT 2.4.08	Vehicle Service	Check and adjust transmission fluid level.		
J AT 2.4.09	Vehicle Service	Inspect, replace and adjust drive belts, tensioners and pulleys; check pulley and belt alignment.		
J AT 2.4.10	Vehicle Service	Inspect and replace the air filter.		
J AT 2.4.11	Vehicle Service	Determine fluid type requirements and identify correct fluid.		
J AT 3	**ENGINE REPAIR**			
J AT 3.1.01	General	Inspect an engine assembly for fuel, oil, coolant and other leaks; determine necessary action.		
J AT 3.1.02	General	Test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.		
J AT 3.1.03	General	Inspect and test cooling system components.		
J AT 3.1.04	General	Perform oil and filter change; properly recycle used oil.		
J AT 3.1.05	General	Remove and replace a radiator.		
J AT 3.1.06	General	Inspect power train mounts; determine necessary action.		
J AT 3.1.07	General	Inspect and replace timing belt(s), overhead cam drive sprockets and tensioners; check belt tension; adjust as necessary.		
J AT 3.1.08	General	Inspect and measure internal and external threads; use charts and tables to determine drill size and restore as needed (including installation of thread inserts).		
J AT 3.1.09	General	Calculate engine displacement in cubic inches, cubic centimeters and liters.		

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J AT 4	**AUTOMATIC TRANSMISSION**			
J AT 4.1.01	Transmission/ Transaxle Service	Service a transmission; perform visual inspection of the transmission; replace fluids and filters.		
J AT 4.1.02	Transmission/ Transaxle Service	Retrieve and interpret diagnostic trouble codes.		
J AT 4.1.03	Transmission/ Transaxle Service	Identify major transmission internal components.		
J AT 4.1.04	Transmission/ Transaxle Service	Identify fluid types, levels and condition concerns; determine necessary action.		
J AT 5	**MANUAL DRIVETRAIN AND AXLES**			
J AT 5.1.01	Drivetrain/Axle Service	Diagnose fluid loss, fluid level and fluid condition concerns; determine necessary action.		
J AT 5.1.02	Drivetrain/Axle Service	Drain and fill a transmission/transaxle and final drive unit; properly recycle fluids.		
J AT 5.1.03	Drivetrain/Axle Service	Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots and springs; determine necessary action.		
J AT 5.1.04	Drivetrain/Axle Service	Inspect hydraulic clutch slave and master cylinders, lines and hoses; determine necessary action.		
J AT 5.1.05	Drivetrain/Axle Service	Bleed a clutch hydraulic system.		
J AT 5.1.06	Drivetrain/Axle Service	Diagnose fluid leakage concerns; determine necessary action.		
J AT 5.1.07	Drivetrain/Axle Service	Inspect and replace drive axle shaft wheel studs.		
J AT 5.1.08	Drivetrain/Axle Service	Inspect constant-velocity (CV) joint boots.		
J AT 5.1.09	Drivetrain/Axle Service	Remove and replace rear wheel drive shaft.		
J AT 6	**SUSPENSION AND STEERING**			
J AT 6.1.01	Systems Service	Identify and interpret suspension and steering concerns; determine necessary action.		
J AT 6.1.02	Systems Service	Determine proper power steering fluid types; inspect fluid levels and condition.		
J AT 6.1.03	Systems Service	Flush, fill and bleed power steering system.		
J AT 6.1.04	Systems Service	Diagnose power steering fluid leakage; determine necessary action.		
J AT 6.1.05	Systems Service	Lubricate suspension and steering systems.		
J AT 6.1.06	Systems Service	Inspect, remove and replace shock absorbers.		
J AT 6.1.07	Systems Service	Remove, inspect and install stabilizer bar bushings, brackets and links.		
J AT 6.1.08	Systems Service	Remove, inspect and install a strut cartridge or assembly, strut coil spring, insulators (silencers) and upper strut bearing mount.		
J AT 6.1.09	Systems Service	Perform pre-alignment inspection; determine necessary action.		
J AT 6.1.10	Systems Service	Measure vehicle riding height; determine necessary action.		
J AT 6.1.11	Systems Service	Demonstrate knowledge of safety aspects of supplemental restraint systems (SRS).		
J AT 6.1.12	Systems Service	Demonstrate how to inspect and replace a pitman arm, relay (center link/intermediate) rod, idler arm and mountings, and steering linkage damper.		
J AT 6.1.13	Systems Service	Describe basic alignment geometry, including camber, caster and toe-in.		
J AT 6.2.01	Wheels/ Tires	Diagnose tire wear patterns and measure tread depth; determine necessary action.		
J AT 6.2.02	Wheels/ Tires	Inspect tires; check and adjust air pressure.		
J AT 6.2.03	Wheels/ Tires	Diagnose wheel/tire vibration, shimmy and noise; determine necessary action.		
J AT 6.2.04	Wheels/ Tires	Rotate tires according to the manufacturer's specifications.		
J AT 6.2.05	Wheels/ Tires	Balance a wheel and tire assembly (static and dynamic).		
J AT 6.2.06	Wheels/ Tires	Dismount, inspect and remount a tire on wheel.		
J AT 6.2.07	Wheels/ Tires	Repair a tire using an internal patch.		
J AT 6.2.08	Wheels/ Tires	Reinstall a wheel; torque lug nuts.		
J AT 6.2.09	Wheels/ Tires	Remove, inspect and service or replace front and rear wheel taper bearings on non-drive axles.		
J AT 7	**BRAKES**			
J AT 7.1.01	Braking Systems	Inspect brake lines, flexible hoses and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.		
J AT 7.1.02	Braking Systems	Select, handle, store and fill brake fluids to the proper level.		
J AT 7.1.03	Braking Systems	Bleed (manual, pressure, vacuum, or surge) a brake system.		
J AT 7.1.04	Braking Systems	Flush a hydraulic system.		
J AT 7.1.05	Braking Systems	Check the vacuum supply (manifold or auxiliary pump) to a vacuum-type power booster.		
J AT 7.1.06	Braking Systems	Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; determine necessary action.		
J AT 7.1.07	Braking Systems	Check parking brake cables and components for wear, rusting, binding and corrosion; clean, lubricate or replace as needed.		
J AT 7.1.08	Braking Systems	Check parking brake operation; determine necessary action.		
J AT 7.1.09	Braking Systems	Check the operation of a parking brake indicator light system.		
J AT 7.1.10	Braking Systems	Check the operation of a brake stop light system; determine necessary action.		
J AT 7.1.11	Braking Systems	Identify and inspect antilock brake system (ABS) components; determine necessary action.		
J AT 7.1.12	Braking Systems	Identify traction control/vehicle stability control system components.		
J AT 7.1.13	Braking Systems	Check a master cylinder for internal and external leaks and proper operation; determine necessary action.		
J AT 7.2.01	Disc Brakes	Remove the caliper assembly from mountings; clean and inspect for leaks and damage to the caliper housing; determine necessary action.		
J AT 7.2.02	Disc Brakes	Clean and inspect the caliper mounting and slides for wear and damage; determine necessary action.		
J AT 7.2.03	Disc Brakes	Remove, clean and inspect pads and retaining hardware; determine necessary action.		

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J AT 7.2.04	Disc Brakes	Reassemble, lubricate and reinstall caliper, pads and related hardware; seat pads and inspect for leaks.		
J AT 7.2.05	Disc Brakes	Clean, inspect and measure rotor with a dial indicator and a micrometer; follow the manufacturer's recommendations in determining the need to machine or replace the rotor.		
J AT 7.2.06	Disc Brakes	Remove and reinstall the rotor.		
J AT 7.2.07	Disc Brakes	Refinish the rotor to specified tolerances on the vehicle.		
J AT 7.2.08	Disc Brakes	Refinish the rotor to specified tolerances off the vehicle.		
J AT 7.2.09	Disc Brakes	Install the wheel and torque the lug nuts; make final checks and adjustments.		
J AT 7.2.10	Disc Brakes	Diagnose wheel bearing noises, wheel shimmy and vibration concerns; determine necessary action.		
J AT 7.2.11	Disc Brakes	Remove, clean, inspect, repack and install wheel bearings and replace seals; install hub and adjust wheel bearings.		
J AT 7.2.12	Disc Brakes	Employ appropriate measures to ensure respiratory safety when servicing disc brake systems.		
J AT 7.3.01	Drum Brake	Remove, clean (using proper safety procedures), inspect and measure brake drums; determine necessary action.		
J AT 7.3.02	Drum Brake	Refinish a brake drum to specified tolerances.		
J AT 7.3.03	Drum Brake	Remove, clean and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware and backing support plates; lubricate and reassemble.		
J AT 7.3.04	Drum Brake	Remove, inspect and install wheel cylinders.		
J AT 7.3.05	Drum Brake	Pre-adjust brake shoes and the parking brake before installing brake drums or drum/hub assemblies and wheel bearings.		
J AT 7.3.06	Drum Brake	Install the wheel and torque lug nuts; make final checks and adjustments.		
J AT 7.3.07	Drum Brake	Diagnose wheel bearing noises, wheel shimmy and vibration concerns; determine necessary action.		
J AT 7.3.08	Drum Brake	Remove, clean, inspect, repack and install wheel bearings and replace seals; install hub and adjust wheel bearings.		
J AT 7.3.09	Drum Brake	Employ appropriate measures to ensure respiratory safety when servicing drum brake systems.		
J AT 8	**ELECTRICAL/ ELECTRONIC SYSTEMS**			
J AT 8.1.01	Electrical Systems	Diagnose the electrical/electronic integrity of series, parallel and series-parallel circuits using the Ohm's Law formula.		
J AT 8.1.02	Electrical Systems	Use wiring diagrams and current-flow theory to diagnose electrical circuit problems.		
J AT 8.1.03	Electrical Systems	Use of a digital multimeter (DMM) to diagnose electrical circuit problems.		
J AT 8.1.04	Electrical Systems	Check electrical circuits with a test light; determine necessary action.		
J AT 8.1.05	Electrical Systems	Measure source voltage and perform voltage drop tests in electrical/electronic circuits using a voltmeter; determine necessary action.		
J AT 8.1.06	Electrical Systems	Measure current flow in electrical/electronic circuits and components using an ammeter; determine necessary action.		
J AT 8.1.07	Electrical Systems	Check continuity and measure resistance in electrical/ electronic circuits and components using an ohmmeter; determine necessary action.		
J AT 8.1.08	Electrical Systems	Check electrical circuits using fused jumper wires; determine necessary action.		
J AT 8.1.09	Electrical Systems	Locate shorts, grounds, opens and resistance problems in electrical/electronic circuits; determine necessary action.		
J AT 8.1.10	Electrical Systems	Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.		
J AT 8.1.11	Electrical Systems	Inspect and test fusible links, circuit breakers and fuses; determine necessary action.		
J AT 8.1.12	Electrical Systems	Inspect and test switches, connectors, relays, solid-state devices and wires of electrical/electronic circuits; perform necessary action.		
J AT 8.1.13	Electrical Systems	Repair connectors and terminal ends.		
J AT 8.1.14	Electrical Systems	Repair a wiring harness (including CAN/BUS systems).		
J AT 8.1.15	Electrical Systems	Perform solder repair of electrical wiring.		
J AT 8.1.16	Electrical Systems	Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.		
J AT 8.1.17	Electrical Systems	Inspect, replace and aim headlights and bulbs.		
J AT 8.2.01	Batteries	Perform a battery state-of-charge test; determine necessary action.		
J AT 8.2.02	Batteries	Perform a battery capacity test (or conductance test); confirm the proper battery capacity for a vehicle application; determine necessary action.		
J AT 8.2.03	Batteries	Maintain or restore electronic memory functions.		
J AT 8.2.04	Batteries	Inspect, clean, fill and replace a battery; ensure proper disposal of used batteries.		
J AT 8.2.05	Batteries	Perform a slow or fast battery charge using the state-of-charge formula.		
J AT 8.2.06	Batteries	Inspect and clean battery cables, connectors, clamps and hold-downs; repair or replace as needed.		
J AT 8.2.07	Batteries	Start a vehicle using jumper cables and a battery or auxiliary power supply.		
J AT 8.2.08	Batteries	Use a hydrometer to measure the specific gravity of a battery cell electrolyte; use charts to determine necessary action.		
J AT 8.3.01	Start/ Charge Systems	Perform starter current draw tests; determine necessary action.		
J AT 8.3.02	Start/ Charge Systems	Perform starter circuit voltage drop tests; determine necessary action.		
J AT 8.3.03	Start/ Charge Systems	Inspect and test starter relays and solenoids; determine necessary action.		

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J AT 8.3.04	Start/ Charge Systems	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.		
J AT 8.3.05	Start/ Charge Systems	Perform a charging system output test; determine necessary action.		
J AT 8.3.06	Start/ Charge Systems	Demonstrate how to remove and install a starter.		
J AT 8.3.07	Start/ Charge Systems	Demonstrate how to remove, inspect and install a generator (alternator).		
J AT 9	**HEATING AND AIR CONDITIONING**			
J AT 9.1.01	Systems Knowledge	Identify and visually inspect air conditioning system components.		
J AT 9.1.02	Systems Knowledge	Locate refrigerant label and identify specified refrigerant type (i.e., R-12, R-134a).		
J AT 9.1.03	Systems Knowledge	Conduct a preliminary performance test of an air conditioning system using manifold gauges (i.e., verify compressor engagement, measure outlet duct temperature, sense temperature change across components); determine necessary action.		
J AT 10	**ENGINE PERFORMANCE**			
J AT 10.1.01	Diagnosis/ Repair	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).		
J AT 10.1.02	Diagnosis/ Repair	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.		
J AT 10.1.03	Diagnosis/ Repair	Perform a cylinder power balance test; determine necessary action.		
J AT 10.1.04	Diagnosis/ Repair	Perform a cylinder cranking compression test; determine necessary action.		
J AT 10.1.05	Diagnosis/ Repair	Perform a cylinder leakage test to measure percentage loss; determine necessary action.		
J AT 10.1.06	Diagnosis/ Repair	Verify engine operating temperatures; determine necessary action.		
J AT 10.1.07	Diagnosis/ Repair	Prepare a 4 or 5 gas analyzer; inspect and prepare vehicle for the test and obtain exhaust readings; determine necessary action.		
J AT 10.1.08	Diagnosis/ Repair	Perform cooling system pressure tests; check coolant condition; inspect and test the radiator, pressure cap, coolant recovery tank and hoses; perform necessary action.		
J AT 10.1.09	Diagnosis/ Repair	Retrieve and record stored OBD I (on board diagnostics) diagnostic trouble codes; clear codes.		
J AT 10.1.10	Diagnosis/ Repair	Retrieve and record stored OBD II and CAN (controlled area network) diagnostic trouble codes; clear codes when applicable.		
J AT 10.1.11	Diagnosis/ Repair	Obtain and interpret scan tool data.		
J AT 10.1.12	Diagnosis/ Repair	Remove and replace a thermostat and gasket.		
J AT 10.1.13	Diagnosis/ Repair	Perform common fastener and thread repair to include removal of a broken bolt; restore internal and external threads and repair internal threads with a thread insert.		
J AT 10.1.14	Diagnosis/ Repair	Practice recommended precautions when handling static sensitive devices.		
J AT 10.2.01	Fuel/ Ignition	Inspect and test ignition primary circuit wiring and components; perform necessary action.		
J AT 10.2.02	Fuel/ Ignition	Inspect, test and adjust ignition system secondary circuit wiring and components; perform necessary action.		
J AT 10.2.03	Fuel/ Ignition	Inspect and test mechanical and electrical fuel pumps and pump control systems; perform necessary action.		
J AT 10.2.04	Fuel/ Ignition	Inspect an exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s) and heat shield(s); perform necessary action.		
J AT 10.2.05	Fuel/ Ignition	Inspect fuel tank and fuel cap, fuel lines, fittings and hoses; perform necessary action.		
J AT 10.2.06	Fuel/ Ignition	Identify, describe and inspect emission control devices.		
J AT 10.2.07	Fuel/ Ignition	Replace fuel filters.		
J AT 10.2.08	Fuel/ Ignition	Identify fuel pressure safety concerns.		
J AT 11	**ALTERNATIVE FUELS AND VEHICLES**			
J AT 11.1.01	Fuels	Describe different types of alternative fuels to include biodiesel, electricity, ethanol, hydrogen, methanol, natural gas and propane.		
J AT 11.1.02	Fuels	Describe safety precautions and procedures for alternative fuels.		
J AT 11.1.03	Fuels	Describe safety precautions and procedures for servicing alternative fuel vehicles.		
J AT 11.1.04	Fuels	Demonstrate knowledge of engine operation characteristics with the use of alternative fuels.		
J AT 11.2.01	Vehicles	Describe the primary alternative fuel vehicles to include electric, flexible fuel, natural gas, propane, hybrid and fuel cell vehicles.		
J AT 11.2.02	Vehicles	Describe safety precautions and procedures for servicing alternative fuel vehicles.		
J AT 11.2.03	Vehicles	Demonstrate knowledge of engine operation characteristics with the use of alternative fuels.		
J AT 11.2.04	Vehicles	Describe safety precautions and procedures when servicing hybrid vehicles.		
J AT 11.2.05	Vehicles	Demonstrate knowledge of hybrid vehicle operation.		
J AT 12	**EMPLOYABILITY SKILLS**			
J AT 12.1.01	Problem Solving	Solve a work-related problem using the appropriate steps in the problem-solving process.		
J AT 12.1.02	Problem Solving	Demonstrate or explain brainstorming techniques.		
J AT 12.1.03	Problem Solving	Evaluate options to solving a work-related problem.		
J AT 12.1.04	Problem Solving	Use a flow chart to help solve a work-related problem.		
J AT 12.1.05	Problem Solving	Use the four-step plan to solve a problem: Interview the customer, verify the concern, repair the vehicle and verify the repair.		
J AT 12.1.06	Problem Solving	Prioritize and organize workloads.		
J AT 12.1.07	Problem Solving	Explain the difference between reliable and unreliable information.		
J AT 12.2.01	Speak, Write, Listen	Follow written and oral directions.		
J AT 12.2.02	Speak, Write, Listen	Demonstrate proper telephone etiquette.		

Identifier	Poplar - Journeyman - Automotive Technology		Introduced	Completed
J AT 12.2.03	Speak, Write, Listen	Prepare well-constructed written communications.		
J AT 12.2.04	Speak, Write, Listen	Effectively demonstrate job skills to others.		
J AT 12.2.05	Speak, Write, Listen	Identify common communication barriers and methods for improving communication.		
J AT 12.3.01	Technology	Demonstrate ability to utilize basic keyboarding techniques.		
J AT 12.3.02	Technology	Demonstrate basic knowledge of computing.		
J AT 12.3.03	Technology	Recognize the impact of technological changes on tasks and people.		
J AT 12.3.04	Technology	Demonstrate routine maintenance and repair of technological equipment.		
J AT 12.4.01	Leadership and Teamwork	Work cooperatively with others when given a group project.		
J AT 12.4.02	Leadership and Teamwork	Match team member's skills with a group activity.		
J AT 12.4.03	Leadership and Teamwork	Explain traits necessary to effectively lead and influence individuals and groups.		
J AT 12.4.04	Leadership and Teamwork	Demonstrate appropriate attitudes and behaviors for effective leadership.		
J AT 12.4.05	Leadership and Teamwork	Demonstrate respect for team members, team processes, and team goals.		
J AT 12.4.06	Leadership and Teamwork	Participate in the implementation of a group's decision and evaluate the results.		
J AT 12.4.07	Leadership and Teamwork	Demonstrate the qualities of an effective leader and team member.		
J AT 12.4.08	Leadership and Teamwork	Describe the importance of a proper dress code.		
J AT 12.5.01	Ethics	Develop personal work ethics through work experience.		
J AT 12.5.02	Ethics	Describe the importance of ethics practiced in the workplace.		
J AT 12.5.03	Ethics	Demonstrate regular attendance, promptness and the willingness to follow instructions and complete assigned tasks.		
J AT 12.5.04	Ethics	Demonstrate appropriate personal and professional attitudes and behaviors.		
J AT 12.5.05	Ethics	Maintain a safe, clean and organized work area.		
J AT 12.5.06	Ethics	Demonstrate awareness of legal responsibilities related to individual performance, safety and customer satisfaction.		
J AT 12.5.07	Ethics	Demonstrate knowledge of various types of harassment.		
J AT 12.5.08	Ethics	Exhibit pride in workmanship, especially as it relates to customer satisfaction.		
J AT 12.6.01	Workplace	Identify and organize the material resources and space requirements needed to complete a job assignment.		
J AT 12.6.02	Workplace	Effectively use technology to complete a job assignment.		
J AT 12.6.03	Workplace	Demonstrate cooperation and leadership as a team at school or in a workplace setting.		
J AT 12.6.04	Workplace	Demonstrate effective time management.		
J AT 12.6.05	Workplace	Recognize the need for management skills for employees in the workplace with regard to stress, anger management and substance abuse.		
J AT 12.6.06	Workplace	Use flat-rate schedules to allot time to complete repairs.		
J AT 12.7.01	Career	Prepare a job application.		
J AT 12.7.02	Career	Prepare a personal resume.		
J AT 12.7.03	Career	Complete a personal aptitude and interest inventory.		
J AT 12.7.04	Career	Participate in a mock job interview.		
J AT 12.7.05	Career	Establish short-term career goals.		
J AT 12.7.06	Career	Establish long-term career goals.		
J AT 12.7.07	Career	Use the Montana Career Information System (CIS) or a similar computer-based program to research careers in a chosen field.		
J AT 12.7.08	Career	Participate in an organized job-shadowing activity.		
J AT 12.7.09	Career	Participate in a community service project.		
J AT 12.7.10	Career	Construct a career portfolio.		
J AT 12.8.01	Retention	Maintain an employment/career portfolio.		
J AT 12.8.02	Retention	Explain strategies for balancing work and family roles.		
J AT 12.8.03	Retention	Demonstrate understanding of the need for lifelong learning in a rapidly changing job market.		
J AT 12.8.04	Retention	Develop long-term career planning strategies.		
J AT 12.8.05	Retention	Describe various educational options needed for job retention.		
J AT 12.8.06	Retention	Model sound workplace ethics, such as loyalty, punctuality and initiative.		
J AT 12.8.07	Retention	Demonstrate interpersonal skills needed for job retention.		

Identifier	Poplar - Master - Automotive Technology		Introduced	Completed
M AT 1	**SAFETY**			
M AT 1.1.01	General Rules	Design a lab safety-improvement plan.		
M AT 2	**GENERAL LAB PROCEDURES**			
M AT 2.1.01	Tools and Equipment Use	Identify and explain specialty tools and equipment and their use.		
M AT 2.1.02	Tools and Equipment Use	Develop a tool inventory system.		
M AT 2.1.03	Tools and Equipment Use	Design a new specialty tool.		
M AT 2.2.01	Information	Research vehicle information and history using Internet sites, technical service bulletins (TSBs) and other resources.		
M AT 2.3.01	Customer Service	Design a comprehensive work order form.		
M AT 2.4.01	Vehicle Service	Develop a vehicle service checklist.		
M AT 3	**ENGINE REPAIR**			
M AT 3.1.01	General	Inspect, repair or replace the crankshaft vibration damper (harmonic balancer).		
M AT 3.1.02	General	Remove cylinder head(s); visually inspect cylinder head(s) for cracks; check gasket surface areas for warping and leakage; check passage condition.		
M AT 3.1.03	General	Adjust valves for mechanical or hydraulic lifters.		
M AT 3.1.04	General	Disassemble and identify components and reassemble an engine.		
M AT 4	**AUTOMATIC TRANSMISSION**			
M AT 4.1.01	Transmission/ Transaxle Service	Disassemble, inspect, measure and reassemble an automatic transmission.		
M AT 4.1.02	Transmission/ Transaxle Service	Diagnose electronic, mechanical and hydraulic vacuum control system concerns; determine necessary action.		
M AT 4.1.03	Transmission/ Transaxle Service	Inspect and replace external seals and gaskets.		
M AT 4.1.04	Transmission/ Transaxle Service	Remove and replace an automatic transmission/transaxle.		
M AT 5	**MANUAL DRIVETRAIN AND AXLES**			
M AT 5.1.01	Drivetrain/Axle Service	Remove and replace a manual transmission/transaxle.		
M AT 5.1.02	Drivetrain/Axle Service	Replace a front- or rear-wheel drive axle.		
M AT 5.1.03	Drivetrain/Axle Service	Disassemble, inspect, measure and reassemble an axle assembly.		
M AT 5.1.04	Drivetrain/Axle Service	Inspect and replace a clutch assembly and flywheel.		
M AT 5.1.05	Drivetrain/Axle Service	Disassemble, clean, measure and reassemble transmission/ transaxle components.		
M AT 5.1.06	Drivetrain/Axle Service	Replace a front wheel drive (FWD) front wheel bearing.		
M AT 5.1.07	Drivetrain/Axle Service	Inspect, service and replace shaft center support bearings.		
M AT 5.1.08	Drivetrain/Axle Service	Diagnose differential noise, vibration, slippage and chatter concerns; determine necessary action.		
M AT 5.1.09	Drivetrain/Axle Service	Remove and reinstall a transfer case.		
M AT 5.1.10	Drivetrain/Axle Service	Inspect and service four-wheel drive/all-wheel drive components.		
M AT 5.1.11	Drivetrain/Axle Service	Diagnose universal joint noise and vibration concerns; perform necessary action.		
M AT 6	**SUSPENSION AND STEERING**			
M AT 6.1.01	Systems Service	Adjust manual or power non-rack and pinion worm bearing preload and sector lash.		
M AT 6.1.02	Systems Service	Remove, inspect and replace a power steering pump.		
M AT 6.1.03	Systems Service	Remove and replace a manual or power rack and pinion steering gear; inspect mounting bushings and brackets.		
M AT 6.1.04	Systems Service	Adjust a manual or power rack and pinion steering gear.		
M AT 6.1.05	Systems Service	Diagnose, inspect, adjust, repair or replace components of electronically controlled suspension systems.		
M AT 6.1.06	Systems Service	Perform a wheel alignment.		
M AT 6.2.01	Wheels/ Tires	Identify the components of an electronic tire pressure sensing system.		
M AT 7	**BRAKES**			
M AT 7.1.01	Braking Systems	Inspect, test and replace components of a brake warning light system.		
M AT 7.1.02	Braking Systems	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.		
M AT 7.1.03	Braking Systems	Inspect and test a hydro-boost system and accumulator for leaks and proper operation; determine necessary action.		
M AT 7.1.04	Braking Systems	Depressurize high-pressure components of the antilock brake system (ABS).		
M AT 7.1.05	Braking Systems	Bleed the antilock brake system's (ABS) front and rear hydraulic circuits.		
M AT 7.1.06	Braking Systems	Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment; determine necessary action.		
M AT 7.1.07	Braking Systems	Remove, bench bleed and reinstall a master cylinder.		
M AT 7.1.08	Braking Systems	Fabricate brake lines using double flare and ISO types.		
M AT 7.2.01	Disc Brakes	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.		
M AT 7.3.01	Drum Brake	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.		
M AT 8	**ELECTRICAL/ ELECTRONIC SYSTEMS**			
M AT 8.1.01	Electrical Systems	Inspect and diagnose incorrect turn signal or hazard light operations; perform necessary action.		
M AT 8.1.02	Electrical Systems	Inspect and test gauges and gauge sending units for cause of intermittent, high, low or no gauge readings; determine necessary action.		
M AT 8.2.01	Batteries	Determine cold cranking amp requirements for inclement weather conditions.		
M AT 8.2.02	Batteries	Explain the difference between spiral, deep cycle and gel cell batteries.		

Identifier	Poplar - Master - Automotive Technology		Introduced	Completed
M AT 8.3.01	Start/ Charge Systems	Disassemble, clean, inspect and test starter components; replace as needed.		
M AT 8.3.02	Start/ Charge Systems	Disassemble a generator (alternator) and clean, inspect and test the components; determine necessary action.		
M AT 9	**HEATING AND AIR CONDITIONING**			
M AT 9.1.01	Systems Knowledge	Leak test an air conditioning system; determine necessary action.		
M AT 9.1.02	Systems Knowledge	Select oil type; measure and add oil to the air conditioning system as needed.		
M AT 9.1.03	Systems Knowledge	Diagnose unusual operating noises in the air conditioning system; determine necessary action.		
M AT 9.1.04	Systems Knowledge	Diagnose air conditioning system conditions that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action.		
M AT 9.1.05	Systems Knowledge	Remove, inspect, troubleshoot and replace heating and air conditioning components.		
M AT 9.1.06	Systems Knowledge	Use an EPA certified recovery machine to evacuate and recharge an air conditioning system.		
M AT 10	**ENGINE PERFORMANCE**			
M AT 10.1.01	Diagnosis/ Repair	Diagnose unusual exhaust colors, odors and sounds; determine necessary action.		
M AT 10.1.02	Diagnosis/ Repair	Diagnose unusual engine noise or vibration concerns; determine necessary action.		
M AT 10.1.03	Diagnosis/ Repair	Diagnose engine mechanical, electrical, electronic, fuel and ignition concerns with an oscilloscope and engine diagnostic equipment; determine necessary action.		
M AT 10.1.04	Diagnosis/ Repair	Diagnose driveability and emissions problems resulting from failures of interrelated systems; determine necessary action.		
M AT 10.1.05	Diagnosis/ Repair	Remove, inspect and test vacuum and electrical circuits, components and connections of a fuel system; perform necessary action.		
M AT 10.1.06	Diagnosis/ Repair	Test the operation of turbocharger/supercharger systems; determine necessary action.		
M AT 10.1.07	Diagnosis/ Repair	Diagnose and test emission control devices.		
M AT 10.2.01	Fuel/ Ignition	Inspect, test and clean fuel injectors.		
M AT 10.2.02	Fuel/ Ignition	Remove, inspect, gap and replace spark plugs.		
M AT 10.2.03	Fuel/ Ignition	Diagnose and replace oxygen sensors.		
M AT 11	**ALTERNATIVE FUELS AND VEHICLES**			
M AT 11.1.01	Fuels	Demonstrate knowledge of different types and construction of electrical vehicle batteries.		
M AT 11.2.01	Vehicles	Demonstrate knowledge of different types and construction of alternative vehicles.		
M AT 12	**EMPLOYABILITY SKILLS**			
M AT 12.1.01	Problem Solving	Develop a flow chart to solve a problem.		
M AT 12.2.01	Speak, Write, Listen	Research, prepare and deliver an automotive-related presentation.		
M AT 12.2.02	Speak, Write, Listen	Prepare technical documents, such as work orders.		
M AT 12.2.03	Speak, Write, Listen	Compete in a SkillsUSA job skill demonstration and/or public speaking contest.		
M AT 12.3.01	Technology	Critique the use, benefits and cost of technologically advanced equipment in the automotive industry.		
M AT 12.3.02	Technology	Analyze the impact of technological changes on one or more aspects of automotive industry by researching current literature.		
M AT 12.3.03	Technology	Compete in a regional or state SkillsUSA automotive contest.		
M AT 12.3.04	Technology	Compete in the Ford/AAA Student Auto Skills Contest.		
M AT 12.4.01	Leadership and Teamwork	Analyze the stages of group development.		
M AT 12.4.02	Leadership and Teamwork	Demonstrate leadership ability within a group or team.		
M AT 12.4.03	Leadership and Teamwork	Compromise and/or build consensus within a group and summarize the decision of the group while maintaining respect for diverse viewpoints.		
M AT 12.4.04	Leadership and Teamwork	Complete levels 1-3 of the SkillsUSA Professional Development Program.		
M AT 12.4.05	Leadership and Teamwork	Campaign for a local SkillsUSA chapter office.		
M AT 12.4.06	Leadership and Teamwork	Serve as a committee chair in a local SkillsUSA chapter.		
M AT 12.5.01	Ethics	Demonstrate time-management skills and cost-effective practices.		
M AT 12.6.01	Workplace	Recognize the individual roles of team members, delegate tasks, and provide feedback on performance.		
M AT 12.6.02	Workplace	Acknowledge and utilize the skills, abilities and input of all members of a team.		
M AT 12.6.03	Workplace	Develop an action plan to accomplish tasks within a given timeframe.		
M AT 12.7.01	Career	Develop a community service or job shadowing project.		
M AT 12.7.02	Career	Develop an education/training plan to fulfill long-term career goals.		
M AT 12.7.03	Career	Define advantages and disadvantages of self-employment or working for various sizes and types of businesses.		
M AT 12.7.04	Career	Critique results of a job interview.		
M AT 12.7.05	Career	Develop a proposal for an organized community service project.		
M AT 12.7.06	Career	Compete in a local or state level SkillsUSA job interview contest.		
M AT 12.8.01	Retention	Create a plan for lifelong learning.		
M AT 12.8.02	Retention	Create a presentation illustrating interpersonal skills needed for job retention.		
M AT 12.8.03	Retention	Adapt new knowledge and skills in changing situations.		
M AT 12.8.04	Retention	Analyze how work life is affected by families and how families are affected by work life.		