

# Transportation Education: Automotive Maintenance and Light Repair Sections A, B, C, & D

Identify general shop safety rules and procedures. [AMLR1](#)

---

**1** Identify general shop safety rules and procedures. [AMLR1](#)

---

Utilize safe procedures for handling of tools and equipment. [AMLR2](#)

---

**2** Utilize safe procedures for handling of tools and equipment. [AMLR2](#)

---

Identify and use proper placement of floor jacks and jack stands [AMLR3](#)

---

**3** Identify and use proper placement of floor jacks and jack stands [AMLR3](#)

---

Identify and use proper procedures for safe lift operation. [AMLR4](#)

---

**4** Identify and use proper procedures for safe lift operation. [AMLR4](#)

---

Utilize proper ventilation procedures for working within the lab/shop area. [AMLR5](#)

---

**5** Utilize proper ventilation procedures for working within the lab/shop area. [AMLR5](#)

---

Identify marked safety areas. [AMLR6](#)

---

**6** Identify marked safety areas. [AMLR6](#)

---

Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers

**7** Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment. [AMLR7](#)

and other fire safety equipment. [AMLR7](#)

---

Identify the location and use of eye wash stations. [AMLR8](#)

---

**8** Identify the location and use of eye wash stations. [AMLR8](#)

---

Identify the location of the posted evacuation routes. [AMLR9](#)

---

**9** Identify the location of the posted evacuation routes. [AMLR9](#)

---

Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. [AMLR10](#)

---

**10** Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. [AMLR10](#)

---

Identify and wear appropriate clothing for lab/shop activities. [AMLR11](#)

---

**11** Identify and wear appropriate clothing for lab/shop activities. [AMLR11](#)

---

Secure hair and jewelry for lab/shop activities [AMLR12](#)

---

**12** Secure hair and jewelry for lab/shop activities [AMLR12](#)

---

Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. [AMLR13](#)

---

**13** Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. [AMLR13](#)

---

Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, and injection systems). [AMLR14](#)

---

**14** Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, and injection systems). [AMLR14](#)

---

Locate and demonstrate knowledge of material

**15** Locate and demonstrate knowledge of material safety data sheets (MSDS). [AMLR15](#)

safety data sheets  
(MSDS). [AMLR15](#)

---

Identify tools and their  
usage in automotive  
applications. [AMLR16](#)

---

**16** Identify tools and their usage in automotive applications. [AMLR16](#)

---

Identify standard and  
metric  
designation. [AMLR17](#)

---

**17** Identify standard and metric designation. [AMLR17](#)

---

Demonstrate safe  
handling and use of  
appropriate  
tools. [AMLR18](#)

---

**18** Demonstrate safe handling and use of appropriate tools. [AMLR18](#)

---

Demonstrate proper  
cleaning, storage, and  
maintenance of tools  
and equipment. [AMLR19](#)

---

**19** Demonstrate proper cleaning, storage, and maintenance of tools and equipment. [AMLR19](#)

---

Demonstrate proper use  
of precision measuring  
tools (for example,  
micrometer,  
dialindicator, and dial-  
caliper). [AMLR20](#)

---

**20** Demonstrate proper use of precision measuring tools (for example, micrometer, dialindicator, and dial-caliper). [AMLR20](#)

---

Identify information  
needed and the service  
requested on a repair  
order. [AMLR21](#)

---

**21** Identify information needed and the service requested on a repair order. [AMLR21](#)

---

Identify purpose and  
demonstrate proper use  
of fender covers,  
mats. [AMLR22](#)

---

**22** Identify purpose and demonstrate proper use of fender covers, mats. [AMLR22](#)

---

Demonstrate use of the  
three C's (concern,  
cause, and  
correction). [AMLR23](#)

---

**23** Demonstrate use of the three C's (concern, cause, and correction). [AMLR23](#)

---

Review vehicle service  
history. [AMLR24](#)

---

**24** Review vehicle service history. [AMLR24](#)

---

**Complete Work Order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.** [AMLR25](#)

---

**25 Complete Work Order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.** [AMLR25](#)

**Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover).** [AMLR26](#)

---

**26 Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover).** [AMLR26](#)

**ENGINE REPAIR:** [AMLR27](#)

**a Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.** [AMLR27A](#)

---

**b Verify operation of the instrument panel engine warning indicators.** [AMLR27B](#)

---

**c Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.** [AMLR27C](#)

---

**d Install engine covers using gaskets, seals, and sealers as required.** [AMLR27D](#)

---

**e Remove and replace timing belt; verify correct camshaft timing.** [AMLR27E](#)

---

**f Perform common fastener and thread repair to include remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.** [AMLR27F](#)

---

**g Identify hybrid vehicle internal combustion engine service precautions.** [AMLR27G](#)

---

**h Adjust valves (mechanical or hydraulic lifters).** [AMLR27H](#)

---

**i Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action.** [AMLR27I](#)

---

**j Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.** [AMLR27J](#)

---

**k Remove, inspect, and replace thermostat and gasket/seal.** [AMLR27K](#)

---

**l Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.** [AMLR27L](#)

---

**m Perform engine oil and filter change.** [AMLR27M](#)

---

**AUTOMATIC  
TRANSMISSION AND  
TRANSAXLE:** [AMLR28](#)

- a** Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. [AMLR28A](#)

---

- b** Check fluid level in a transmission or a transaxle equipped with a dipstick. [AMLR28B](#)

---

- c** Check fluid level in a transmission or a transaxle not equipped with a dipstick. [AMLR28C](#)

---

- d** Check transmission fluid condition; check for leaks. [AMLR28D](#)

---

- e** Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch. [AMLR28E](#)

---

- f** Inspect for leakage at external seals, gaskets, and bushings. [AMLR28F](#)

---

- g** Inspect power train mounts. [AMLR28G](#)

---

- h** Drain and replace fluid and filter(s). [AMLR28H](#)

---

- i** Describe the operational characteristics of a continuously variable transmission (CVT). [AMLR28I](#)

---

- j** Describe the operational characteristics of a hybrid vehicle drive train. [AMLR28J](#)

**MANUAL DRIVE TRAIN  
AND AXLES:** [AMLR29](#)

- a** Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. [AMLR29A](#)

---

- b** Drain and refill manual transmission/transaxle and final drive unit. [AMLR29B](#)

---

- c** Check fluid condition; check for leaks. [AMLR29C](#)

---

- d** Check and adjust clutch master cylinder fluid level. [AMLR29D](#)

---

- e** Check for system leaks. [AMLR29E](#)

---

- f** Describe the operational characteristics of an electronically controlled manual transmission/transaxle. [AMLR29F](#)

---

- g** Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals. [AMLR29G](#)

---

- h** Inspect, service, and replace shafts, yokes, boots, and universal/CV joints. [AMLR29H](#)

---

- i** Clean and inspect differential housing; check for leaks; inspect housing vent. [AMLR29I](#)

---

- j** Check and adjust differential housing fluid level. [AMLR29J](#)

---

- k** Drain and refill differential housing. [AMLR29K](#)

---

**l** Inspect and replace drive axle wheel studs. [AMLR29L](#)

---

**m** Inspect front-wheel bearings and locking hubs. [AMLR29M](#)

---

**n** Check for leaks at drive assembly seals; check vents; check lube level. [AMLR29N](#)

---

**SUSPENSION AND  
STEERING  
SYSTEMS:** [AMLR30](#)

**a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR30A](#)

---

**b** Disable and enable supplemental restraint system (SRS). [AMLR30B](#)

---

**c** Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. [AMLR30C](#)

---

**d** Determine proper power steering fluid type; inspect fluid level and condition. [AMLR30D](#)

---

**e** Flush, fill, and bleed power steering system. [AMLR30E](#)

---

**f** Inspect for power steering fluid leakage; determine necessary action. [AMLR30F](#)

---

**h** Inspect and replace power steering hoses and fittings. [AMLR30H](#)

---

**i** Replace power steering pump filter(s). [AMLR30I](#)

---

**j** Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. [AMLR30J](#)

---

**k** Inspect tie rod ends (sockets), tie rod sleeves, and clamps. [AMLR30K](#)

---

**l** Inspect upper and lower control arms, bushings, and shafts. [AMLR30L](#)

---

**m** Inspect and replace rebound and jounce bumpers. [AMLR30M](#)

---

**n** Inspect track bar, strut rods/radius arms, and related mounts and bushings. [AMLR30N](#)

---

**o** Inspect upper and lower ball joints (with or without wear indicators). [AMLR30O](#)

---

**p** Inspect suspension system coil springs and spring insulators (silencers). [AMLR30P](#)

---

**q** Inspect suspension system torsion bars and mounts. [AMLR30Q](#)

---

**r** Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links. [AMLR30R](#)

---

**s** Inspect strut cartridge or assembly. [AMLR30S](#)

---

**t** Inspect front strut bearing and mount. [AMLR30T](#)

---

- 
- u** Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms. [AMLR30U](#)

---

  - v** Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. [AMLR30V](#)

---

  - w** Inspect, remove, and replace shock absorbers; inspect mounts and bushings. [AMLR30W](#)

---

  - x** Inspect electric power-assisted steering. [AMLR30X](#)

---

  - y** Identify hybrid vehicle power steering system electrical circuits and safety precautions. [AMLR30Y](#)

---

  - z** Describe the function of the power steering pressure switch. [AMLR30Z](#)

---

  - aa** Perform pre-alignment inspection and measure vehicle ride height; determine necessary action. [AMLR30AA](#)

---

  - bb** Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action. [AMLR30BB](#)

---

  - cc** Rotate tires according to manufacturer's recommendations. [AMLR30CC](#)

---

  - dd** Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). [AMLR30DD](#)

---

  - ee** Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. [AMLR30EE](#)

---

  - ff** Inspect tire and wheel assembly for air loss; perform necessary action. [AMLR30FF](#)

---

  - gg** Repair tire using internal patch. [AMLR30GG](#)

---

  - hh** Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps. [AMLR30HH](#)

---

  - ii** Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. [AMLR30II](#)

---

**BRAKES:** [AMLR31](#)

- a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR31A](#)

---

- b** Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS). [AMLR31B](#)

---

- c** Measure breaks pedal height, travel, and free play (as applicable); determine necessary action. [AMLR31C](#)

- 
- d** Check master cylinder for external leaks and proper operation. [AMLR31D](#)
- 
- e** Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action. [AMLR31E](#)
- 
- f** Select, handle, store, and fill brake fluids to proper level. [AMLR31F](#)
- 
- g** Identify components of brake warning light system. [AMLR31G](#)
- 
- h** Bleed and/or flush brake system. [AMLR31H](#)
- 
- i** Test brake fluid for contamination. [AMLR31I](#)
- 
- j** Remove, clean, inspect, and measure brake drum diameter; determine necessary action. [AMLR31J](#)
- 
- k** Refinish brake drum and measure final drum diameter; compare with specifications. [AMLR31K](#)
- 
- l** Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. [AMLR31L](#)
- 
- m** Inspect wheel cylinders for leaks and proper operation; remove and replace as needed. [AMLR31M](#)
- 
- n** Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments. [AMLR31N](#)
- 
- o** Install wheel and torque lug nuts. [AMLR31O](#)
- 
- p** Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action. [AMLR31P](#)
- 
- q** Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action. [AMLR31Q](#)
- 
- r** Remove, inspect, and replace pads and retaining hardware; determine necessary action. [AMLR31R](#)
- 
- s** Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks. [AMLR31S](#)
- 
- t** Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action. [AMLR31T](#)
- 
- u** Remove and reinstall rotor. [AMLR31U](#)
- 
- v** Refinish rotor on vehicle; measure final rotor thickness and compare with specifications. [AMLR31V](#)

- 
- w** Refinish rotor off vehicle; measure final rotor thickness and compare with specifications. [AMLR31W](#)

---

  - x** Retract and re-adjust caliper piston on an integral parking brake system. [AMLR31X](#)

---

  - y** Check brake pad wear indicator; determine necessary action. [AMLR31Y](#)

---

  - z** Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations. [AMLR31Z](#)

---

  - aa** Check brake pedal travel with, and without, engine running to verify proper power booster operation. [AMLR31AA](#)

---

  - bb** Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster [AMLR31BB](#)

---

  - cc** Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. [AMLR31CC](#)

---

  - dd** Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. [AMLR31DD](#)

---

  - ee** Check parking brake operation and parking brake indicator light system operation; determine necessary action. [AMLR31EE](#)

---

  - ff** Check operation of brake stop light system. [AMLR31FF](#)

---

  - gg** Replace wheel bearing and race. [AMLR31GG](#)

---

  - hh** Identify traction control/vehicle stability control system components. [AMLR31HH](#)

---

  - ii** Identify traction control/vehicle stability control system components. [AMLR31II](#)
- 

**ELECTRICAL/ELECTRONIC SYSTEMS:** [AMLR32](#)

- a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR32A](#)

---

- b** Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). [AMLR32B](#)

---

- c** Use wiring diagrams to trace electrical/electronic circuits. [AMLR32C](#)

---

- d** Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance. [AMLR32D](#)

---

- e** Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. [AMLR32E](#)

---

- f** Check operation of electrical circuits with a test light. [AMLR32F](#)

---

- g** Check operation of electrical circuits with fused jumper wires. [AMLR32G](#)

- 
- h** Measure key-off battery drain (parasitic draw). [AMLR32H](#)
- 
- i** Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. [AMLR32I](#)
- 
- j** Perform solder repair of electrical wiring. [AMLR32J](#)
- 
- k** Replace electrical connectors and terminal ends. [AMLR32K](#)
- 
- l** Perform battery state-of-charge test; determine necessary action. [AMLR32L](#)
- 
- m** Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action. [AMLR32M](#)
- 
- n** Maintain or restore electronic memory functions. [AMLR32N](#)
- 
- o** Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. [AMLR32O](#)
- 
- p** Perform slow/fast battery charge according to manufacturer's recommendations. [AMLR32P](#)
- 
- q** Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. [AMLR32Q](#)
- 
- r** Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions. [AMLR32R](#)
- 
- s** Identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting vehicle battery. [AMLR32S](#)
- 
- t** Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. [AMLR32T](#)
- 
- u** Perform starter current draw test; determine necessary action. [AMLR32U](#)
- 
- v** Perform starter circuit voltage drop tests; determine necessary action. [AMLR32V](#)
- 
- w** Inspect and test starter relays and solenoids; determine necessary action. [AMLR32W](#)
- 
- x** Remove and install starter in a vehicle. [AMLR32X](#)
- 
- y** Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. [AMLR32Y](#)
- 
- z** Perform charging system output test; determine necessary action. [AMLR32Z](#)
- 
- aa** Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. [AMLR32AA](#)

- 
- bb** Remove, inspect, and re-install generator (alternator). [AMLR32BB](#)

---

  - cc** Perform charging circuit voltage drop tests; determine necessary action. [AMLR32CC](#)

---

  - dd** Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. [AMLR32DD](#)

---

  - ee** Aim headlights. [AMLR32EE](#)

---

  - ff** Identify system voltage and safety precautions associated with high-intensity discharge headlights. [AMLR32FF](#)

---

  - gg** Disable and enable airbag system for vehicle service; verify indicator lamp operation. [AMLR32GG](#)

---

  - hh** Remove and reinstall door panel. [AMLR32HH](#)

---

  - ii** Describe the operation of keyless entry/remote-start systems. [AMLR32II](#)

---

  - jj** Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. [AMLR32JJ](#)

---

  - kk** Verify windshield wiper and washer operation; replace wiper blades. [AMLR32KK](#)
- 

**HEATING AND AIR  
CONDITIONING:** [AMLR33](#)

- a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR33A](#)

---

  - b** Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action. [AMLR33B](#)

---

  - c** Identify hybrid vehicle A/C system electrical circuits and the service/safety precautions. [AMLR33C](#)

---

  - d** Inspect A/C condenser for airflow restrictions; determine necessary action. [AMLR33D](#)

---

  - e** Inspect engine cooling and heater systems hoses; perform necessary action. [AMLR33E](#)

---

  - f** Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; perform necessary action. [AMLR33F](#)

---

  - g** Identify the source of A/C system odors. [AMLR33G](#)
- 

**ENGINE  
PERFORMANCE:** [AMLR34](#)

- a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR34A](#)

- 
- b** Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action. [AMLR34B](#)
- 
- c** Perform cylinder power balance test; determine necessary action. [AMLR34C](#)
- 
- d** Perform cylinder cranking and running compression tests; determine necessary action. [AMLR34D](#)
- 
- e** Perform cylinder leakage test; determine necessary action. [AMLR34E](#)
- 
- f** Verify engine operating temperature. [AMLR34F](#)
- 
- g** Remove and replace spark plugs; inspect secondary ignition components for wear and damage. [AMLR34G](#)
- 
- h** Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. [AMLR34H](#)
- 
- i** Describe the importance of operating all OBDII monitors for repair verification. [AMLR34I](#)
- 
- j** Replace fuel filter(s). [AMLR34J](#)
- 
- k** Inspect, service, or replace air filters, filter housings, and intake duct work. [AMLR34K](#)
- 
- l** Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action. [AMLR34L](#)
- 
- m** Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. [AMLR34M](#)
- 
- n** Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. [AMLR34N](#)
- 
- o** Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action. [AMLR34O](#)