Maine Department of Education Career and Technical Education CTE Intersections with College and Career Readiness Standards-Mathematics				
	Automotive Mechanics Technology; CIP: 47.0604 Maintenance and Light Repair-MLR (NATEF)			
Maintenance and Light Repair (MLR) Duties, Skills, and Tasks	Standards for Mathematical Content; Standards for Mathematical Practice (CCSS)	Criteria for Demonstration of Proficiency (possible; to be determined at the local level)		
Shop and Personal Safety (required supplemental tasks)				
 a. Identify general shop safety rules and procedures. b. Utilize safe procedures for handling of tools and equipment. c. Identify and use proper placement of floor jacks and jack stands. d. Identify and use proper procedures for safe lift operation. e. Utilize proper ventilation procedures for working within the lab/shop area. f. Identify marked safety areas. g. 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. h. Identify the location and use of eye wash stations. i. Identify the location of the posted evacuation routes. j. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. k. Identify and wear appropriate clothing for lab/shop activities. m. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. n. Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). o. Locate and demonstrate knowledge of material safety data sheets (MSDS). 	No Standards identified for Intersection	No Standards identified for Intersection		

Tools and Equipment (required supplemental tasks)		
Tools and Equipment (required supplemental tasks) a. Identify tools and their usage in automotive applications. b. Identify standard and metric designation. c. Demonstrate safe handling and use of appropriate tools. d. Demonstrate proper cleaning, storage, and maintenance of tools and equipment. e. Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).	No Standards identified for Intersection	No Standards identified for Intersection

Preparing Vehicle for Customer		
 a. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.). b. Provide basic vehicle service: Determine fluid type requirements and identify fluid. Check and adjust engine oil level. Check and adjust engine coolant level. Check and adjust power steering fluid level. Check and adjust brake fluid level. Check and adjust windshield washer fluid level. Check and adjust differential/transfer case fluid level. Check and replace wiper blades. Inspect, replace, and adjust drive belts, 	No Standards identified for Intersection	No Standards identified for Intersection
tensioners, and pulleys; check pulley and belt alignment.Inspect and replace air filter.		
Check and adjust tire air pressure.Inspect exhaust system components.		

 c. Perform engine repair Demonstrate knowledge of four-cycle engine operation. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. Perform cooling system pressure tests; test coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action. Test cooling system for the presence of combustion gases. Drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. Perform oil and filter change; reset oil life monitoring system where applicable. Remove and replace radiator; replace radiator hoses. Inspect power-train mounts; determine necessary action 	 N-Q.A.1: Use units as a way to understand problems and to guide the solution of milt-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. Math Practice 5 Math Practice 6 N-Q.A.3: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Math Practice 5 Math Practice 6 	Perform cooling system pressure tests; test coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.
 d. Check automatic transmission: Perform visual inspection of transmission; replace fluid and filters. e. Check manual drive train and axles. Diagnose fluid loss, level, and condition concerns; determine necessary action. Drain and fill transmission/transaxle and final 		
 brain and init transmission, transacte and initial drive unit. Identify and inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; determine necessary action. Identify and inspect hydraulic clutch slave and master cylinders, lines, and hoses; determine necessary action. Bleed clutch hydraulic system. Inspect and replace wheel studs and lug nuts. Inspect constant velocity (CV) joint boots. 		
• Remove and replace rear wheel drive driveshaft.		

 Check suspension and steering • Identify and nterpret suspension and steering system concerns; determine necessary action. Determine proper power steering fluid type; nspect fluid levels and condition. Flush, fill, and bleed power steering system. 	N-Q.A:3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Math Practice 2 Math Practice 6	Define camber, caster, toe, SAI, included angle, and thrust angle. Include description of the directionality of each of the above angles.
 Diagnose power steering fluid leakage; 	G-CO.A.1: Know precise definitions of angle, circle,	
determine necessary action.	perpendicular line, parallel line, and line segment, based on	
 Lubricate suspension and steering systems. Inspect, remove, and replace shock absorbers. 	the undefined notions of point, line, distance along a line, and distance around a circular arc.	
 Inspect, remove, and install stabilizer bar 	Math Practice 5	
oushings, brackets, and links.	Math Practice 6	
 Inspect, remove, and install strut cartridge or 		
assembly, strut coil spring, insulators		
silencers), and upper strut bearing mount.		
 Perform pre-alignment inspection and 		
measure vehicle ride height; determine		
necessary action.		
 Demonstrate knowledge of the principals of 		
steering geometry using caster, camber and		
coe.		
 Inspect tires; identify abnormal tire wear 		
patterns; determine necessary action.		
Demonstrate knowledge of the causes of		
wheel tire vibration, shimmy, and noise.		
 Identify vehicles equipped with a tire 		
pressure monitoring system (TPMS).		
• Demonstrate knowledge of service		
considerations of vehicles equipped with a tire		
pressure monitoring system (TPMS).		
• Rotate tires according to manufacturer's		
recommendations.		
 Balance wheel and tire assembly. 		
Dismount, inspect, and remount tire on		
wheel.		
• Repair tire using internal patch.		
• Reinstall wheel; torque lug nuts.		

 g. Deck brakes - inspect brake since statistics runt, determine if they are social statistics on state the origin in graphs and data displays. beach shafe, store, and fill brake fluids to social the origin in graphs and data displays. beach shafe fluid for containiation; determine necessary action. beach shafe fluid for containiation; determine necessary action. beach shafe shafe action; social shafe shafe

• Install wheel, torque lug nuts, and make fir	าล
checks and adjustments.	

• Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.

• Inspect vacuum-type power booster unit for leaks; inspect the check valve for proper operation; verify proper booster function.

• Demonstrate knowledge of the causes of wheel bearing noises, wheel shimmy, and vibration concerns.

• Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.

• Check parking brake and indicator light

system operation; determine necessary action.

• Check operation of brake stop light system; determine necessary action.

• Replace tapered roller wheel bearing and race.

• Clean, inspect, lubricate, install and adjust wheel bearing.

• Identify and inspect electronic brake control system components; determine necessary action.

• Demonstrate knowledge of the operation of the brake hydraulic failure warning light.



i. Check heating and air conditioning	N-Q.A.1: Use units as a way to understand problems and to	Students will measure data, interpret graphs, and draw
 Identify and visually inspect A/C system 	guide the solution of milt-step problems; choose and interpret	conclusions based on data.
components.	units consistently in formulas; choose and interpret the scale	
Locate refrigerant label and identify specified	and the origin in graphs and data displays.	Students will generate data points and create appropriate
refrigerant type (e.g., R-12, R-134a).		graphs to support their conclusions.
• Conduct preliminary performance test of A/C	Math Practice 5	
system (i.e., verify compressor engagement,	Math Practice 6	
measure outlet duct temperature, sense		
temperature change across	N-Q.A.3: Choose a level of accuracy appropriate to limitations	
 A/C components); determine necessary 	on measurement when reporting quantities.	
action.		
 Identify refrigerant type; select and connect 	Math Practice 5	
proper gauge set; record temperature and	Math Practice 6	
pressure readings.		
 Conduct performance test of the 	S-ID.A.1: Represent data with plots on the real number line	
heater/ventilation system.	(dot plots, histograms, and box plots).	
 Inspect and replace cabin air filter. 		
 Perform cylinder leakage test; determine 	Math Practice 3	
necessary action.		
 Verify engine operating temperature; 		
determine necessary action.		
 Prepare 4 or 5 gas analyzer; inspect and 		
prepare vehicle for test and obtain exhaust		
readings; determine necessary action.		
Retrieve and record stored diagnostic trouble		
codes, OBD monitor status, and freeze frame		
data; clear codes when applicable.		
 Obtain and interpret scan tool data. 		
 Perform fuel pressure test. 		
Replace fuel filters.		
 Remove and replace secondary ignition 		
components.		
 Remove and replace thermostat and 		
gasket/seal.		
• Perform common fastener and thread repair,		
to include: remove broken bolt, restore		
internal and external threads, and repair		
internal threads with a threaded insert.		
Perform cylinder power balance test;		
determine necessary action.		
• Perform cylinder cranking compression test;		
determine necessary action.		
Perform cylinder leakage test; determine	7 	
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j. Check engine performance • Perform engine cranking and running vacuum	S-IC.B.6: Evaluate reports based on data.	Students will be able to read and interpret data and determine necessary action to be taken.
tests; determine necessary action.	Math Practice 1	
 Perform cylinder power balance test; 	Math Practice 2	
determine necessary action.	Math Practice 4	
• Perform cylinder cranking compression test;	Math Practice 5	
determine necessary action.		
 Prepare 4 or 5 gas analyzer; inspect and 		
prepare vehicle for test and obtain exhaust		
readings; determine necessary action.		
• Retrieve and record stored diagnostic trouble		
codes, OBD monitor status, and freeze frame		
data; clear codes when applicable.		
 Obtain and interpret scan tool data. 		
 Perform fuel pressure test. 		
Replace fuel filters.		
 Remove and replace secondary ignition 		
components.		
 Remove and replace thermostat and 		
gasket/seal.		
• Perform common fastener and thread repair,		
to include: remove broken bolt, restore		
internal and external threads, and repair		
internal threads with a threaded insert.		