

CANON CITY HIGH SCHOOL VOCATIONAL AUTO MECHANICS

MATRIX -- TRADES & TECHNICAL EDUCATION

COMPETENCY/SKILL BRAKES	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE - MENT LEVEL
Remove and replace drums	3		P	PR
Replace brake shoes	3		P	PR
Measure and adjust pedal pushrod length and pedal height.	1a 3	IIR5.2	P	PR
Check master cylinder for internal and external leaks and proper operation; determine needed repairs.	1d 1p 2I 2s 2t 3	III I2.2	P	PR
Rebuild master cylinder	3		P	PR
Remove, bench bleed and replace master cylinder	3		P	PR
Diagnose poor stopping, pulling or dragging caused by problems in the hydraulic system; determine needed repairs.	1d 1p 2I 2s 2t 3	IIIR2.3	WP	PR 70%
Inspect flexible brake hoses for leaks, kinks, cracks, bulging or wear; tighten loose fittings and supports	3		P	PR
Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports.	3		P	PR
Fabricate and install brake lines (double flare and ISO types); replace hoses, fittings and supports as needed.	3		P	PR
Select, handle, store and install brake fluids to proper level	1d 2t 3		P	PR
Inspect, test and replace metering, proportioning, pressure differential and combination valves.	1d 2I 2t 3	III I2.2 III I 2.3	P	PR
Inspect, test, replace and adjust height sensing proportioning valve.	1d 1p 2I 3		P	PR

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Inspect, test and replace components of brake warning light system	1rs 1d 1p 2s 3		P	PR
Bleed (manual, pressure, vacuum or surge) brake system; flush hydraulic system.	3		P	PR
Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation problems; determine needed repairs	1c 1rs 1d 1p 2s 2I 2t 3	III I2.3	PW	
Remove, clean (using proper safety procedures), inspect and measure brake drums; service or replace as needed.	1d 3	III I2.2 III I2.3	P O	PR
Mount brake drum on lathe; machine braking surface.	1d 1p 3		P	PR
Remove, clean and inspect brake shoes, springs, pins, clips, levers, adjusters/ self adjusters, other related brake hardware and backing support plates; lubricate and reassemble.	1rs 3		P	PR
Remove and reinstall wheel cylinders	2t 3		P	PR
Rebuild wheel cylinders	2t 3		P	PR
Preadjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings.	1rs 2t 3		P	PR
Reinstall wheel, torque lug nuts and make final checks and adjustments	1rs 2s 3		P	PR
Adjust drum brakes	2t 3	IIR6.1	P	PR
Determine the reusability of all parts of the brake system	1rs 1d 2I 3	IIIR6	P W O	PR 70%
Diagnose wheel bearing noises, wheel shimmy and vibration problems; determine needed repairs	1rs 1c 1d 1p 2I 2t 3	IIIR1	PW	PR 70%

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	COLORADO	COLORADO	ASSESS-	ACHIEVE-
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COMPETENCY/SKILL BRAKES	CORE MEASURE	CONTENT STANDARD (1313)	MENT METHOD	MENT LEVEL
Remove, clean, inspect, repack and reinstall wheel bearings and replace seals; reinstall hub and adjust wheel bearings	1r 2t 3		P	PR
Replace wheel bearing and race	2t 3		P	PR
Free parking brake cables	1c 3		P	PR
Check parking brake cables and components for wear, rusting, binding and corrosion; clean, lubricate and replace as needed.	1r 1d 2t 3	III I 2.2	P O	PR
Check parking brake cables and components for wear, rusting, binding and corrosion; clean, lubricate and replace as needed.	1r 1d 2t 3	III I 2.2	P O	PR
Check parking brake operation; adjust as needed.	1rs 2s 3		P O	PR
Check operation of parking brake indicator light system.	2s 3		P	PR
Check operation of parking brake indicator light system.	2s 3		P	PR
Replace parking brake cables	3		P	PR
Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation caused problems in disc brakes; determine needed repairs.	1r 1c 1d 1p 2s 2t 3	IIIR2.3	P W O	PR 70%
Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing	2s 3		P	PR
Clean and inspect caliper mounting and slides for wear and damage.	3		P	PR
Remove, clean and inspect pads and retaining hardware; determine needed service	1d 2s 2t 3	IIIR5.2	P O	PR

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COMPETENCY/SKILL	COLORADO CORE	COLORADO CONTENT	ASSESS- MENT	ACHIEVE- MENT
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BRAKES	MEASURE	STANDARD (1313)	METHOD	LEVEL
Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring and damage; replace seal, boot, and damaged or worn parts	1rs 2s 3		P	PR
Reassemble, lubricate and reinstall caliper pads and related hardware	2s 2t 3		P	PR
Clean, inspect and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace	1a 1rs 1d 3	IR1.2 IR5.5 IIR5.2	PWO	PR 70%
Refinish rotor according to manufacturer's recommendations	1a 3	IIR6.1	P	PR
Adjust calipers with integrated parking brake system.	2s 3		P	PR
Fill master cylinder with recommended fluid and seat pads; inspect caliper for leaks.	1d 3		P	PR
Replace disc brake pads	2s 3		P	PR
Measure disc brake rotor runout and parallelism	1a 1rs 3	IIR5.2	P O	PR
Measure minimum thickness of the disc brake rotor	1a 1rs 3	IIR5.2	P O	PR
Remove and replace rotor	2s 3		P	PR
Bleed brakes manually	2t 2s 3	IIR2.2	P	PR
Bleed brakes with a pressure bleeder	1rs 2t 3	IIR2.2	P	PR
Test pedal free travel with and without engine running; check power assist	1rs 3		P	PR

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COMPETENCY/SKILL BRAKES	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
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		(1313)		
Check vacuum supply to a vacuum-type power booster.	2s 2t 3	III I1	P	PR
Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; repair or replace parts as needed.	1rs 1d 2s 2t 3		P O	PR
Replace power brake booster.	3		P	PR
Check operation of brake stop light system; adjust and service as needed	1rs 1d 3	III I2.2	P O	PR
Inspect, test and service anti-lock brake system hydraulic, electrical and mechanical components.	1rs 1d 2s 2t 3	III I2.2	P O	PR
Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation and noise problems caused by the anti-lock brake system; determine needed repairs	1rs 1c 1d 1p 2I 2s 2t 3	III I2.2	PW	PR 70%
Observe anti-lock brake system warning light at startup; determine if further diagnosis is needed.	1rs 2s 3		P O	PR
Diagnose anti-lock brake system electronic control and components using self-diagnosis and/or test equipment; determine needed repairs.	1rs 1c 1d 1p 2I 2s 2t 3	III I2.2	PW	P 70%
Depressurize high pressure components of the anti-lock brake system following manufacturer's safety procedures.	1r 3	IR1.2	P	PR
Fill the anti-lock brake system's master cylinder with recommended fluid following manufacturer's procedures; inspect system for leaks.	1r 2s 3		P	PR
Bleed the anti-lock brake system's front and rear hydraulic circuits following manufacturer's procedures	3	IR1.2	P	PR
Perform a fluid pressure (hydraulic boost) diagnosis on the high pressure anti-lock brake system; determine needed repairs.	2s 2I 3	IIIR1	P O	PR
Remove and install anti-lock system electrical/electronic/hydraulic components following manufacturer's procedures and specifications	1rs 1p 2s 3	IR1.2	P	PR

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Service, test and adjust anti-lock brake system speed sensors following manufacturer's recommended procedures.	1rs 1c 1p 1d 2I 2s 2t 3	IR1.2 III I1	P	PR
Diagnose anti-lock brake system braking problems caused by vehicle modifications (tire size, curb height, final drive ratio, etc.)	1rs 1p 1c 1d 2I 2s 2t 3	IIIR2.3 IR1.2 IIR3.2	P W O	PR 70%

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COMPETENCY/SKILL FRONT SUSPENSION AND ALIGNMENT	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
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		(1313)		
Disable supplemental restraint system in accordance with manufacturers procedures	1r 1rs 3		P	PR
Diagnose steering column noises, looseness and binding problems (including tilt mechanisms); determine needed repairs.	1rs 1c 1d 1p 2I 2t 3	IIIR1	PW	PR 70%
Diagnose power non-rack and pinion steering gear binding, uneven turning effort, looseness, hard steering and fluid leakage problems; determine needed repairs.	1rs 1c 1d 1p 2I 2t 3	IIIR1	PW	PR 70%
Diagnose power rack and pinion steering gear vibration, looseness and hard steering problems; determine needed repairs.	1rs 1c 1d 1p 2I 2t 3	IIIR1	PW	PR 70%
Inspect and replace steering shaft universal joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel.	2s 3		P	PR
Inspect manual and power steering fluid levels and condition.	1rs 2s 3		P	PR
Flush, fill, and bleed power steering system.	3		P	PR
Diagnose power steering fluid leakage; determine needed repairs.	1rs 1d 1p 3	IIIR1 IIIR2.2	P O	PR
Inspect, replace and adjust power steering pump belt.	3		P O	PR
Inspect, replace and adjust power steering pump belt.	3		P O	PR
Remove, inspect and replace power steering pump, pump mounts, pump seals and gaskets .	3		P	PR
Remove, inspect and replace power steering pump pulley; check alignment.	3		P	PR
Perform power steering system pressure test; determine needed repairs.	1rs 1d 1p 2I 2s 3	IIIR2.2 IIR5.5	P O	PR

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Inspect and replace power steering hoses and fittings.	3		P	PR
Rebuild power steering pump.	1p 3		P	PR

Lubricate steering boxes and linkages	3		P	PR
Replace steering gear assemblies	3		P	PR
Adjust manual or power non-rack and pinion worm bearing preload and sector lash	1rs 2s 3		P	PR
Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.	3		P	PR
Disassemble, inspect, repair and reassemble rack and pinion steering gear.	2s 3		P	PR
Adjust manual or power rack and pinion steering gear.	2I 3		P	PR
Inspect and replace manual or power rack and pinion steering gear inner tie rod ends and bellows boots.	3		P	PR
Repack and adjust front and rear wheel bearings	1r 3		P	PR
Diagnose wheel bearing wear	1rs 1p 2I 3	IIIR1	PWO	PR 70%
Diagnose tire wear patterns; determine needed repairs.	1rs 1p 2I 3	IIIR1	PWO	PR 70%
Inspect tires; check and adjust air pressure.	3		P	PR

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Diagnose wheel/tire vibration, shimmy and noise problems; determine needed repairs.	1rs 1d 1p 2I 2s 3		PW	PR 70%
Rotate tires according to manufacturer's recommendations.	1r 3		P	PR

Measure wheel, tire, axle and hub runout; determine needed repairs.	1rs 1d 1p 3	IIR5.5	P	PR
Measure wheel, tire, axle and hub runout; determine needed repairs.	1rs 1d 1p 3	IIR5.5	P	PR
Diagnose pull (lead) problems; determine corrective actions.	1rs 1c 1p 2s 3		PW	PR 70%
Dismount, inspect, repair and remount tire on wheel.	3		P	PR
Balance wheel and tire assembly (static and dynamic).	3	III I6	P	PR
Reinstall wheel; torque lug nuts.	3		P	PR
Lubricate suspension and steering system.	3		P	PR
Diagnose short and long arm suspension system noises, body sway and uneven riding height problems; determine needed repairs.	1rs 1c 1p 1d 2s 2I 3	IIIR2.3	PW	PR 70%
Diagnose MacPherson strut suspension system noises, body sway and uneven riding height problems; determine needed repairs.	1rs 1c 1p 1d 2s 2i13	IIIR2.3	PW	PR 70%
Remove, inspect and replace upper and lower control arms, bushings, shafts and rebound bumpers.	3		P	PR
Remove, inspect, replace and adjust strut rods and bushings.	3		P	PR

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Remove, inspect and replace upper and lower ball joints on short and long arm suspension systems.	1rs 2s 3		P	PR
Remove, inspect and replace steering knuckle assemblies	3		P	PR

Remove, inspect and replace short and long arm suspension system coil springs and spring insulators.	3		P	PR
Remove, inspect, replace and adjust suspension system torsion bars.	3		P	PR
Remove, inspect and replace ball joints on MacPherson strut suspension systems.	3		P	PR
Remove, inspect and replace MacPherson strut cartridge or assembly, strut coil spring, insulators and upper strut bearing mount.	3		P	PR
Remove and replace components of a Type I suspension system	1rs 1c 1p 2s 2t 3		P	PR
Remove and replace components of a Type II suspension system	1rs 1c 1p 2s 2t 3		P	PR
Remove and replace components of a Torsion Bar suspension system	1rs 1c 1p 2s 2t 3		P	PR
Remove and replace components of a McPhearson suspension system	1rs 1c 1p 2s 2t 3		P	PR
Perform prealignment checks to determine condition of parts in all front suspension systems	1rs 1c 1p 2s 2t 3	IIR5.2 IIR5.3	P W O	PR 70%
Replace front springs in all types of suspensions	3		P	PR
Replace front wheel bearing and races	3		P	PR

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Align all types of front suspensions	1a 1s 1p 3	IIR5.2 IIR4.5 IIR5.5	P	PR
Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return problems; determine needed repairs	1c 1rs 1p 1d 2s 2I 3	Iir5.3 IIR5.2	P W	PR 70%
Measure vehicle riding height; determine needed repairs.	1rs 2s 2I 3	IIR5.2 IIR6.1	P W	PR 70%

Check and adjust front and rear wheel camber; determine needed repairs.	1d 1rs 2I 3	IIR5.2 IIR6.1	P W	PR 70%
Check and adjust caster; determine needed repairs.	1d 1rs 2I 3	IIR5.2 IIR6.1	P W	PR 70%
Check and adjust front wheel toe; adjust as needed.	1d 1rs 2I 3	IIR5.2 IIR6.1	P W	PR 70%
Center steering wheel.	3		P W	PR 70%
Check toe-out-on-turns; determine needed repairs.	1rs 1p 2s 3	IIR5.2 IIR6.1	P W	PR 70%
Check SAI and included angle; determine needed repairs.	1rs 1p 2s 3	IIR5.2 IIR6.1	P W	PR 70%
Check and adjust rear wheel toe.	3	IIR5.2 IIR6.1	P W	PR 70%
Check rear wheel thrust angle; determine needed repairs.	1rs 1p 2s 3	IIR5.2 IIR6.1	P W	PR 70%
Check for front wheel setback; determine needed repairs.	1rs 1p 2s 3	IIR5.2 IIR6.1	P W	PR 70%
Check front cradle (subframe) alignment; determine needed repairs.	1rs 1p 2s 3	IIR5.2 IIR6.1	P W	PR 70%

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Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	3		P	PR
Inspect, replace and adjust tie rod ends, tie rod sleeves and clamps	3		P	PR
Diagnose, inspect, adjust or replace components of electrically-controlled steering systems	1rs 1c 2I 2s 3	IIR2.1	P W O	PR 70%

Diagnose, inspect, repair or replace components of variable-assist steering systems.	1rs 1c 2I 2s 3	IIIR2.2	P W O	PR 70%
Remove and replace shock absorbers.	3		P	PR
Diagnose, inspect, adjust, repair or replace components of electrically-controlled suspension systems.	1rs 1c 2I 2s 3	IIIR2.1	P W O	PR 70%

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Interpret and verify complaint; determine needed repairs.	1s 1I 1rs 2s 3	IR4.1 IR4.3	P W O	PR 70%
Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed repairs.	1rs 3		P	PR
Perform cylinder compression test; determine needed repairs	1rs 2t 3	IIR5.2 IIRT2.3	P W	PR 70%
Perform tail pipe emission test	1r 2t 3		P W	PR 70%

Perform cylinder leakage tests; determine needed repairs	1r 2t 3	IIIR2.3	P W	PR 70%
Check engine oil pressure with a master gauge; determine needed repairs	1r 1d 2s 3		P	PR
Perform cooling system tests (pressure, combustion leakage, and temperature); determine needed repairs.	1r 1d 2s 3	IIIR2.2 Iir5.2	P W	PR 70%
Listen to engine noises: determine needed repairs	1rs 1c 1d 2s 3		P W	PR 70%
Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine needed repairs	1rs 1cr 1p 2s 2I 2t 3		P W	PR 70%
Perform engine vacuum tests; determine needed repairs	1rs 1cr 2I 2s 3	IIR5.2 IIR2.3	P W	PR
Perform cylinder power balance tests; determine needed repairs	1rs 1cr 2I 2s 3	IIR5.2	P W	70%
Perform a visual inspection of engine condition	1rs 3		P	PR
Remove engine from both front wheel drive and rear wheel drive vehicle	2s 3		P	PR

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COMPETENCY/SKILL ENGINE	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Locate and use engine rebuilding specifications	1r 2I 3	IR5.5 IR4.2	W O	90%
Remove cylinder head from engine; inspect cylinder head(s) for cracks; check gasket surfaces for warp and leakage; check passage condition	3	IIR5.2	P	PR
Check cylinder head for warp	2t 3	IR5.2 IIR5.5	P	PR
Properly mark connecting rod and main bearing caps before disassembly	3		P	PR
Remove piston and rod assembly from block	3		P	PR

Remove ridge from cylinders	3		P	PR
Inspect engine block for cracks, passage condition, core and gallery plug condition, and surface warpage: determine needed repairs.	1rs 1d 2s 2t 3		P W	PR 70%
Inspect internal and external threads; repair as needed	3		P	P[R
Inspect and measure piston, rings, rod, and cap	2I 3	IIR5.2	P	PR
Memorize engine rebuilding tolerances	1rs 2I 3	IR1.2	P W	PR 70%
Remove harmonic balancer	3		P	PR
Inspect crankshaft for surface cracks and journal damage; check oil passage condition; measure journal wear; determine needed repairs.	1rs 1d 3	IIR5.2 IIR5.5	P	PR
Inspect and replace camshaft drives(including gear wear and backlash, sprocket and chain wear, overhead cam drive sprockets, drive belts, belt tension and tensioners)	1rs 1p 2s 2t 3		P	PR

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Remove and inspect lifters for wear; replace as needed	3		P	PR
Remove and inspect the camshaft for runout; measure journals and lobes for wear	2t 3	IIR5.2 IIR1.1	P	PR
Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine needed repairs	2t 3	IIR5.2 IIR1.1	P W	PR 70%
Define the term "valve overlap"	3		W O	70%
Check block deck warp	3	IIR5.2 IIR1.1	P	PR

Measure cylinder for taper, out of round, damage and wear; determine needed repairs	1rs 1d 1p 2t 3	IIR5.5 IIR5.2 IIR1.1	P	PR
Deglaze and clean cylinder walls.	3		P	PR
Remove and replace block plugs Clean and inspect valves	3		P	PR
Inspect, measure, service or replace pistons.	1rs 2I 2t 3	IIR5.2	P W	PR 70%
Measure piston cam grind	2t 3	IIR5.2	P W	PR 70%
Measure connecting rod cap for out of round	2t 3	IIR5.2	P W	PR 70%
Measure piston to wall clearance	3		P	PR

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Check for bent rod	3		P	PR
Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; inspect rod alignment and bearing bore condition	1rs 1p 2I 2s 3		P W O	PR 70%
Inspect and measure main and connecting rod bearings for damage, clearance, and end play; determine needed repairs (includes the proper selections of bearings)	1rs 1p 2I 2t 3	IIR6.1 IIR5.2	P O	PR 70%
Inspect and test valve springs for squareness, pressure, and free height comparison; replace as needed.	1rs 1p 3	II I2.1 IIR5.2	P O	PR 70%
Inspect valve spring retainers, locks, and valve grooves.	3		P	PR

Replace valve spring seals.	3		P	PR
Inspect valve guides for wear; check valve guide height and stem to guide clearance; recondition or replace as needed	1rs 1d 2t 3	IIR2.3 IIR5.2	P O	PR 70%
Inspect valves; resurface or replace	1rs 1d 2t 3		P W O	PR 70%
Inspect valve seats; resurface or replace	1rs 1d 2t 3		P W O	PR 70-%
Check valve face-to-seat contact and valve seat concentricity (runout); service seats and valves as needed	1rs 1d 1p 2t 3	IIR2.3 IIR5.2	P O	PR 70%
Check valve spring assembled height and valve stem height; service valve and spring assemblies as needed.	1rs 1d 1p 2t 3	IIR2.3 IIR5.2	P O	PR 70%
Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); repair or replace.	1rs 1d 1p 2t 3		P	PR

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Check crankshaft endplay	2I 2t 3	IIR5.2 IIR5.3	P	PR
Install engine oil seals	3		P	PR
Set and check valve timing; verify timing according to manufacturer's specifications and procedure	1rs 2I 2t 3		P	PR
Inspect, measure and install rings using ring expander.	1rs 2I 2t 3	IIR5.2 IIR5.3	P	PR
Check ring end gap	1rs 1cr 2t 3		P W	PR 70%
Check ring side clearance	1rs 2I 2t 3		P W	PR 70%
Install pistons in cylinders	3		P	PR

Torque all engine fasteners	2I 3	IIR5.5	P	PR
Reassemble engine components using correct gaskets and sealants.	3		P	PR
Inspect auxiliary (balance, intermediate, idler, counterbalance or silencer) shaft; inspect shaft and support bearings for damage and wear; determine needed repairs	1rs 1d 2t 3		P O	PR 70%
Inspect, repair or replace crankshaft vibration damper (harmonic balancer).	3		P	PR
Inspect oil pump gears or rotors, housing, pressure relief devices and pump drive; repair as needed.	1rs 1d 2t 3		P	PR
Inspect flywheel or flexplate and ring gear for cracks and wear; measure runout; determine needed repairs.	1rs 1d 2t 3	IIR5.2 IIR5.5	P O	PR 70%

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Inspect, remove, and replace crankshaft pilot bearing or bushing (as applicable)	3		P	PR
Install distributor to proper position	2I 2t 3		P	PR
Install cylinder heads and gaskets; tighten according to manufacturer's specifications and procedures	1r 1p 1d 2I 2t 3		P W	PR 70%
Adjust valves (both solid and hydraulic)	1r 2I 3	IIR5.2 IIR5.5	P	PR
Wire distributor and set ignition timing	2I 2t 3		P	PR
Inspect and replace pans, covers, gaskets, and seals	2t 3		P	PR
Inspect, replace and adjust drive belts and pulleys	2t 3		P	PR

Inspect and replace engine cooling and heater system hoses	1rs 2t 3		P	PR
Inspect, test, and replace thermostat and housing	2t 3	IIR5.5 IIR2.2	P	PR
Inspect coolant; drain, flush, and refill cooling system with recommended coolant and bleed air as required.	1r 1cr 2t 3	IIR2.2	P W	PR 70%
Inspect, test, remove, and replace water pump	1rs 1cr 1d 2t 3		P	PR
Inspect and test radiator, pressure cap, and coolant recovery system; remove and replace radiator	1rs 1cr 1d 2t 3		P	PR
Clean, inspect, and test fans (electrical or mechanical), fan clutch, fan shroud, and air dams.	1rs 2s 3		P	PR

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COMPETENCY/SKILL ENGINE	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Inspect and test electrical fan control system and circuits	1rs 1cr 2s 3	IIR2.1 IIR5.2	P	PR
Inspect auxiliary oil coolers; replace as needed.	3		P	PR
Inspect, test, and replace oil temperature, pressure switches and sensors	2s 3	IIR2.2 IIR5.2	P	PR
Perform oil and filter change	2I 2t 3		P	PR
Explain how to properly break in a new engine	3		W O	70%
Set carburetor	1rs 1d 2s 2t 3		P	PR
Install engine in vehicle (both front and rear-wheel drive)	1p 2t 2s 3		P	PR
Prime engine lubrication system.	3		P	PR
Start and adjust new engine	1p 2s 3		P	PR
Inspect fluid levels and oil pressure	1p 2t 3		P	PR

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COMPETENCY/SKILL TRANSMISSIONS	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Interpret and verify driver's complaint; verify proper engine operation; determine needed repairs.	1rs 1cr 1d 1p 2I 2t 3	IR4.1 IR5.5	P W O	PR 70%
Diagnose clutch noise, binding, slippage, pulsation and chatter problems; determine needed repairs.	1rs 1p 1d 2I 2t 3	IIIR1	P W O	PR 70%
Inspect and replace clutch pressure plate assembly and clutch disc.	1rs 2t 3		P	PR
Inspect , adjust or replace release (throwout) bearing, lever and pivot.	1rs 2t 3		P	PR
Inspect, remove or replace crankshaft pilot bearing or bushing (as applicable).	3		P	PR
Inspect, repair and service or replace flywheel and ring gear.	1rs 1d 2t 3		P	PR
Inspect engine block, clutch (bell) housing and transmission case mating	1rs 1d 2s 2t 3		P	PR

surfaces; determine needed repairs.				
Measure flywheel-to-block runout and crankshaft end play; determine needed repairs.	1rs 1d 1p 2t 3	IIR5.2 IIR5.5	P O	PR
Measure clutch housing bore-to-crankshaft runout and face squareness; determine needed repairs.	1rs 1d 1p 2t 3	IIR5.2 IIR5.5	P O	PR
Inspect adjust or replace clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots and springs.	2t 3		P	PR
Inspect, adjust, repair or replace hydraulic clutch slave and master cylinders, lines and hoses.	1rs 1p 2t 3		P	PR
Bleed hydraulic components	3	IIR2.2	P	PR
Diagnose transmission noise, hard shifting, jumping out of gear and fluid leakage problems; determine needed repairs.	1rs 1p 1d 2t 2s 3	IIR1	P W O	PR 70%

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COMPETENCY/SKILL TRANSMISSIONS	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Remove and replace a standard transmission (front and rear wheel drive)	2s 3		P	PR
Disassemble, clean and reassemble transmission components.	2s 2t 3		P	PR
Inspect, adjust and reinstall transmission shift cover, forks, grommets, levers, shafts, sleeves, detent mechanisms, interlocks, and springs.	1rs 1d 2t 3		P	PR
Inspect and reinstall input (clutch) shaft and bearings.	2s 2t 3		P	PR
Inspect and reinstall main shaft, gears, thrust washers, bearings and retainers.	1rs 2s 2t 3		P	PR
Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs and blocking rings.	1rs 2s 2t 3		P	PR
Inspect and reinstall counter (cluster) gear, shaft, bearings, thrust washers, and retainers; check end play; adjust as needed.	1rs 2s 2t 3		P	PR
Inspect and reinstall reverse idler gear, shaft, bearings, thrust washers and retainers; check end play; adjust as needed	1rs 2s 2t 3		P	PR

Inspect lubrication devices (oil pump and slingers).	1rs 2s 2t 3		P	PR
Remove and replace transaxle final drive.	1rs 2s 2t 3		P	PR
Disassemble and clean transaxle final drive.	1rs 2s 2t 3		P	PR
Inspect, adjust and reinstall transaxle shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks and springs.	1rs 1p 1d 2t 3		P	PR
Inspect and reinstall output shaft gears, thrust washers, bearings and retainers.	3		P	PR

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COMPETENCY/SKILL TRANSMISSIONS	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Measure end play or preload (shim or spacer selection procedure) on transaxle shafts; adjust as needed.	1rs 1d 1p 2t 3	IIR5.2	P O	PR
Inspect transaxle case, mating surfaces, bores, bushings and vents.	2s 3		P	PR
Diagnose transaxle differential assembly noise and vibration problems; determine needed repairs.	1rs 1cr 1d 1p 2s 2t 3	IIIR1	P W O	PR 70%
Remove, inspect, measure, adjust and reinstall transaxle differential pinion gears, shaft, side gears, side bearings, thrust washers and case assembly.	1rs 1d 2t 3	IIR5.2	P	PR
Inspect, adjust and replace transmission shift linkages, brackets, bushings, cables pivots, and levers.	2s 2t 3		P	PR
Inspect and replace transmission gaskets, seals, and sealants; inspect surfaces.	3		P	PR
Inspect, replace, and align power train mounts.	1rs 2s 3		P	PR
Replace speedometer cables, drive gears, and housings	3		P	PR

Check transmission fluid levels	1r 2I 2s 3		P	PR
Diagnose unusual fluid usage, level, and condition problems; determine needed repairs.	1rs 1cr 1p 1d 2t 2s 3	IIIR1	P W	PR 70%
Inspect and replace transmission external seals and gaskets	1rs 2t 3		P	PR
Inspect and replace transmission external seals and gaskets	1rs 2t 3		P	PR
Remove and replace automatic transmission (front and rear wheel drive)	1rs 1cr 2s 2t 3		P	PR

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COMPETENCY/SKILL TRANSMISSIONS	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Remove and replace transmission filter and gaskets	1rs 2t 3		P	PR
Pressure test automatic transmission; determine needed repairs	1rs 1cr 2s 2t 3	III I2.3 IIR5.2	P W	PR 70%
Perform lock-up converter system tests; determine needed repairs	1rs 1cr 2t 3		P W	PR 70%
Perform stall tests; determine needed repairs	1rs 1cr 2t 3		P W	PR 70%
Diagnose electronic, mechanical, and vacuum control systems; determine needed repairs.	1rs 1cr 2t 3	IIIR1 IIIR2.2	P W	PR 70%
Diagnose noise and vibration problems; determine needed repairs.	1rs 1cr 2t 3	IIIR1	P	PR
Inspect, adjust or replace manual shift valve and throttle linkages or cables and check gear select indicator (as applicable)	1rs 1d 2t 3		P	PR
Service transmission; perform visual inspection; replace fluid and filters	1rs 2t 3		P	PR
Adjust automatic transmission bands and linkages	1rs 1d 2t 3		P	PR

Remove and replace automatic transmission external seals	1rs 1d 2t 3		P	PR
Disassemble, clean and inspect transmission/transaxle.	1rs 1d 2t 3		P	PR
Assemble transmission/transaxle.	1rs 1d 2t 3		P	PR
Inspect, adjust or replace (as applicable) vacuum modulator, inspect and repair or replace lines and hoses.	1rs 1d 2t 3		P	PR

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COMPETENCY/SKILL TRANSMISSIONS	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Inspect, repair and replace governor assembly.	1rs 1d 2t 3		P	PR
Inspect, leak test, flush and replace cooler, lines and fittings.	1rs 1d 2t 3		P	PR
Inspect extension housing; replace bushing and seals	1rs 1d 2t 3		P	PR
Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor and retainers	1rs 1d 2t 3		P	PR
Inspect, measure, clean and replace valve body (includes surfaces and bores springs, valves, sleeves, retainers, brackets, check balls, screens, spacers, and gaskets); check\adjust valve body bolt torque.	1rs 1d 2t 3		P	PR
Inspect servo bore, piston seals, pin, spring and retainers; repair or replace as needed.	1rs 1d 2t 3		P	PR
Inspect accumulator bore, piston, seals, spring and retainer; repair or replace as needed.	1rs 1d 2t 3		P	PR
Inspect, test, adjust, repair or replace transmission related electrical and electronic components (includes computers, solenoids, sensors, relays, switches, and harnesses).	1rs 1d 2t 3		P	PR
Inspect and replace parking pawl, shaft, spring and retainer	1rs 1d 2t 3		P	PR
Remove and reinstall transmission and torque converter (rear wheel drive).	1rs 1d 2t 3		P	PR

Remove and reinstall transaxle and torque converter assembly.	1rs 1d 2t 3		P	PR
Inspect converter flex plate, attaching parts, pilot, pump drive and seal areas.	1rs 1d 2t 3		P	PR
Measure torque converter end play and check for interference; check stator clutch.	1rs 1d 2t 3		P	PR

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COMPETENCY/SKILL TRANSMISSIONS	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Inspect, measure and replace oil pump housings, shafts, vanes, rotors, gears, valves, seals, and bushings.	1rs 1d 2t 3		P	PR
Check torque converter and transmission cooling system for contamination.	1rs 1d 2t 3		P	PR
Check end play or preload; determine needed service.	1rs 1d 2I 2t 3		P	PR
Inspect, measure and replace thrust washers and bearings.	1rs 1d 2t 3	IIR5.2 IIR6.1	P	PR
Inspect oil delivery seal rings, ring grooves and sealing surface areas.	1rs 1d 2t 3		P	PR
Inspect bushings; replace as needed.	1rs 1d 2t 3		P	PR
Inspect and measure planetary gear assembly (includes sun, ring gear, thrust washers, planetary gears and carrier assembly); replace as needed.	1rs 1d 2t 3		P	PR
Inspect cases, bores, passages, bushings, vents, and mating surfaces; replace as needed.	1rs 1d 2t 3		P	PR
Inspect transaxle drive, link chains, sprockets, gears, bearings and bushings; replace as needed.	1rs 1d 2t 3		P	PR
Inspect, measure, repair, adjust or replace transaxle final drive components.	1rs 1d 2t 3		P	PR

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COMPETENCY/SKILL DIFFERENTIALS, DRIVESHAFTS, AXLES	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Diagnose noise and vibration problems; determine needed repairs.	1rs 1d 1p 2t 3	IIIR1	P W O	PR 70%
Diagnose fluid leakage problems; determine needed repairs.	1rs 1d 1p 2t 3	IIIR1	P O	PR
Remove, inspect and replace coil springs and spring insulators.	1rs 1d 2t 3		P	PR
Remove, inspect and replace transverse links, control arms, bushings and mounts.	1rs 1d 2t 3		P	PR
Remove, inspect and replace leaf springs, leaf spring insulators, shackles, brackets and mounts.	1rs 1d 2t 3		P	PR
Remove, inspect and replace MacPherson strut cartridge or assembly, strut coil spring and insulators.	1rs 1d 2t 3		P	PR
Remove and replace an axle housing	1rs 1d 2t 3		P	PR
Diagnose rear axle shafts, bearings and seals for noise, vibration and fluid leakage problems; determine needed repairs.	1rs 1d 1ccr 1p 2I 2t 2s 3	IIIR1	P W O	PR 70%
Inspect and replace rear axle shaft wheel studs.	1rs 1d 2t 3		P	PR
Remove and replace rear axle shafts.	1rs 1d 2t 3		P	PR
Inspect and replace rear axle shaft seals, bearings and retainers.	1rs 1d 2t 3		P	PR

Measure rear axle flange runout and shaft end play; determine needed repairs.	1rs 1dc 1cr 1p 2I 2s 2t 3	IIR5.2	P W O	PR 70%
Remove and replace ring and pinion gears	1rs 1d 2t 3		P	PR

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COMPETENCY/SKILL DIFFERENTIALS, DRIVESHAFTS, AXLES	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Set up differential assembly (conventional and transaxle)	1rs1d1p1cr2t 3		P W	PR 70%
Disassemble, inspect, measure and adjust or replace differential pinion gears, shaft, side gears, side bearings, thrust washers and case.	1rs 1p 2t 3		P	PR
Reassemble and reinstall differential case assembly; measure runout; determine needed repairs.	1rs 1d 1p 1cr 2t 3	IIR5.2	P W	PR 70%
Inspect and replace companion flange and pinion seal; measure companion flange runout.	1rs 1p 2t 3		P	PR
Remove and inspect drive pinion gear, spacers, sleeves and bearings.	1rs 1[2t 3		P	PR
Measure and adjust drive pinion depth.	1rs 1p 2t 3	IIR5.2	P W	PR 70%
Measure and adjust drive pinion bearing preload.	1rs 1p 2t 3	IIR5.2	P W	PR 70%
Torque pinion yoke	1rs 1p 2t 3		P	PR
Check for proper fluid level	1rs 1p 2t 3		P	PR
Inspect ring gear and measure runout; determine needed repairs.	1rs 1cr 1p 1d 2t 2s 3	IIR5.2 IIR5.5	P O	PR
Measure and adjust side bearing preload and ring and pinion total backlash and backlash variation on a differential carrier assembly (threaded cup and shim type)	1rs 1cr 1p 1d 2t 3		P	PR

Check ring and pinion tooth contact patterns; adjust as needed.	1rs 1cr 1p 1d 2t 3		P W	PR 70%
Check preload	1rs 1cr 1p 1d 2t 3		P	PR

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COMPETENCY/SKILL DIFFERENTIALS, DRIVESHAFTS, AXLES	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Diagnose noise, slippage and chatter problems on a limited slip differential; determine needed repairs.	1rs 1p 1d 1cr 2t 21s 3	IIIR1	P W	PR 70%
Inspect and flush differential housing; refill with correct lubricant.	1rs 1d 2t 3		P	PR
Remove and replace drive shaft	3		P	PR
Remove and replace U-joints	1rs 1d 2t 3		P	PR
Lubricate U-joints	3		P	PR
Inspect and reinstall clutch components on a limited slip differential.	1rs 1d 2t 3		P	PR
Measure rotating torque on a limited slip differential; determine needed repairs.	1rs 1p1d 1cr 2s 2t 3	IIR5.2 II I2.2	P O	PR
Diagnose constant-velocity (CV) joint noise and vibration problems; determine needed repairs.	1rs 1p 1d 1cr 2t 2s 3	IIIR1	P W O	PR 70%
Diagnose universal joint noise and vibration problem; determine needed repairs.	1rs 1p 1d 1cr 2t 2s 3	IIIR1	P W O	PR 70%
Diagnose front wheel drive bearing noise and vibration problems; determine needed repairs.	1rs 1p 1d 1cr 2t 2s 3	IIIR1	P W [PR 70%
Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.	1rs 1d 2t 3		P	PR
Remove and replace constant velocity joints	1rs 1d 2t 3		P	PR

Inspect, service and replace a shaft center support bearing	1rs 1d 2t 3		P	PR
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MATRIX -- TRADES & TECHNICAL EDUCATION

COMPETENCY/SKILL DIFFERENTIALS, DRIVESHAFTS, AXLES	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Check and correct shaft balance; measure shaft runout; measure and adjust driveline angles.	1rs 1p 1d 2s 2t 3	II I4.2 IIR5.2	P	PR
Diagnose noise, vibration and unusual steering problems on 4WD/AWD; determine needed repairs.	1rs 1p1d 2s 2t 3	IIIR1	P W	PR 70%
Inspect , adjust and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers and brackets on 4WD/AWD.	1r 1d 2t 3		P	PR
Remove and reinstall transfer case.	3		P	PR
Disassemble, service and reassemble transfer case and components.	1r 1d 2t 3		P	PR
Inspect, service and replace front-wheel bearings and locking hubs.	1r 1d 2t 3		P	PR
Check 4WD/AWD drive assembly seals and vents; check lubricant level.	1r 1d 2t 3		P	PR
Inspect a viscous coupling assembly.	1r 1d 2t 3	III I2.1	P	PR
Perform operational inspections of drive lines	1r 1d 2t 3		P O	PR
Perform road test inspections of differentials	1r 1d 1p 1cr 2t 2s 3		P	PR

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COMPETENCY/SKILL BASIC ELECTRICITY, BATTERY, CHARGING, STARTING	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Use wiring diagrams during diagnosis of electrical circuit problems.	1d 1rs 1r 2I 3	IIIR1	P O	PR
Check electrical circuits with a test light; determine needed repairs.	1rs 1d 27 3	IIIR2.1 IIIR2.3	P O	PR
Check voltage and voltage drop in electrical/electronic circuits using a digital multimeter; determine needed repairs.	1rs 1d 2t 3	IIIR2.1 IIIR2.3	P O	PR
Check current flow in electrical/electronic circuits and components using an ammeter; determine needed repairs.	1rs 1d 2t 3	IIIR2.1 IIIR2.3	P O	PR
Find shorts, grounds, opens and resistance problems in electrical/electronic circuits; determine needed repairs.	1rs 1d 2t 3	IIIR2.1 IIIR2.3	P O	PR
Measure and diagnose the cause(s) of abnormal key-off battery drain; determine needed repairs.	1rs 1d 2t 3	IIIR2.1 IIIR2.3	P O	PR
Inspect and test fusible links; circuit breakers and fuses; replace as needed.	1rs 1d 2t 3	IIIR2.1 IIIR2.3	P O	PR
Inspect and test switches, connectors, relays and wires of electrical/electronic circuits; repair or replace as needed.	1r`1d 1p 2t 3	IIIR2.1 IIIR2.3	P O	PR
Maintain or restore electronic memory functions.	1r 1d 2t 3	IIIR2.1 IIIR2.3	P O	PR
Inspect and clean battery cables, connectors, clamps and hold-downs; repair or replace as needed..	2t 3		P	PR
Inspect, clean, fill and replace battery.	2t 3		P	PR
Perform slow/fast battery charge.	2t 3		P	PR
Start a vehicle using jumper cables and a battery or auxiliary power supply.	2t 3		P	PR

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COMPETENCY/SKILL BASIC ELECTRICITY, BATTERY, STARTING, CHARGING	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Perform battery state-of-charge test; determine needed repairs.	1rs 1d 2t 3	IIIR2.1 IIIR2.3 IIIR1	P W O	PR 70%
Perform battery capacity (load, high-rate discharge) test; determine needed repairs.	1r 1d 2t 3	IIIR2.1IIIR2.3IIIR1	P W O	PR 70%
Perform battery sulphation test	1rs 1d 2t 3	IIIR2.1 IIIR2.3 IIIR1	P W O	PR 70%
Perform battery leakage test	1rs 1d 2t 3	IIIR2.1IIIR2.3IIIR1	P W O	PR 70%
Test battery cables using a voltage drop test	1rs 1d 1p 2t 3	IIIR2.1 IIIR2.3 IIIR1	P O	PR
Test battery with hydrometer	1rs 1d 1p 2t 3	IIIR2.1 IIIR2.3 IIIR1	P O	PR
Inspect, test and repair or replace switches, connectors and wires of starter control circuits.	1rs 1d 1p 2t 3	IIIR2.1	P O	PR
Remove and replace/reinstall starter.	1rs 2t 3		P	PR
Inspect and test starter relays and solenoids; replace as needed.	1rs 1d 1p 2t 3	IIIR2.2 IIIR1	P O	PR
Perform starter current draw and circuit voltage drop test; determine needed repairs.	1rs 1d1p 2t 3	IIIR2.2 IIIR	P O W	PR 70%
Perform starter bench tests; determine needed repairs.	1rs 1cr 1d 1p 2t 3	IIIR2.2 IIIR1	P O	PR
Check starter component using a growler	1rs 1d 2t 3	IIIR2.2 IIIR1	P P	PR
Check starter components using a ohmmeter	1rs 1d 1p 2t 3	IIIR2.2 IIIR1	P O	PR

MATRIX -- TRADES & TECHNICAL EDUCATION

COMPETENCY/SKILL BASIC ELECTRICITY, BATTERY, CHARGING, STARTING	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Disassemble, clean, inspect and test starter components; replace as needed.	1rs 1cr 1d 1p 2t 3		P W O	PR 70%
Replace starter drive	2t 3		P	PR
Replace starter bushings	2t 3		P	PR
Replace starter brushes	2t 3		P	PR
Analyze malfunctions in the starting circuit	1rs 1cr 1p 1d 2t 3	IIIR2.1 IIIR2.3 IIIR2.2 IIIR1	P W O	PR 70%
Diagnose charging system problems that cause and undercharge, a no-charge or overcharge conditions.	1rs 1cr 1p1d 2t 3	IIIR2.1 IIIR2.3 IIIR2.2 IIIR1	P W O	PR 70%
Inspect and adjust alternator drive belts; replace as needed.	1rs 1d 2t 3		P O	PR
Remove, inspect and replace/reinstall alternator.	1rs 1d 2t 3	IIIR1	P O	PR
Inspect and test voltage regulator; replace as needed.	1rs 1d 1p 2t 3	IIIR1	P O	PR
Replace external regulator	2t 3		P	PR
Replace internal regulator	2t 3	PR	P	
Disassemble, clean, inspect and test alternator components; replace as needed.	1rs 1d 2t 3	IIIR	P O W	PR 70%
Perform alternator output test	1rs 2t 3	IIIR2.2 IIIR2.3 IIIR1	P O W	PR 70%

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COMPETENCY/SKILL BASIC ELECTRICITY, BATTERY, CHARGING, STARTING	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Perform alternator output test with regulator disconnected	1rs 1p 1d 2t 3	IIIR2.3 IIIR1	P O	PR
Replace alternator bearings	1rs 2t 3		P	PR
Replace alternator brushes	1rs 2t 3		P	PR
Perform charging circuit voltage drop tests; determine needed repairs.	1rs 1d 2t 3	IIIR1 IIIR2.3	P O	PR
Analyze malfunctions in the charging system instrument circuits; repair or replace as needed.	1rs 1d 1p 2t 3	IIIR2.3	P O W	PR
Diagnose brighter than normal, intermittent, dim or no light operation.	1rs 1p 2t 3	IIIR1	P O	PR
Check and replace lighting system bulbs and sealed units	1rs 2t 3		P O	PR
Check fuses using a test light or ohmmeter	1rs 2t 3		P O	PR
Inspect, replace and aim headlights and bulbs.	2t 3		P	PR
Inspect and diagnose incorrect turn signal or hazard light operation; repair or replace as needed.	1rs 1p 1d 2t 3	IIIR1	P O	PR
Perform operational inspections of the lighting circuit	1d 2t 3	IIIR1	P O	PR
Diagnose incorrect horn operation; repair as needed.	1rs 1p 2t 3	IIIR1	P O	PR
Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; repair as needed.	1rs 1p 1d 2t 3	IIIR1	P O	PR

MATRIX -- TRADES & TECHNICAL EDUCATION

	COLORADO	COLORADO	ASSESS-	ACHIEVE-
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COMPETENCY/SKILL BASIC ELECTRICITY, BATTERY, CHARGING, STARTING	CORE MEASURE	CONTENT STANDARD (1313)	MENT METHOD	MENT LEVEL
Diagnose incorrect windshield washer operation; repair as needed.	1rs 1p1d 2t 3	IIIR1	P	PR
Diagnose intermittent, high, low or no gauge readings.	1rs 1d 2t 3	IIIR1	P	PR
Test gauge circuit voltage regulators (limiters); replace as needed.	1rs 1p1d 2t 3	IIIR1	P W	PR 70%
Inspect and test gauges and gauge sending units; replace as needed.	1rs 1d 2t 3	IIIR1	P W O	PR 70%
Inspect and test connectors, wires, and printed circuit boards of gauge circuits; instrument circuits; repair or replace as needed.	1rs 1d 2t 3	IIIR1	P W O	PR 70%
Diagnose incorrect operation of warning devices and other driver information systems.	1RS 1D 2T 3	IIIR2.1 IIIR2.2 IIIR2.3	P O	PR
Diagnose intermittent, high, low or no readings on electronic instrument clusters.	1rs 1d 1p 2t 3	IIIR2.1 IIIR2.2 IIIR2.3	P O	PR
Inspect and test sensors, sending units, connectors and wires of electronic	1rs 1d 2t 3		P W O	PR 70%
Diagnose incorrect operation of motor-driven accessory circuits; repair as needed.	1rs 1cr 1d 1p 2t 3	IIIR1	P W O	PR 70%
Diagnose incorrect heated glass operation; repair as needed.	1rs 1p12t 3	IIIR1	P O	PR 70%
Diagnose incorrect electric door and hatch/trunk lock operation; repair as needed.	1rs 1p 2t 3	IIIR1	P O	PR
Diagnose supplemental restraint system problems; repair as needed.	1rs 1cr 1p 1d 2t 3	IIIR1	P O	PR
Diagnose radio static and weak, intermittent or no radio reception.	1rs 1p 1d 2t 3	IIIR1	P O	PR

**CANON CITY HIGH SCHOOL VOCATIONAL AUTO MECHANICS
MATRIX -- TRADES & TECHNICAL EDUCATION**

	COLORADO	COLORADO	ASSESS-	ACHIEVE-
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COMPETENCY/SKILL ENGINE PERFORMANCE	CORE MEASURE	CONTENT STANDARD (1313)	MENT METHOD	MENT LEVEL
Interpret and verify complaint; determine needed repairs.	1rs 2is 1so 1p	IR5.5	W O	70%
Inspect engine assembly for fuel, oil, coolant and other leaks; determine needed repairs.	1rs 1p1d 2t 3	IIIR2.1	P W O	PR 70%
Diagnose unusual engine noise or vibration problems; determine needed repairs.	1rs 1cr 1p 1d3		P W O	PR 70%
Diagnose unusual exhaust color, odor and sound; determine needed action.	1rs 1p 1d 12t 3		P W O	PR 70%
Perform engine absolute (vacuum/boost) manifold pressure tests; determine needed repairs.	1rs 1p 1d 2t 3	IIIR1	P W O	PR 70%
Perform cylinder power balance test; determine needed action.	1rs 1p 1d 2t 3	IIIR1	P W O	PR 70%
Perform cylinder compression test; determine needed action.	1rs 1p 1d 2t 3	IIIR1	P W O	PR 70%
Perform cylinder leakage test; determine needed action.	1rs 1d 1p 2t 3	IIIR1	P W O	PR 70%
Diagnose engine mechanical, electrical, electronic, fuel and ignition problems with an oscilloscope and engine diagnostic equipment; determine needed repairs.	1rs 1d 1p 2t 3	IIIR1	P W O	PR 70%
Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test and obtain exhaust readings; interpret readings and determine needed action.	1rs 1d 1p 2t 3	IIIR1 IIIR2.1 IIIR2.2	P W O	PR 70%
Retrieve and record stored diagnostic trouble codes.	1rs 1p 1d 2t 3	IIIR1	P W O	PR 70%
Diagnose the causes of emissions or driveability problems resulting from failure of computerized engine controls with stored diagnostic trouble codes.	1p 1d 1rs 2t 3	IIIR1 IIIR6	P W O	PR 70%
Inspect, test, adjust and replace computerized engine control system sensors, powertrain control module, actuators and circuits.	1p 1d 1rs 2t 3	IIIR1	P W O	PR 70%

MATRIX -- TRADES & TECHNICAL EDUCATION

	COLORADO	COLORADO	ASSESS-	ACHIEVE-
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COMPETENCY/SKILL ENGINE PERFORMANCE	CORE MEASURE	CONTENT STANDARD (1313)	MENT METHOD	MENT LEVEL
Diagnose emissions or driveability problems resulting from failure of computerized engine controls with no diagnostic trouble codes stored; determine needed repairs.	1rs 1p 1d 2t 3	IIIR6 IIIR1	P W O	PR 70%
Obtain and interpret digital multimeter readings.	1rs 1p 1d 2t 3	IIIR5.2	P O	PR
Access and use electronic service information.	1rs 1d 2I 2t 3		P	PR
Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals.	1r 2t 3	IR5.5	P	PR
Inspect and test power and ground circuits and connections; service or replaces needed.	1rs 1p 1d 2t 3		P O	PR
Practice recommended precautions when handling static sensitive devices.	2t 3		P	PR
Diagnose driveability and emissions problems resulting from failures of interrelated systems (cruise control, security alarms, torque controls, suspension controls, traction controls, torque management, A/C, automatic transmissions and similar systems); determine needed repairs.	1rs 1p 1cr 2t 2I 3	IIIR1 IIIR6	P W O	PR 70%
Diagnose no-starting, driveability and emission problems on vehicles with electronic ignition (distributorless) systems; determine needed repairs.	1rs 1p 1cr 2t 2I 3	IIIR1 IIIR6	P W O	PR 70%
Diagnose no-starting , driveability, and emissions problems on vehicles with distributor ignition systems; determine needed repairs.	1rs 1p 1cr 2t 2I 3	IIIR1 IIIR6	P W O	PR 70%
Replace points	2t 3		P O	PR
Replace condenser	2t 3		P O	PR
Adjust dwell	1rs 2t 3	IIIR5.5	P O	PR
Check and adjust (where applicable) ignition system timing and timing advance/retard.	1rs 2t 3	IIIR5.5	P O	PR

MATRIX -- TRADES & TECHNICAL EDUCATION

	COLORADO	COLORADO	ASSESS-	ACHIEVE-
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COMPETENCY/SKILL ENGINE PERFORMANCE	CORE MEASURE	CONTENT STANDARD (1313)	MENT METHOD	MENT LEVEL
.Time distributor to engine	1rs 2t 3		P	PR
Test ignition switch	1rs 1d 1p 2t 3		PO	PR
Remove and replace ignition switch	2t 3		P	PR
Test and replace neutral safety switch	1rs1d1p2t 3	IIR1	P O	PR
Inspect and test primary circuit wiring and components; repair or replace as needed.	1rs 1d 1p 2t 3	IIR1	P O	PR
Inspect and test ignition wiring harness and connectors; replace as needed	1rs 1p1d 2t 3	IIR5.2	P O	PR
Measure resistance in spark plug wires	1rs 1p1d 2t 3	IIR5.2	P O	PR
Clean, gap, and inspect spark plugs	2t 3		P	PR
Inspect and test ignition secondary circuit wiring and components; replace as needed.	1rs 1p1d 2t 3	IVR1	P W O	PR 70%
Inspect and test distributor; service as needed	1rs 1p 1d 2t 3	IVR1	P W O	PR 70%
Inspect and test ignition coils; replace as needed.	1rs 1d 1p 2t 3	IVR1	P W O	PR 70%
Perform operational tests using oscilloscope and engine analyzer	1rs 1p 1d 2t 3	IVR1	P W O	PR 70%
Test electronic ignition components using ohmmeter	1rs 1p 1d 2t 3	IVR1	P W O	PR 70%

MATRIX -- TRADES & TECHNICAL EDUCATION

COMPETENCY/SKILL	COLORADO CORE	COLORADO CONTENT	ASSESS- MENT	ACHIEVE- MENT
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ENGINE PERFORMANCE	MEASURE	STANDARD (1313)	METHOD	LEVEL
Inspect and test ignition control module; replace as needed.	1rs 1p 1d 2t 3	IIIR1	P W O	PR 70%
Replace components and rebuild electronic ignition distributor	1rs 1d 1p 2t 3		P W O	PR 70%
Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling poor mileage, dieseling and emission problems on vehicles with carburetor-type fuel systems; determine needed action.	1rs 1p 1d 1cr 2t 3	IIIR6 IIIR1	P W O	PR 70%
Diagnose hot or cold no-starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emission problems on vehicles with injection-type fuel systems; determine needed action.	1rs 1p 1d 1cr 2t 3	IIIR6 IIIR1	P W O	PR 70%
Properly remove and store fuel	2t 3		P	PR
Check fuel for contaminants and quality.	1rs 1p 2t 3	IIIR2.1	P O	PR
Remove and replace fuel tank	2t 3		P	PR
Test fuel gauge and sending unit	1rs 1p1d 2t 3		P O	PR
Inspect and test mechanical and electrical fuel pumps and pump control systems; replace as needed.	1rs 1d 1p 2t 3	IIIR1	P O	PR
Remove and replace fuel pump (mechanical and electrical)	2t 3		P	PR
Inspect fuel tank and fuel cap; inspect and replace fuel lines, fittings and hoses	1rs 1d 1p 2t 3		P O	PR
Remove and replace carburetors	1rs 1d 1p 2t 3		P O	PR
Disassemble, clean and inspect carburetor	1rs 1d 1p 2t 3		P O	PR

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COMPETENCY/SKILL ENGINE PERFORMANCE	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL

		(1313)		
Remove and replace needle and seat, adjust float	1rs 2t 3		P	PR
Reassemble carburetor and adjust	1rs 1p 1d 2t 3		P W O	PR 70%
Adjust chokes and linkages	2t 3		P O	PR
Inspect and service air cleaners	2t 3		PO	PR
Service or replace manifold heat control valves	2t 3		PO	PR
Clean or replace fuel filter units	2t 3		PO	PR
Perform carburetor final adjustments on engine	1rs 1d 1p 2t 3		P O	PR
Inspect and test fuel pressure regulation system and components of injection-type fuel systems; adjust or replace as needed.	1rs 1d 1p 2t 3	IIIR1	P W O	PR 70%
Inspect and test cold enrichment system components; adjust or replace as needed.	1rs 1d 1p 2t 3	IIIR1	P W O	PR 70%
Test and service throttle body injections	1rs 1d 1p 2t 3	IIIR1	P W O	PR 70%
Remove, clean, and reinstall throttle body; adjust related linkages.	1rs 2t 3		P	PR
Remove, clean, and reinstall throttle body; adjust related linkages.	1rs 2t 3		P	PR
Inspect and test fuel injectors; clean and replace.	1rs 2t 3		P	PR

MATRIX -- TRADES & TECHNICAL EDUCATION

COMPETENCY/SKILL ENGINE PERFORMANCE	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
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Inspect throttle body mounting plates, air induction and filtration system, intake manifold, and gaskets; clean or replace as needed.	1rs 1p 1d 2t 3		P O	PR
Test and service multi-port injection systems	1rs 1cr 1p 1d 2t 2I 3	IIIR1 IIIR6	P W O	PR 70%
Check/adjust idle speed and fuel mixture where applicable.	1rs 1d 2t 3		P O	PR
Remove, inspect, and test vacuum and electrical components and connections of fuel system; repair or replace as needed.	1rs 1p 1d 2t 3	IIIR2.2 IIIR6	P W O	PR 70%
Inspect exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, and heat shields; repair or replace as needed.	1rs 1p 1d 2t 3		P	PR
Perform exhaust system back-pressure test; determine needed action.	1rs 1p 1d 2t 3		P	PR
Test the operation of turbocharger/supercharger systems; determine needed action.	1rs 1p 1d 2t 3		P W O	PR 70%
Remove, clean, inspect, and repair or replace turbocharger/supercharger system components.	2t 3		P	PR
Identify the causes of turbocharger/supercharger failure; determine needed action	1rs 1p 1d 2t 3		P W O	PR 70%
Diagnose oil leaks, emissions, and driveability problems resulting from failure of the positive crankcase ventilation system.	1rs 1p 1d 2t 3	IIIR1 IIIR6	P W O	PR 70%
Inspect and test positive crankcase ventilation filter/breather cap, valve, tubes, orifices, and hoses; service or replace as needed.	1rs 1p 1d 2t 3	IIIR1 IIIR6	P W O	PR 70%
Diagnose emissions and driveability problems caused by failure of the exhaust gas Recirculation system.	1rs 1p 1d 2t 3	IIIR1 IIIR6	P W O	PR 70%
Inspect and test EGR valve, valve manifold, and exhaust passages of exhaust gas Recirculation systems; service or replace as needed.	1rs 1p 1d 2t 3	IIIR1 IIIR6	P W O	PR 70%

MATRIX -- TRADES & TECHNICAL EDUCATION

COMPETENCY/SKILL ENGINE PERFORMANCE	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Inspect and test vacuum/pressure controls, filters, and hoses of exhaust gas	1rs 1d 1p 2t	IIIR6 IIIR2.1	P W O	PR

Recirculation systems; service or replace as needed.	2I 3			70%
Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas Recirculation systems; repair or replace as needed.	1rs 1d 1p 2t 2I 3	IIR2.1 IIR2.2 IIR2.3	P W O	PR 70%
Diagnose emissions and driveability problems resulting from failure of the secondary air injection and catalytic converter systems.	1rs 1d 1p 2t 2I 3	IIR6 IIR2.3	P W O	PR 70%
Inspect and test mechanical components of secondary air injection systems; service or replace as needed.	1rs 1d 1p 2t 2I 3		P W O	PR 70%
Inspect and test components of catalytic converter systems; replace as needed.	1rs1d1p2t2i3	IIR6 IIR2.1	P W O	PR 70%
Diagnose emissions and driveability problems resulting from failure of the air intake temperature control system.	1rs 1d 1p 2t 2I 3	IIR6 IIR5.4	P W O	PR 70%
Inspect and test components of intake air temperature control system; replace as needed.	1rs 1d 1p 2t 2I 3	IIR6 IIR5.4	P W O	PR 70%
Diagnose emissions and driveability problems resulting from failure of early fuel evaporative control systems.	1rs 1d 1p 2t 2I 3	IIR6 IIR2.1	P W O	PR 70%
Inspect and test components of early fuel evaporation control systems; service or replace as needed.	1rs 1d 1p 2t 2I 3	IIR6 IIR2.1	P W O	PR 70%
Diagnose emissions and driveability problems resulting from failure of evaporative emission control systems.	1rs 1d 1p 2t 2I 3	IIR6 IIR2.1	P W O	PR 70%
Inspect and test components and hoses of evaporative emissions control system; replace as needed.	1rs 1d 1p 2t 2I 3	IIR6 IIR2.1	P W O	PR 70%
Adjust valves on engines with mechanical or hydraulic lifters.	1rs 1d 2t 3		P	PR
Verify correct camshaft timing; determine needed action.	1rs 1d 2t 3		P	PR

MATRIX -- TRADES & TECHNICAL EDUCATION

COMPETENCY/SKILL	COLORADO CORE MEASURE	COLORADO CONTENT STANDARD (1313)	ASSESS- MENT METHOD	ACHIEVE- MENT LEVEL
Verify engine operating temperature; determine needed action.	1rs 1d 2t 3	IIR5.4	P W O	PR 70%
Perform cooling system pressure tests, check coolant condition; inspect and test	1rs 1d 1p 2t 3	IIR5.3	P W O	PR 70%

radiator, pressure cap, coolant recovery tank, and hoses; service or replace as needed.		IIIR5.2		
Inspect and test thermostat, by-pass, and housing; replace as needed.	1rs 1d 1p 2t 3		P W O	PR 70%
Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; service or replace as needed.	1rs 1d 1p 2t 3		P W O	PR 70%
Analyze exhaust emissions	1rs 1cr 1p 1d 2I 2t 3	IIIR6 IIIR2.1 IIIR2.2	P W O	PR 70%
Test and replace sensors and sensor circuits	1rs 1cr 1p 1d 2I 2t 3		P W O	PR 70%
Perform CO method carburetor adjustment	1rs 1d 2t 3		P O	PR
Perform propane enrichment adjustment	1rs 1d 2t 3		P O	PR
Perform lean drop adjustment	1rs 1d 2t 3		P O	PR