







Unit/Standard Number	 <p style="text-align: center;">pennsylvania DEPARTMENT OF EDUCATION</p> <p style="text-align: center;"><u>High School Graduation Years 2013, 2014 and 2015</u></p> <p style="text-align: center;">Automobile/Automotive Mechanics Technology/Technician CIP 47.0604 Task Grid</p>	<p style="text-align: center;">Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level</p>
	Secondary Competency Task List	
100	ORIENTATION	
101	Explain and follow all lab rules.	
102	Participate in basic shop management.	
103	Participate in parts ordering.	
104	Demonstrate auto shop safety and hygiene.	
105	Demonstrate the use of service information.	
106	Demonstrate proper telephone courtesy.	
107	Identify vehicle by: sight, V.I.N. and/or ID tag.	
108	Identify career paths within the career and technical education program.	
200	SAFETY	
201	Identify and follow all safety rules.	
202	Demonstrate the ability to secure vehicles on jack stands and hydraulic lifts.	
203	Demonstrate the ability to safely set-up/shut-down oxygen acetylene welding equipment.	
204	Identify chemical safety, "Right-To-Know Laws" and Materials Safety Data Sheets (MSDS).	
205	Identify and demonstrate the safe use of hand tools.	
206	Identify and demonstrate the safe use of power tools.	
207	Identify and demonstrate the safe use of protective clothing and equipment.	
208	Identify and demonstrate the safe use of fire protection equipment.	
209	Identify and demonstrate the safe use of shop equipment.	
210	Explain EPA and OSHA Regulations.	
300	TOOLS/FASTENERS	
301	Identify and use fasteners and bolts.	
302	Demonstrate the ability to correctly drill and use re-threading tools.	
303	Demonstrate the ability to correctly read and interpret precision automotive measuring tools.	
304	Demonstrate the ability to correctly use automotive tools.	
305	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	
400	CERTIFICATIONS	


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401	Prepare to obtain PA Safety Inspection Certification.	
402	Prepare to obtain EPA 609 Refrigerant Recovery, Recycling Certification.	
403	Prepare to obtain Emission Inspection Certification.	
500	SUSPENSION AND STEERING	
501	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
502	Identify and interpret suspension and steering system concerns; determine necessary action.	
503	Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins.	
504	Locate and interpret vehicle and major component identification numbers.	
505	Disable and enable supplemental restraint system (SRS).	
506	Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).	
507	Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets.	
508	Inspect and replace rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.	
509	Determine proper power steering fluid type; inspect fluid level and condition.	
510	Flush, fill, and bleed power steering system.	
511	Diagnose power steering fluid leakage; determine necessary action.	
512	Remove, inspect, replace, and adjust power steering pump belt.	
513	Remove and reinstall power steering pump.	
514	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	
515	Inspect and replace power steering hoses and fittings.	
516	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	
517	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.	
518	Inspect and test electric power assist steering.	
519	Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers.	
520	Remove, inspect and install strut rods and bushings.	
521	Remove, inspect, and install upper and/or lower ball joints.	
522	Remove, inspect, and install steering knuckle assemblies.	
523	Remove, inspect, and install short and long arm suspension system coil springs and spring insulators.	
524	Remove, inspect, install, and adjust suspension system torsion bars; inspect mounts.	
525	Remove, inspect, and install stabilizer bar bushings, brackets, and links.	
526	Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.	


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527	Inspect, remove, and replace shock absorbers.	
528	Remove, inspect, and service or replace front and rear wheel bearings.	
529	Lubricate suspension and steering systems.	
530	Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.	
531	Prepare vehicle for wheel alignment on the alignment machine; perform four wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel.	
532	Check SAI (steering axis inclination) and included angle; determine necessary action.	
533	Check rear wheel thrust angle; determine necessary action.	
534	Check for front wheel setback; determine necessary action.	
535	Check front and/or rear cradle (subframe) alignment; determine necessary action.	
536	Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action.	
537	Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	
538	Rotate tires according to manufacturer's recommendations.	
539	Measure wheel, tire, axle flange, and hub runout; determine necessary action.	
540	Diagnose tire pull problems; determine necessary action.	
541	Dismount, inspect, and remount tire on wheel; Balance wheel and tire assembly (static and dynamic).	
542	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	
543	Reinstall wheel; torque lug nuts.	
544	Inspect tire and wheel assembly for air loss; perform necessary action.	
545	Repair tire using internal patch.	
600	BRAKES	
601	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
602	Identify and interpret brake system concern; determine necessary action.	
603	Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.	
604	Locate and interpret vehicle and major component identification numbers.	
605	Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	
606	Check master cylinder for internal/external leaks and proper operation; determine necessary action.	
607	Remove, bench bleed, and reinstall master cylinder.	
608	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.	

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609	Replace brake lines, hoses, fittings, and supports.	
610	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	
611	Select, handle, store, and fill brake fluids to proper level.	
612	Inspect, test, and/or replace components of brake warning light system.	
613	Bleed and/or flush brake system.	
614	Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	
615	Remove, clean, inspect, and measure brake drums; determine necessary action.	
616	Refinish brake drum; measure final drum diameter.	
617	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	
618	Inspect and install wheel cylinders.	
619	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings.	
620	Install wheel, torque lug nuts, and make final checks and adjustments.	
621	Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.	
622	Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action.	
623	Clean and inspect caliper mounting and slides/pins for operation, wear, and damage; determine necessary action.	
624	Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	
625	Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action.	
626	Remove and reinstall rotor.	
627	Refinish rotor on vehicle; measure final rotor thickness.	
628	Refinish rotor off vehicle; measure final rotor thickness.	
629	Install wheel, torque lug nuts, and make final checks and adjustments.	
630	Check brake pad wear indicator system operation; determine necessary action.	
631	Test pedal free travel; check power assist operation.	
632	Check vacuum supply to vacuum-type power booster.	
633	Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.	
634	Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	
635	Check parking brake and indicator light system operation; determine necessary action.	
636	Check operation of brake stop light system; determine necessary action.	
637	Replace wheel bearing and race.	
638	Inspect and replace wheel studs.	
639	Remove and reinstall sealed wheel bearing assembly.	
640	Identify and inspect electronic brake control system components; determine necessary action.	

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641	Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.	
642	Depressurize high-pressure components of the electronic brake control system.	
643	Bleed the electronic brake control system hydraulic circuits.	
644	Identify traction control/vehicle stability control system components.	
700	ELECTRICAL/ELECTRONIC SYSTEMS	
701	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
702	Identify and interpret electrical/electronic system concern; determine necessary action.	
703	Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.	
704	Locate and interpret vehicle and major component identification numbers.	
705	Use wiring diagrams during diagnosis of electrical circuit problems.	
706	Check electrical circuits with a test light; determine necessary action.	
707	Check electrical circuits using fused jumper wires; determine necessary action.	
708	Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.	
709	Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action.	
710	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	
711	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.	
712	Remove and replace terminal end from connector; replace connectors and terminal ends.	
713	Repair wiring harness (including CAN/BUS systems).	
714	Perform solder repair of electrical wiring.	
715	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.	
716	Perform battery state-of-charge test; determine necessary action.	
717	Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action.	
718	Maintain or restore electronic memory functions.	
719	Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs.	
720	Perform battery charge.	
721	Start a vehicle using jumper cables or an auxiliary power supply.	
722	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	

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723	Perform starter current draw tests; determine necessary action.	
724	Perform starter circuit voltage drop tests; determine necessary action.	
725	Inspect and test starter relays and solenoids; determine necessary action.	
726	Remove and install starter in a vehicle.	
727	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	
728	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	
729	Perform charging system output test; determine necessary action.	
730	Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.	
731	Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment.	
732	Remove, inspect, and install generator (alternator).	
733	Perform charging circuit voltage drop tests; determine necessary action.	
734	Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.	
735	Inspect, replace, and aim headlights and bulbs.	
736	Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.	
737	Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.	
738	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.	
739	Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.	
740	Diagnose incorrect horn operation; perform necessary action.	
741	Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	
742	Diagnose incorrect washer operation; perform necessary action.	
743	Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action.	
745	Disarm and enable the airbag system for vehicle service.	
746	Remove and reinstall door panel.	
800	ENGINE PERFORMANCE	
801	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
802	Identify and interpret engine performance concern; determine necessary action.	
803	Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins.	
804	Locate and interpret vehicle and major component identification numbers.	
805	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	
806	Diagnose abnormal engine noise or vibration concerns; determine necessary action.	

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807	Diagnose abnormal exhaust color, odor, and sound; determine necessary action.	
808	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	
809	Perform cylinder power balance test; determine necessary action.	
810	Perform cylinder cranking and running compression tests; determine necessary action.	
811	Perform cylinder leakage test; determine necessary action.	
812	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	
813	Verify engine operating temperature; determine necessary action.	
814	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	
815	Verify correct camshaft timing.	
816	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	
817	Diagnose the causes of emissions or drivability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	
818	Access and use service information to perform step-by-step diagnosis.	
819	Perform active tests of actuators using a scan tool; determine necessary action.	
820	Describe the importance of running all OBDII monitors for repair verification.	
821	Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor drivability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action.	
822	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	
823	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	
824	Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	
825	Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	
826	Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	
827	Replace fuel filters.	
828	Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmeasured air.	
829	Inspect and test fuel injectors.	
830	Verify idle control operation.	
831	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action.	
832	Diagnose oil leaks, emissions, and drivability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.	

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833	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	
834	Diagnose emissions and drivability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.	
835	Inspect, test, service and replace components of the EGR system, including EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	
836	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.	
837	Inspect and test mechanical components of secondary air injection systems; perform necessary action.	
838	Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	
839	Inspect and test catalytic converter efficiency.	
840	Diagnose emissions and drivability concerns caused by the evaporative emissions control system; determine necessary action.	
841	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	
842	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	
843	Remove and replace timing belt; verify correct camshaft timing.	
844	Remove and replace thermostat and gasket/seal.	
845	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	
846	Perform engine oil and filter change.	