PLANNED INSTRUCTION

#### **COURSE DESCRIPTION**

Course Title:Automotive TechnologyCourse Number:00902 (AM)00952 (PM)Course Prerequisites:Student must have earned at least 6 credits as a sophomore and/or 12 credits as a junior to be enrolled in the Automotive Technology program.

**Course Description:** 47.0604 AUTOMOBILE/AUTOMOTIVE MECHANICS TECHNOLOGY/TECHNICIAN An instructional program that prepares individuals to apply technical knowledge and skills to engage in the servicing and maintenance of all types of automobiles and light trucks. This program includes instruction in the diagnosis and testing, including computer analysis of malfunctions in and repair of engines, fuel, electrical, cooling and brake systems, drive train and suspensions. Instruction is also given in the adjustment and repair of individual components and systems such as cooling systems, drivetrains, fuel system components and air conditioning, and includes the use of technical repair information.

 Suggested Grade Level: Grades 10-12

 Length of Course:
 Two Semesters

 Units of Credit:
 3 elective credits per year (up to 9 credits). Choose an item.

 PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:

 #13: Emergency Certification
 #66 Vocational Instructional & Vocational Intern Certificate

 #7 Level II (Permanent Certification)
 Automotive Technician 2575

 To find the CSPG information, go to CSPG

 Certification verified by the WCSD Human Resources Department:
 ⊠ Yes

# WCSD STUDENT DATA SYSTEM INFORMATION

| Course Level: | Academic              |                               |                              |
|---------------|-----------------------|-------------------------------|------------------------------|
| Mark Types:   | Check all that apply. |                               |                              |
|               | □F – Final Average    | ⊠MP – Marking Period          | 🖾 EXM – Final Exam           |
| GPA Type:     | GPAEL-GPA Elementary  | GPAML-GPA for Middle Level    | 🛛 NHS-National Honor Society |
|               | UGPA-Non-Weighted Gr  | ade Point Average 🛛 GPA-Weigh | ited Grade Point Average     |

**State Course Code:** Click or tap here to enter text.

To find the State Course Code, go to <u>State Course Code</u>, download the Excel file for *SCED*, click on SCED 6.0 tab, and choose the correct code that corresponds with the course.

#### PLANNED INSTRUCTION

#### **TEXTBOOKS AND SUPPLEMENTAL MATERIALS**

#### Board Approved Textbooks, Software, and Materials:

Title:Fundamentals of Automotive Technology: CDX Learning Systems – 3<sup>rd</sup> EdPublisher:Jones and BartletISBN #:9781284230352Copyright Date:2021WCSD Board Approval Date:Image: Image: Ima

**Supplemental Materials:** Fundamentals of Automotive Technology: CDX Learning Systems – 3<sup>rd</sup> Ed. Workbook - ISBN # 9781284265873

#### **Curriculum Document**

| WCSD Board Approval: |                               |
|----------------------|-------------------------------|
| Date Finalized:      | Click or tap to enter a date. |
| Date Approved:       | Click or tap to enter a date. |
| Implementation Year: | 2023-2024                     |

### **SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS**

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

PLANNED INSTRUCTION

# SCOPE AND SEQUENCE OF CONTENT AND CONCEPTS

# Standards/Eligible Content and Skills

| Performance Indicator  | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|--|--|----------------|
| Justify the selection of a career.   | 13.1.11D                                       | 2              |
| Analyze and evaluate complex technical tasks using sophisticated processes.  | 13.2.11B                                       | 2              |
| Identify sources of health, safety and regulatory practices and their effect on the work environment.                          | 13.2.11D                                       | 2              |
| Analyze Performance-based assessments components.  | 13.2.11F                                       | 2              |
| Analyze the need for manipulative/motor skills.  | 13.2.11G                                       | 2              |
| Analyze work habits needed to advance within a career.   | 13.3.11A                                       | 2              |
| Discriminate among the concepts of systems, subsystems, feedback and control in solving technological problems.                | 3.1.10A  | 1              |
| Describe patterns of change in nature, physical and manmade systems.   | 3.1.10E  | 1              |
| Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.   | 3.7.10A  | 1              |
| Apply appropriate instruments and apparatus to examine a variety of objects and processes.                                     | 3.7.10B  | 1              |
| Utilize computer software to solve specific problems.  | 3.7.10D  | 1              |
| Apply advanced tools, materials and techniques to answer complex questions.  | 3.7.12A  | 3              |
| Evaluate appropriate instruments and apparatus to accurately measure materials and processes.                                  | 3.7.12B  | 3              |
| Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations. | 2.3.11A  | 2              |
| Demonstrate the ability to produce measures with specified levels of precision.  | 2.3.11C  | 2              |
| Present mathematical procedures and results clearly, systematically, succinctly and correctly.                                 | 2.5.11C  | 2              |
| Locate various texts, media and traditional resources for assigned and independent projects before reading.                    | 1.1.11A  | 2              |
| Read and understand essential content of informational texts and documents in all academic areas.                              | 1.2.11A  | 2              |
| Maintain a written record of activities, course work, experience, honors and interests.  | 1.4.11D  | 2              |
| Write a personal resume.   | 1.4.11E  | 2              |
| Listen to others.  | 1.6.11A  | 2              |

| Performance Indicator   | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|---|--|----------------|
| 100 Orientation   |  |                |
| Explain and follow all lab rules  | 101  | 1,2,3          |
| Participate in basic shop management.   | 102  | 1,2,3          |
| Participate in parts ordering.  | 103  | 1,2,3          |
| Demonstrate auto shop safety and hygiene.   | 104  | 1,2,3          |
| Demonstrate the use of service information.   | 105  | 1,2,3          |
| Identify proper telephone courtesy  | 106  | 1,2,3          |
| Identify a vehicle by sight, vehicle identification number (VIN) and ID tag.  | 107  | 1,2,3          |
| Identify career paths within the automotive technology profession.  | 108  | 1,2,3          |
| Complete a work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. | 109  | 1,2,3          |
| Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.                       | 110  | 1,2,3          |
| Locate and interpret vehicle and major component identification numbers.  | 111  | 1,2,3          |
| 200 Safety  |  |                |
| Identify and follow all safety rules.   | 201  | 1,2,3          |
| Demonstrate the ability to secure vehicles on jack stands and hydraulic lifts.  | 202  | 1,2,3          |
| Demonstrate the ability to set-up/shut-down oxygen acetylene welding equipment.   | 203  | 1,2,3          |
| Identify chemical safety, Right-To-Know laws and Safety Data Sheets (SDS).  | 204  | 1,2,3          |
| Identify and use hand tools.  | 205  | 1,2,3          |
| Identify and use power tools.   | 206  | 1,2,3          |
| Wear personal protective equipment (PPE).   | 207  | 1,2,3          |
| Follow guidelines for use of fire protection equipment.   | 208  | 1,2,3          |
| RESERVED  | 209  |                |
| Follow EPA and OSHA regulations.  | 210  | 1,2,3          |
| 300 Tools/Fasteners   |  |                |
| Identify and use fasteners and bolts.   | 301  | 1,2,3          |
|   |  | 1 1.2          |

| Read and interpret precision automotive measuring tools.3032,3Identify and use automotive specialty tools.304904Perform common fastener and thread repairs, including remove<br>broken bolt, restore internal and external threads, and repair internal<br>threads with a threaded insert.3052,3 <b>400 Certifications</b> 4012,3Prepare to obtain EPA 609 Refrigerant Recovery and Recycling<br>Certification.4022,3Prepare to obtain EPA 609 Refrigerant Recovery and Recycling<br>Certification.4032,3Prepare to obtain EPA 609 Refrigerant Recovery and Recycling<br>Certification.2,32,3Prepare to obtain EPA 609 Refrigerant Recovery and Recycling<br>Certification.2,32,3Prepare for SP/2 certifications12,3 <b>500 Suspension and Steering</b><br>RESERVED5012,3RESERVED5011RESERVED5032,3RESERVED5042,3RESERVED5042,3RESERVED5052,3Inspect rack and pinion steering gear and mounting bushings and<br>brackets.5072,3Inspect rack and pinion steering gear inner tie rod ends (sockets) and<br>bellows boots.5082,3Determine proper power steering fluid type and inspect fluid level<br>and condition.5102,3Flush, fill, and bleed power steering pump.5132,3ResterVED5122,3Remove and reinstall power steering pump.5132,3ResterVED5122,3Remove and reinstall power steering   | Performance Indicator   | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|--|---|--|----------------|
| Perform common fastener and thread repairs, including remove<br>broken bolt, restore internal and external threads, and repair internal3052,3 <b>400 Certifications</b> 4012,3Prepare to obtain PA Safety Inspection Certification.4012,3Prepare to obtain EPA 609 Refrigerant Recovery and Recycling<br>Certification.4032,3Prepare to obtain EPA 609 Refrigerant Recovery and Recycling<br>Certification.4032,3Prepare to obtain EPA 609 Refrigerant Recovery and Recycling<br>Certification.11Prepare for ASE certifications2,32,3Prepare for ASE certifications2,31Prepare for SP/2 certifications1,2,3 <b>500 Suspension and Steering</b> 5011RESERVED5011Identify and interpret suspension and steering system concerns and<br>determine necessary actions.5022,3RESERVED504RESERVEDInspect rack and pinion steering gear and mounting bushings and<br>brackets.5072,3Inspect rack and pinion steering gear inner tie rod ends (sockets) and<br>bellows boots.5082,3Diagnose power steering fluid type and inspect fluid level<br>and condition.5102,3Diagnose power steering fluid leakage and determine necessary<br>actions.5112,3RESERVED51222Remove and reinstall prover steering pump.5132,3Inspect and replace power steering hoses and fittings.5152,3Inspect and replace power steering hoses and fittings.5162,3 <td< td=""><td>Read and interpret precision automotive measuring tools.</td><td>303</td><td>2,3</td></td<>  | Read and interpret precision automotive measuring tools.                  | 303  | 2,3            |
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| broken bolt, restore internal and external threads, and repair internal<br>threads with a threaded insert.  400 Certifications Prepare to obtain PA Safety Inspection Certification. 401 2,3 Prepare to obtain EPA 609 Refrigerant Recovery and Recycling<br>certification. 402 2,3 Prepare to obtain Emission Inspection Certification. 403 2,3 Prepare to obtain Emission Inspection Certification. 403 2,3 Prepare for SSHA 10 hr. Certifications Prepare for SSP/2 certifications Prepare for SP/2 certifications 500 Suspension and Steering 500 Suspension and Steering 500 Suspension and Steering 500 Suspension and Steering system concerns and determine necessary actions. RESERVED 503 RESERVED 504 RESERVED 505 RESERVED 505 RESERVED 506 Inspect rack and pinion steering gear and mounting bushings and bellows boots. Determine proper power steering fluid type and inspect fluid level and condition. Flush, fill, and bleed power steering system. 510 2,3 Preser steering fluid type and inspect fluid level and condition. Flush, fill, and bleed power steering pump. RESERVED 512 Remove and reinstall proses fit power steering pump pulley and check pulley and heil alignment. Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.   | Perform common fastener and thread repairs, including remove              | 305  | 2,3            |
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| Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps. 2,3  |   | 516  |                |
|  | Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and | 517  | 2,3            |
|  | RESERVED  | 518  |                |

| Performance Indicator  | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|--|--|----------------|
| Inspect, and replace upper and lower control arms, bushings, shafts, and rebound bumpers.                                  | 519  | 2,3            |
| Inspect and replace strut rods and bushings.   | 520  | 2,3            |
| Inspect and replace upper and lower ball joints.   | 521  | 2,3            |
| Inspect and replace steering knuckle assemblies.   | 522  | 2,3            |
| Inspect and replace short and long arm suspension system coil springs and spring insulators.                               | 523  | 2,3            |
| Inspect, replace, and adjust suspension system torsion bars and inspect mounts.  | 524  | 2,3            |
| Inspect and replace stabilizer bar bushings, brackets, and links.  | 525  | 2,3            |
| Inspect and replace strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount. | 526  | 2,3            |
| Inspect, remove, and replace shock absorbers.  | 527  | 2,3            |
| RESERVED   | 528  |                |
| Lubricate suspension and steering systems.   | 529  | 1,2,3          |
| Perform pre-alignment inspection and measure vehicle ride height and; perform necessary actions.                           | 530  | 2,3            |
| Perform four-wheel alignment.  | 531  | 2,3            |
| RESERVED   | 532  | ,              |
| RESERVED   | 533  |                |
| RESERVED   | 534  |                |
| Check front and rear cradle (subframe) alignment.  | 535  | 2,3            |
| Inspect tire condition, identify tire wear patterns, and check and adjust air pressure.                                    | 536  | 1,2,3          |
| Diagnose wheel/tire vibration, shimmy, and noise.  | 537  | 1,2,3          |
| Rotate tires according to manufacturer's recommendations.  | 538  | 1,2,3          |
| Measure wheel, tire, axle flange, and hub runout.  | 539  | 2,3            |
| RESERVED   | 540  | 2,0            |
| Dismount, inspect, and remount tire on wheel and balance wheel and tire assembly (static and dynamic).                     | 541  | 1,2,3          |
| Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.                         | 542  | 1,2,3          |
| RESERVED   | 543  |                |
| Inspect tire and wheel assembly for air loss.  | 544  | 1,2,3          |
| Repair tire using internal patch.  | 545  | 1,2,3          |
| Identify indirect and direct tire pressure monitoring systems (TPMS),  |  | 2,3            |
| calibrate system, and verify operation of instrument panel lamps.  | 546  |                |
| Identify steps required to remove and replace sensors in a tire  | 547  | 2,3            |
| pressure monitoring system (TPMS) including relearn procedure.   |  |                |
| Identify the need for reset procedures post wheel alignment.   | 548  | 2,3            |
| 600 Brakes   |  |                |
| RESERVED   | 601  |                |
|  | 001  |                |

| Performance Indicator   | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|---|--|----------------|
| Identify and interpret brake system concerns.   | 602  | 2,3            |
| RESERVED  | 603  |                |
| RESERVED  | 604  |                |
| Measure brake pedal height, travel, and free play as applicable.  | 605  | 2,3            |
| Check master cylinder for internal/external leaks and proper operation.   | 606  | 2,3            |
| Remove, bench bleed, and reinstall master cylinder.   | 607  | 2,3            |
| Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks,  |  | 2,3            |
| rust, cracks, bulging or wear; tighten loose fittings and supports; and determine necessary actions.              | 608  | 2,3            |
| Replace brake lines, hoses, fittings, and supports.   | 609  | 2,3            |
| Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).                  | 610  | 2,3            |
| Select, handle, store, and test brake fluid for contamination and fill to proper level.                           | 611  | 2,3            |
| Inspect, test, and replace components of brake warning light system.  | 612  | 2,3            |
| Bleed and flush brake system.   | 613  | 2,3            |
| Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging, or pedal pulsation concerns.               | 614  | 2,3            |
| Remove, clean, inspect, and measure brake drums.  | 615  | 2,3            |
| Refinish brake drum and measure final drum diameter.  | 616  | 2,3            |
| Remove, clean, and inspect brake shoes, springs, pins, clips, levers,   | 010  | 2,3            |
| adjusters/self-adjusters, other related brake hardware, and backing support plates then lubricate and reassemble. | 617  | 2,5            |
| Inspect and install wheel cylinders.  | 618  | 2,3            |
| Pre-adjust brake shoes and parking brake, install brake drums or drum/hub assemblies, and wheel bearings.         | 619  | 1,2,3          |
| Install wheel, torque lug nuts, and make final checks and adjustments.  | 620  | 1,2,3          |
| RESERVED  | 621  |                |
| Remove caliper assembly, inspect for leaks, and damage to caliper housing.  | 622  | 1,2,3          |
| Clean and inspect caliper mounting and slides/pins for operation,<br>wear, and damage.                            | 623  | 1,2,3          |
| Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads; and inspect for leaks.       | 624  | 1,2,3          |
| Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation.                             | 625  | 1,2,3          |
| Remove and reinstall rotor.   | 626  | 1,2,3          |
| Refinish rotor on vehicle and measure final rotor thickness.  | 627  | 1,2,3          |
| Refinish rotor off vehicle and measure final rotor thickness.   | 628  | 1,2,3          |
| RESERVED  | 629  | 1,2,5          |
| Check brake pad wear indicator system operation.  | 630  | 1,2,3          |

| Performance Indicator   | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|---|--|----------------|
| RESERVED  | 631  |                |
| Check vacuum supply to vacuum-type power booster and check power assist operation.  | 632  | 1,2,3          |
| Remove, clean, inspect, repack, and install wheel bearings, RACES and replace seals; install hub; and adjust bearings.  | 633  | 1,2,3          |
| Check parking brake cables and components including integral parking brake system for wear, binding, and corrosion then clean, lubricate, adjust, or replace as needed. | 634  | 1,2,3          |
| Check parking brake and indicator light system operation.   | 635  | 1,2,3          |
| Check operation of brake stop light system.   | 636  | 1,2,3          |
| RESERVED  | 637  |                |
| Inspect and replace wheel studs.  | 638  | 2,3            |
| Remove and reinstall sealed wheel bearing assembly.   | 639  | 2,3            |
| Identify and inspect electronic brake control system components.  | 640  | 2,3            |
| Diagnose electronic brake control system, electronic control(s), and components by retrieving diagnostic trouble codes and using recommended test equipment.            | 641  | 3              |
| RESERVED  | 642  |                |
| Bleed the electronic brake control system hydraulic circuits.   | 643  | 3              |
| Identify traction control/vehicle stability control system components.  | 644  | 2,3            |
| Describe the operation of a regenerative braking system   | 645  | 3              |
| 700 Electrical/Electronic Systems   |  |                |
| RESERVED  | 701  |                |
| Identify and interpret electrical/electronic system concerns.   | 702  | 2,3            |
| RESERVED  | 703  |                |
| RESERVED  | 704  |                |
| Use wiring diagrams during diagnosis of electrical circuit problems.  | 705  | 2,3            |
| Check electrical circuits with a test light.  | 706  | 2,3            |
| Check electrical circuits using fused jumper wires.   | 707  | 2,3            |
| Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits.   | 708  | 2,3            |
| Measure and diagnose the cause(s) of excessive parasitic draw.  | 709  | 2,3            |
| Inspect and test fusible links, circuit breakers, and fuses.  | 710  | 2,3            |
| Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits.   | 711  | 3              |
| Remove and replace terminal end from connector, replace connectors, and terminal ends.  | 712  | 2,3            |
| Repair wiring harness and solder repair.  | 713  | 2,3            |
| RESERVED  | 714  | -,-            |
| Identify location of electric hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.   | 715  | 3              |

| Performance Indicator  | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|--|--|----------------|
| Perform battery state-of-charge test.  | 716  | 1,2,3          |
| Perform battery capacity test and confirm proper battery capacity for vehicle application.   | 717  | 1,2,3          |
| Maintain and restore electronic memory functions.  | 718  | 2,3            |
| Inspect, clean, fill, and replace battery, battery cables, connectors, clamps, and hold-downs.   | 719  | 2,3            |
| Perform battery charge.  | 720  | 1,2,3          |
| Start a vehicle using jumper cables or an auxiliary power supply.  | 721  | 1,2,3          |
| Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect. | 722  | 2,3            |
| Perform starter current draw tests.  | 723  | 3              |
| Perform starter circuit voltage drop tests.  | 724  | 3              |
| Inspect and test starter relays and solenoids.   | 725  | 2,3            |
| Remove and install starter in a vehicle.   | 726  | 2,3            |
| Inspect and test switches, connectors, and wires of starter control circuits and perform necessary action.   | 727  | 2,3            |
| Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.   | 728  | 2,3            |
| Perform charging system output test and determine necessary action.  | 729  | 2,3            |
| Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.   | 730  | 3              |
| RESERVED   | 731  |                |
| Remove, inspect, and install generator (alternator).   | 732  | 2,3            |
| RESERVED   | 733  |                |
| RESERVED   | 734  |                |
| Inspect, replace, and aim headlights and bulbs.  | 735  | 1,2,3          |
| RESERVED   | 736  |                |
| RESERVED   | 737  |                |
| RESERVED   | 738  |                |
| Diagnose the cause of incorrect operation of warning devices and other driver information systems.   | 739  | 2,3            |
| Diagnose incorrect horn operation.   | 740  | 2,3            |
| Diagnose incorrect wiper operation and diagnose wiper speed control and park problems.   | 741  | 2,3            |
| Diagnose incorrect washer operation.   | 742  | 2,3            |
| Diagnose incorrect operation of motor-driven accessory circuits.   | 743  | 3              |
| OPEN   | 744  |                |
| RESERVED   | 745  |                |
| Remove and reinstall door panel.   | 746  | 2,3            |
| Use a digital multimeter (DMM).  | 747  | 2,3            |
| Demonstrate knowledge of an automatic idle start/stop system.  | 748  | 3              |

| Performance Indicator  | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|--|--|----------------|
| 800 Engine Performance   |  |                |
| RESERVERD  | 801  |                |
| Identify and interpret engine performance concern.   | 802  | 2,3            |
| RESERVED   | 803  | ,              |
| RESERVED   | 804  |                |
| RESERVED   | 805  |                |
| Diagnose abnormal engine noise or vibration concerns.  | 806  | 2,3            |
| Diagnose abnormal exhaust color, odor, and sound.  | 807  | 2,3            |
| Perform engine absolute (vacuum/boost) manifold pressure tests.  | 808  | 2,3            |
| Perform cylinder power balance test.   | 809  | 2,3            |
| Perform cylinder cranking and running compression tests.   | 810  | 2,3            |
| Perform cylinder leakage test.   | 811  | 2,3            |
| Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns.   | 812  | 2,3            |
| Verify engine operating temperature.   | 813  | 1,2,3          |
| RESERVED   | 814  | 1,2,3          |
| RESERVED   | 815  |                |
| Retrieve and record diagnostic trouble codes, OBD monitor status,<br>and freeze frame data and clear codes when applicable.  | 816  | 1,2,3          |
| Diagnose the causes of emissions or drivability concerns with stored<br>or active diagnostic trouble codes and obtain, graph, and interpret<br>scan tool data.   | 817  | 2,3            |
| Access and use service information to perform step-by-step diagnosis.  | 818  | 1,2,3          |
| Perform active tests of actuators using a scan tool.   | 819  | 2,3            |
| Describe the importance of running all OBDII monitors for repair verification.   | 820  | 3              |
| RESERVED   | 821  |                |
| Inspect and test ignition primary and secondary circuit wiring and solid-state components and test ignition coil(s).   | 822  | 3              |
| Inspect and test crankshaft and camshaft position sensor(s).   | 823  | 3              |
| Inspect, test, and replace ignition control module and powertrain/engine control module and reprogram as necessary.  | 824  | 3              |
| Diagnose hot or cold no-starting, hard starting, poor drivability,<br>incorrect idle speed, poor idle, flooding, hesitation, surging, engine<br>misfire, power loss, stalling, poor mileage, dieseling, and emissions<br>problems. | 825  | 3              |
| Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume.   | 826  | 3              |
| Replace fuel filters.  | 827  | 1,2,3          |
| Inspect throttle body, air induction system, intake manifold, and gaskets for vacuum leaks and unmetered air.  | 828  | 2,3            |

| Performance Indicator  | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|--|--|----------------|
| Inspect and test fuel injectors.   | 829  | 3,             |
| Verify idle control operation.   | 830  | 1,2,3          |
| Inspect the integrity of the exhaust manifold, exhaust pipes,  |  | 1,2,3          |
| muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s).  | 831  |                |
| RESERVED   | 832  | 2,3            |
| Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses.                          | 833  | 2,3            |
| RESERVED   | 834  | 2,3            |
| Inspect, test, service, and replace components of the EGR system,  |  | 2,3            |
| including electrical/electronic sensors, controls, and wiring, EGR tubing, exhaust passages, vacuum/pressure controls, filters, and hoses.       | 835  |                |
| RESERVED   | 836  |                |
| Inspect and test mechanical components of secondary air injection systems.   | 837  | 3              |
| Inspect and test electrical/electronically operated components and circuits of air injection systems.  | 838  | 3              |
| Inspect and test catalytic converter efficiency.   | 839  | 3              |
| RESERVED   | 840  | 1              |
| Inspect and test components and hoses of the evaporative emissions control system.   | 841  | 1,2,3          |
| Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems.   | 842  | 1,2,3          |
| RESERVED   | 843  |                |
| RESERVED   | 844  |                |
| RESERVED   | 845  |                |
| RESERVED   | 846  |                |
| 900 Engine Repair  |  |                |
| RESERVED   | 901  |                |
| Verify operation of the instrument panel engine warning indicators.  | 902  | 1,2,3          |
| Install engine covers using gaskets, seals, and sealers.   | 903  | 1,2,3          |
| RESERVED   | 904  | , ,-           |
| Adjust valves (mechanical or hydraulic lifters).   | 905  | 3              |
| Inspect, replace, and adjust drive belts, tensioners, and pulleys and check pulley and belt alignment.   | 906  | 2,3            |
| Inspect and test coolant, drain and recover coolant, and flush and refill cooling system with recommended coolant.                               | 907  | 1,2,3          |
| Perform cooling system pressure tests; check coolant condition;<br>inspect and test radiator, pressure cap, coolant recovery tank, and<br>hoses. | 908  | 1,2,3          |

| Performance Indicator  | PA Core Standard<br>and/or Eligible<br>Content | YEAR<br>Taught |
|--|--|----------------|
| Identify components and inspect engine assembly for fuel, oil,   |  | 1,2,3          |
| coolant, and other leaks.  | 909  |                |
| Remove and replace timing belt and verify correct camshaft timing.   | 910  | 3              |
| Remove and replace thermostat and gasket/seal.   | 911  | 2,3            |
| Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices.              | 912  | 2,3            |
| Perform engine oil and filter change.  | 913  | 1,2,3          |
| 1000 Automatic Transmission and Transaxle  |  |                |
| RESERVED   | 1001   |                |
| Check fluid level and fluid condition in a transmission or a transaxle equipped with a dip-stick.                            | 1002   | 1,2,3          |
| Check fluid level and fluid condition in a transmission or a transaxle not equipped with a dip-stick.                        | 1003   | 1,2,3          |
| Drain, replace, and exchange fluid and filter(s).  | 1004   | 1,2,3          |
| Identify drivetrain components and configuration.  | 1005   | 1,2,3          |
| Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral switch. | 1006   | 2,3            |
| Inspect for leakage at external seals, gaskets, and bushings.  | 1007   | 1,2,3          |
| Inspect, replace, and align powertrain mounts.   | 1008   | 2,3            |
| 1100 Manual Drive Train and Axles  |  |                |
| RESERVED   | 1101   |                |
| Drain and refill manual transmission/transaxle and final drive unit.   | 1102   | 2,3            |
| Check and adjust clutch master cylinder fluid level.   | 1103   | 1,2,3          |
| Check for system leaks   | 1104   | 1,2,3          |
| Check and adjust differential housing fluid level.   | 1105   | 1,2,3          |
| Drain and refill differential housing.   | 1106   | 1,2,3          |
| Identify, inspect, and replace manual drivetrain and axle components and configuration.                                      | 1107   | 1,2,3          |
| 1200 Heating and Air Conditioning  |  |                |
| RESERVED   | 1201   |                |
| RESERVED   | 1202   |                |
| Inspect air conditioning (A/C) condenser for airflow restrictions.   | 1203   | 2,3            |
| Inspect engine cooling and heating systems hoses.  | 1204   | 1,2,3          |
| Inspect A/C heating ducts, doors, hoses, cabin filters, and outlets.   | 1205   | 2,3            |
| Check for A/C leaks.   | 1206   | 2,3            |
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| Performance indicator           PA Core Standard and/or Eligible Content         YEAR Taught           Image: Content         Image: Content         Image: Content           Image: Content         Image: Content   | WARREN COUNT          | Y SCHOOL DISTRICT |  |
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| Performance indicator           PA Core Standard and/or Eligible Content         YEAR Taught           Image: Content         Image: Content         Image: Content           Image: Content         Image: Content   | WARREN COUNT          | Y SCHOOL DISTRICT |  |
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#### PLANNED INSTRUCTION

#### **ASSESSMENTS**

**PDE Academic Standards, Assessment Anchors, and Eligible Content:** The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

**Formative Assessments:** The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

**Effective formative assessments for this course include:** Analyzing student work, strategic questioning.

**Summative Assessments:** The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

**Effective summative assessments for this course include:** NOCTI Written and Performance Tests (2<sup>nd</sup> and 3<sup>rd</sup> year students – during senior year) developed by the National Occupational Competency Testing Institute. Students who score advanced will receive the PA Skills Certificate in Automotive Technology signed by the Governor of Pennsylvania. Students who score advanced and successfully complete the Program of Study Task Grid will earn SOAR PA state-wide articulated credit and any additional approved articulated college credit.