AUTOMOTIVE TECHNOLOGY STANDARDS

This document was prepared by:

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CTE MISSION STATEMENT:

The Office of Career, Technical and Adult Education is dedicated to developing innovative educational opportunities for students to acquire skills for productive employment and lifelong learning.

NEVADA DEPARTMENT OF EDUCATION

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

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BUSINESS AND INDUSTRY VALIDATION

All CTE standards developed through the Nevada Department of Education are validated by business and industry through one or more of the following processes: (1) the standards are developed by a team consisting of business and industry representatives; or (2) a separate review panel was coordinated with industry experts to ensure the standards include the proper content; or (3) the adoption of nationally-recognized standards endorsed by business and industry.

The Automotive Technology standards were validated with the adoption of the nationally recognized standards approved by NATEF (National Automotive Technicians Education Foundation).

PROJECT COORDINATOR

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INTRODUCTION

The standards in this document are designed to clearly state what the student should know and be able to do upon completion of an advanced high school Automotive Technology program. These standards are designed for a three-credit course sequence that prepares the student for a technical assessment directly aligned to the standards.

These exit-level standards are designed for the student to complete all standards through their completion of a program of study. These standards are intended to guide curriculum objectives for a program of study.

The standards are organized as follows:

Content Standards are general statements that identify major areas of knowledge, understanding, and the skills students are expected to learn in key subject and career areas by the end of the program.

Performance Standards follow each content standard. Performance standards identify the more specific components of each content standard and define the expected abilities of students within each content standard.

Performance Indicators are very specific criteria statements for determining whether a student meets the performance standard. Performance indicators may also be used as learning outcomes, which teachers can identify as they plan their program learning objectives.

The crosswalk and alignment section of the document shows where the performance indicators support the English Language Arts and the Mathematics Common Core State Standards, and the Nevada State Science Standards. Where correlation with an academic standard exists, students in the Automotive Technology program perform learning activities that support, either directly or indirectly, achievement of one or more Common Core State Standards.

All students are encouraged to participate in the career and technical student organization (CTSO) that relates to their program area. CTSOs are co-curricular national associations that directly enforce learning in the CTE classroom through curriculum resources, competitive events, and leadership development. CTSOs provide students the ability to apply academic and technical knowledge, develop communication and teamwork skills, and cultivate leadership skills to ensure college and career readiness.

The Employability Skills for Career Readiness identify the “soft skills” needed to be successful in all careers, and must be taught as an integrated component of all CTE course sequences. These standards are available in a separate document.

CONTENT STANDARD 1.0 : IDENTIFY AND UTILIZE SAFETY PROCEDURES AND PROPER TOOLS

PERFORMANCE STANDARD 1.1 : DEMONSTRATE GENERAL LAB SAFETY RULES AND PROCEDURES

1.1.1	Describe general shop safety rules and procedures (i.e., safety test)
1.1.2	Utilize safe procedures for handling of tools and equipment
1.1.3	Identify and use proper placement of floor jacks and jack stands
1.1.4	Identify and use proper procedures for safe vehicle lift operation
1.1.5	Utilize proper ventilation procedures for working within the lab/shop area
1.1.6	Identify marked safety areas
1.1.7	Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment
1.1.8	Identify the location and use of eye wash stations
1.1.9	Identify the location of the posted evacuation routes
1.1.10	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities
1.1.11	Identify and wear appropriate clothing for lab/shop activities
1.1.12	Secure hair and jewelry for lab/shop activities
1.1.13	Research safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits
1.1.14	Research safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)
1.1.15	Locate and interpret material safety data sheets (MSDS)

PERFORMANCE STANDARD 1.2 : IDENTIFY AND UTILIZE PROPER TOOLS

1.2.1	Identify tools and their usage in automotive applications
1.2.2	Identify standard and metric designation
1.2.3	Demonstrate safe handling and use of appropriate tools
1.2.4	Demonstrate proper cleaning, storage, and maintenance of tools and equipment
1.2.5	Demonstrate proper use of precision measuring tools (i.e., micrometer, dial-indicator, dial-caliper)

CONTENT STANDARD 2.0 : PERFORM BASIC VEHICLE SERVICE	
PERFORMANCE STANDARD 2.1 : IDENTIFY AND UTILIZE VEHICLE SERVICE INFORMATION	
2.1.1	Locate and utilize paper and/or electronic service information
2.1.2	Locate and utilize Technical Service Bulletins (TSBs)
2.1.3	Demonstrate knowledge of special service messages, quotes, service campaigns/recalls, vehicle/service warranty applications, and service interval recommendations
2.1.4	Locate Vehicle Identification Number (VIN) and production date code
2.1.5	Analyze Vehicle Identification Number (VIN) information
2.1.6	Research other vehicle information labels (such as tire, emissions, etc.)
PERFORMANCE STANDARD 2.2 : PREPARE A VEHICLE FOR SERVICE	
2.2.1	Identify information needed and the service requested on a repair order
2.2.2	Identify purpose and demonstrate proper use of fender covers, seat covers, and floor mats
2.2.3	Demonstrate use of the three C's (concern, cause, and correction)
2.2.4	Review vehicle service history
2.2.5	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction
PERFORMANCE STANDARD 2.3 : PREPARE A VEHICLE FOR THE CUSTOMER	
2.3.1	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.)

CONTENT STANDARD 3.0 : APPLY CONCEPTS OF ENGINE REPAIR (A1)	
PERFORMANCE STANDARD 3.1 : DEMONSTRATE GENERAL ENGINE SERVICE TECHNIQUES	
3.1.1	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
3.1.2	Verify operation of the instrument panel engine warning indicators
3.1.3	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action
3.1.4	Install engine covers using gaskets, seals and sealers as required
3.1.5	Remove and replace timing belt; verify correct camshaft timing
3.1.6	Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert
3.1.7	Identify hybrid vehicle internal combustion engine service precautions
PERFORMANCE STANDARD 3.2 : PERFORM CYLINDER HEAD AND VALVE TRAIN SERVICE AND REPAIR	
3.2.1	Adjust valves (mechanical or hydraulic lifters)
PERFORMANCE STANDARD 3.3 : PERFORM LUBRICATION AND COOLING SYSTEMS SERVICE AND REPAIR	
3.3.1	Perform cooling system pressure and dye tests; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core; determine necessary action
3.3.2	Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment
3.3.3	Remove, inspect, and replace thermostat and gasket/seal
3.3.4	Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required
3.3.5	Perform oil and filter change

CONTENT STANDARD 4.0 : ANALYZE AUTOMATIC TRANSMISSION/TRANSAXLE FOR SERVICE (A2)	
PERFORMANCE STANDARD 4.1 : PERFORM GENERAL TRANSMISSION/TRANSAXLE SERVICE	
4.1.1	Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins
4.1.2	Check fluid level in a transmission, or a transaxle equipped with a dipstick
4.1.3	Check fluid level in a transmission, or a transaxle not equipped with a dipstick
4.1.4	Check transmission fluid condition; check for leaks
PERFORMANCE STANDARD 4.2 : PERFORM IN-VEHICLE TRANSMISSION/TRANSAXLE SERVICE AND REPAIR	
4.2.1	Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch
4.2.2	Inspect for leakage at external seals, gaskets, and bushings
4.2.3	Inspect powertrain mounts
4.2.4	Drain and replace fluid and filter(s)
PERFORMANCE STANDARD 4.3 : INVESTIGATE CHARACTERISTICS OF OFF-VEHICLE TRANSMISSION/TRANSAXLE SERVICE AND REPAIR	
4.3.1	Describe the operational characteristics of a continuously variable transmission (CVT)
4.3.2	Describe the operational characteristics of a hybrid vehicle drivetrain

CONTENT STANDARD 5.0 : ANALYZE MANUAL DRIVETRAIN AND AXLES FOR SERVICE (A3)	
PERFORMANCE STANDARD 5.1 : PERFORM GENERAL DRIVETRAIN SERVICE	
5.1.1	Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins
5.1.2	Drain and refill manual transmission/transaxle and final drive unit
5.1.3	Check fluid condition; check for leaks
PERFORMANCE STANDARD 5.2 : INVESTIGATE CLUTCH SYSTEMS FOR SERVICE AND REPAIR	
5.2.1	Check and adjust clutch master cylinder fluid level
5.2.2	Check for system leaks
PERFORMANCE STANDARD 5.3 : ANALYZE THE TRANSMISSION/TRANSAXLE COMPONENTS	
5.3.1	Describe the operational characteristics of an electronically controlled transmission/transaxle
PERFORMANCE STANDARD 5.4 : PERFORM DRIVE SHAFT AND HALF SHAFT, UNIVERSAL AND CONSTANT VELOCITY(CV) JOINT SERVICE AND REPAIR	
5.4.1	Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals
5.4.2	Inspect, service, and replace shafts, yokes, boots, and universal/CV joints
PERFORMANCE STANDARD 5.5 : ASSESS DIFFERENTIAL CASE ASSEMBLY FOR SERVICE	
5.5.1	Clean and inspect differential housing; check for leaks; inspect housing vent
5.5.2	Check and adjust differential housing fluid level
5.5.3	Drain and fill differential housing
PERFORMANCE STANDARD 5.6 : PERFORM DRIVE AXLE SERVICE AND REPAIR	
5.6.1	Inspect and replace drive axle wheel studs

PERFORMANCE STANDARD 5.7 : ASSESS FOUR-WHEEL DRIVE/ALL-WHEEL DRIVE COMPONENT FOR SERVICE AND REPAIR	
5.7.1	Inspect front-wheel bearings and locking hubs
5.7.2	Check for leaks at drive assembly seals, check vents; check lube level

CONTENT STANDARD 6.0 :	PERFORM SUSPENSION AND STEERING SERVICE AND REPAIR (A4)
PERFORMANCE STANDARD 6.1 :	**PREPARE VEHICLE FOR GENERAL SUSPENSION AND STEERING SYSTEMS SERVICE**
6.1.1	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
6.1.2	Disable and enable supplemental restraint system (SRS)
PERFORMANCE STANDARD 6.2 :	**PERFORM STEERING SYSTEMS SERVICE AND REPAIR**
6.2.1	Inspect rack and pinion steering, inner tie rod ends (sockets) and bellows boots
6.2.2	Determine proper power steering fluid type; inspect fluid level and condition
6.2.3	Flush, fill, and bleed power steering system
6.2.4	Inspect for power steering fluid leakage; determine necessary action
6.2.5	Remove, inspect, replace, and adjust power steering pump belt
6.2.6	Inspect and replace power steering hoses and fittings
6.2.7	Replace power steering pump filter(s)
6.2.8	Inspect steering gear box, pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper
6.2.9	Inspect tie rod ends (sockets), tie rod sleeves, and clamps
6.2.10	Inspect upper and lower control arms, bushings, and shafts
6.2.11	Inspect and replace rebound and jounce bumpers
6.2.12	Inspect track bar, strut rods/radius arms, and related mounts and bushings
6.2.13	Inspect upper and lower ball joints (with or without wear indicators)
6.2.14	Inspect suspension system coil springs and spring insulators (silencers)
6.2.15	Inspect suspension system torsion bars and mounts
6.2.16	Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links
6.2.17	Inspect strut cartridge or assembly
6.2.18	Inspect front strut bearing and mount
6.2.19	Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms
6.2.20	Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts
6.2.21	Inspect, remove, and replace shock absorbers; inspect mounts and bushings
6.2.22	Inspect electric power-assisted steering
6.2.23	Identify electronically controlled suspension systems and safety precautions
6.2.24	Identify hybrid vehicle power steering system electrical circuits and safety precautions
6.2.25	Describe the function of the power steering pressure switch

PERFORMANCE STANDARD 6.3 : INVESTIGATE WHEEL ALIGNMENT CONDITIONS	
6.3.1	Perform prealignment inspection and measure vehicle ride height; perform necessary action
PERFORMANCE STANDARD 6.4 : PERFORM WHEEL AND TIRE SERVICE AND REPAIR	
6.4.1	Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action
6.4.2	Rotate tires according to manufacturer's recommendations
6.4.3	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic)
6.4.4	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor
6.4.5	Inspect tire and wheel assembly for air loss; perform necessary action
6.4.6	Repair tire using internal patch
6.4.7	Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps
6.4.8	Research the steps to remove and replace sensors in a tire pressure monitoring system

CONTENT STANDARD 7.0 : ANALYZE BRAKE SYSTEMS FOR SERVICE AND REPAIR (A5)	
PERFORMANCE STANDARD 7.1 : DEMONSTRATE KNOWLEDGE OF GENERAL BRAKE SYSTEMS	
7.1.1	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
7.1.2	Describe procedure for performing a road test to check brake system operation, including the anti-lock brake system (ABS)
PERFORMANCE STANDARD 7.2 : PERFORM HYDRAULIC SYSTEM SERVICE AND REPAIR	
7.2.1	Measure brake pedal height, travel, and free play (as applicable); determine necessary action
7.2.2	Check master cylinder for internal/external leaks and proper operation
7.2.3	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action
7.2.4	Select, handle, store, and fill brake fluids to proper level
7.2.5	Identify components of brake warning light system
7.2.6	Bleed and/or flush brake system
7.2.7	Test brake fluid for contamination
PERFORMANCE STANDARD 7.3 : PERFORM DRUM BRAKE SERVICE AND REPAIR	
7.3.1	Remove, clean, inspect, and measure brake drum diameter; determine necessary action
7.3.2	Refinish brake drum and measure final drum diameter; compare with specifications
7.3.3	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble
7.3.4	Inspect wheel cylinders for leaks and proper operation; remove and replace as needed
7.3.5	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies, wheel bearings; make final checks and adjustments
7.3.6	Install wheel and torque lug nuts to proper specifications

PERFORMANCE STANDARD 7.4 : PERFORM DISC BRAKE SERVICE AND REPAIR	
7.4.1	Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action
7.4.2	Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action
7.4.3	Remove, inspect, and replace pads and retaining hardware; determine necessary action
7.4.4	Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks
7.4.5	Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action
7.4.6	Remove and reinstall rotor
7.4.7	Refinish rotor on vehicle; measure final rotor thickness and compare with specifications
7.4.8	Refinish rotor off vehicle; measure final rotor thickness and compare with specifications
7.4.9	Retract and re-adjust caliper piston on an integral parking brake system
7.4.10	Check brake pad wear indicator; determine necessary action
7.4.11	Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations
PERFORMANCE STANDARD 7.5 : ANALYZE POWER ASSIST UNITS	
7.5.1	Check brake pedal free travel with, and without, engine running to verify proper power booster operation
7.5.2	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster
7.5.3	Identify alternative power assist units
PERFORMANCE STANDARD 7.6 : PERFORM MISCELLANEOUS SERVICE AND REPAIR (WHEEL BEARINGS, PARKING BRAKES, ELECTRICAL, ETC.)	
7.6.1	Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings
7.6.2	Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed
7.6.3	Check parking brake operation and parking brake indicator light system operation; determine necessary action
7.6.4	Check operation of brake stop light system
7.6.5	Replace wheel bearing and race
PERFORMANCE STANDARD 7.7 : ASSESS ELECTRONIC BRAKE, TRACTION AND STABILITY CONTROL SYSTEMS	
7.7.1	Identify traction control/vehicle stability control system components
7.7.2	Describe the operation of a regenerative braking system

CONTENT STANDARD 8.0 : ANALYZE ELECTRICAL / ELECTRONIC SYSTEMS (A6)

PERFORMANCE STANDARD 8.1 : PERFORM GENERAL ELECTRONIC SYSTEMS SERVICE

8.1.1	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
8.1.2	Demonstrate knowledge of electrical/electronic series, parallel and series-parallel circuits using principles of electricity (Ohm's Law)
8.1.3	Use wiring diagrams to trace electrical/electronic circuits
8.1.4	Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance
8.1.5	Research the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits
8.1.6	Check operations of electrical circuits with a test light
8.1.7	Check operation of electrical circuits using fused jumper wires
8.1.8	Measure key-off battery drain (parasitic draw)
8.1.9	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action
8.1.10	Perform solder repair of electrical wiring
8.1.11	Replace electrical connectors and terminal ends

PERFORMANCE STANDARD 8.2 : PERFORM BATTERY SERVICE

8.2.1	Perform battery state-of-charge test; determine necessary action
8.2.2	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action
8.2.3	Maintain or restore electronic memory functions
8.2.4	Inspect and clean battery; fill battery cells; clean battery cables, connectors, clamps, and hold downs
8.2.5	Perform slow/fast battery charge according to manufacturer recommendations
8.2.6	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply
8.2.7	Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions
8.2.8	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery
8.2.9	Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures

PERFORMANCE STANDARD 8.3 : PERFORM STARTING SYSTEM SERVICE AND REPAIR

8.3.1	Perform starter current draw test; determine necessary action
8.3.2	Perform starter circuit voltage drop tests; determine necessary action
8.3.3	Inspect and test starter relays and solenoids; determine necessary action
8.3.4	Remove and install starter in a vehicle
8.3.5	Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action

PERFORMANCE STANDARD 8.4 : PERFORM CHARGING SYSTEM SERVICE AND REPAIR	
8.4.1	Perform charging system output test; determine necessary action
8.4.2	Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment
8.4.3	Remove, inspect, and reinstall generator (alternator)
8.4.4	Perform charging circuit voltage drop tests; determine necessary action
PERFORMANCE STANDARD 8.5 : PERFORM LIGHTING SYSTEMS SERVICE AND REPAIR	
8.5.1	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed
8.5.2	Aim headlights
8.5.3	Identify system voltage and safety precautions associated with high intensity discharge headlights
PERFORMANCE STANDARD 8.6 : PERFORM ACCESSORIES SERVICE AND REPAIR	
8.6.1	Disable and enable the airbag system for vehicle service; verify indicator lamp operation
8.6.2	Remove and reinstall door panel
8.6.3	Describe the operation of keyless entry/remote-start systems
8.6.4	Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators
8.6.5	Verify windshield wiper and washer operation; replace wiper blades

CONTENT STANDARD 9.0 : ANALYZE HEATING AND AIR CONDITIONING SYSTEMS (A7)	
PERFORMANCE STANDARD 9.1 : DEMONSTRATE KNOWLEDGE OF A/C SYSTEMS	
9.1.1	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
9.1.2	Identify A/C components on a vehicle
PERFORMANCE STANDARD 9.2 : INSPECT REFRIGERATION SYSTEM COMPONENTS	
9.2.1	Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action
9.2.2	Research hybrid vehicle A/C system electrical circuits and the service/safety precautions
9.2.3	Inspect A/C condenser for airflow restrictions; determine necessary action
PERFORMANCE STANDARD 9.3 : INSPECT HEATING, VENTILATION, AND ENGINE COOLING SYSTEMS	
9.3.1	Inspect engine cooling and heater system hoses; perform necessary action
PERFORMANCE STANDARD 9.4 : INSPECT OPERATING SYSTEMS AND RELATED CONTROLS	
9.4.1	Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; perform necessary action
9.4.2	Identify the source of A/C system odors

CONTENT STANDARD 10.0 : ANALYZE ENGINE PERFORMANCE (A8)	
PERFORMANCE STANDARD 10.1 : PERFORM GENERAL ENGINE SERVICE	
10.1.1	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
10.1.2	Perform engine absolute (vacuum) manifold pressure tests; determine necessary action
10.1.3	Perform cylinder power balance test; determine necessary action
10.1.4	Perform cylinder cranking and running compression tests; determine necessary action
10.1.5	Perform cylinder leakage test; determine necessary action
10.1.6	Verify engine operating temperature
10.1.7	Remove and replace spark plugs; inspect secondary ignition components for wear and damage
PERFORMANCE STANDARD 10.2 : ANALYZE COMPUTERIZED ENGINE CONTROLS	
10.2.1	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable
10.2.2	Describe the importance of operating all OBDII monitors for repair verification
PERFORMANCE STANDARD 10.3 : PERFORM FUEL, AIR INDUCTION, AND EXHAUST SYSTEMS SERVICE AND REPAIR	
10.3.1	Replace fuel filter(s)
10.3.2	Inspect, service, or replace air filters, filter housings, and intake duct work
10.3.3	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action
10.3.4	Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed
10.3.5	Describe diesel exhaust fluid (DEF)
PERFORMANCE STANDARD 10.4 : PERFORM EMISSIONS CONTROL SYSTEMS SERVICE AND REPAIR	
10.4.1	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action

CONTENT STANDARD 11.0 : INVESTIGATE TRANSPORTATION SYSTEMS	
PERFORMANCE STANDARD 11.1 : ASSESS TRANSPORTATION SYSTEMS	
11.1.1	Describe the history of the automobile and the effects on society
11.1.2	Research the different career opportunities in the transportation career path
11.1.3	Investigate new and emerging technologies
11.1.4	Analyze workplace situations and use problem-solving techniques to improve the workplace environment

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CROSSWALK AND ALIGNMENTS OF AUTOMOTIVE TECHNOLOGY STANDARDS AND THE COMMON CORE STATE STANDARDS, THE NEVADA SCIENCE STANDARDS, AND THE COMMON CAREER TECHNICAL CORE STANDARDS

CROSSWALK (ACADEMIC STANDARDS)

The crosswalk of the Automotive Technology Standards shows links to the Common Core State Standards for English Language Arts and Mathematics and the Nevada Science Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Automotive Technology program support academic learning. The performance indicators are grouped according to their content standard and are crosswalked to the English Language Arts and Mathematics Common Core State Standards and the Nevada Science Standards.

ALIGNMENTS (MATHEMATICAL PRACTICES)

In addition to correlation with the Common Core Mathematics Content Standards, many performance indicators support the Common Core Mathematical Practices. The following table illustrates the alignment of the Automotive Technology Standards Performance Indicators and the Common Core Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Automotive Technology program support academic learning.

CROSSWALK (COMMON CAREER TECHNICAL CORE)

The crosswalk of the Automotive Technology Standards shows links to the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Automotive Technology program support the Common Career Technical Core. The Common Career Technical Core defines what students should know and be able to do after completing instruction in a program of study. The Automotive Technology Standards are crossedwalked to the Transportation, Distribution & Logistics Career Cluster™ and the Facility & Mobile Equipment Maintenance Career Pathway.

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CROSSWALKS OF AUTOMOTIVE TECHNOLOGY STANDARDS AND THE COMMON CORE STATE STANDARDS

CONTENT STANDARD 1.0: IDENTIFY AND UTILIZE SAFETY PROCEDURES AND PROPER TOOLS

Performance Indicators	Common Core State Standards and Nevada Science Standards
1.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
1.1.4	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
1.1.7	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
1.1.13	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

1.1.14	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
1.1.15	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.

CONTENT STANDARD 2.0: PERFORM BASIC VEHICLE SERVICE

Performance Indicators	Common Core State Standards and Nevada Science Standards
2.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
2.1.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

2.1.3	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
2.1.5	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
2.1.6	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
2.2.5	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **English Language Arts: Speaking and Listening Standards** SL.11-12.1d Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.

CONTENT STANDARD 3.0: APPLY CONCEPTS OF ENGINE REPAIR (A1)

Performance Indicators	Common Core State Standards and Nevada Science Standards
3.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

CONTENT STANDARD 4.0: ANALYZE AUTOMATIC TRANSMISSION/TRANSAXLE FOR SERVICE (A2)

Performance Indicators	Common Core State Standards and Nevada Science Standards
4.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
4.3.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
4.3.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CONTENT STANDARD 5.0: ANALYZE MANUAL DRIVETRAIN AND AXLES FOR SERVICE (A3)

Performance Indicators	Common Core State Standards and Nevada Science Standards
5.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
5.3.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CONTENT STANDARD 6.0: PERFORM SUSPENSION AND STEERING SERVICE AND REPAIR (A4)

Performance Indicators	Common Core State Standards and Nevada Science Standards
6.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
6.2.25	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
6.4.8	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CONTENT STANDARD 7.0: ANALYZE BRAKE SYSTEMS FOR SERVICE AND REPAIR (A5)

Performance Indicators	Common Core State Standards and Nevada Science Standards
7.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
7.1.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
7.4.11	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
7.7.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CONTENT STANDARD 8.0: ANALYZE ELECTRICAL / ELECTRONIC SYSTEMS (A6)

Performance Indicators	Common Core State Standards and Nevada Science Standards
8.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
8.1.2	**Math: Algebra – Creating Equations** A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. **Math: Algebra – Reasoning with Equations and Inequalities** A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **Math: Functions – Linear, Quadratic, and Exponential Models** F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.
8.1.5	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
8.6.3	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CONTENT STANDARD 9.0: ANALYZE HEATING AND AIR CONDITIONING SYSTEMS (A7)

Performance Indicators	Common Core State Standards and Nevada Science Standards
9.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
9.2.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

CONTENT STANDARD 10.0: ANALYZE ENGINE PERFORMANCE (A8)

Performance Indicators	Common Core State Standards and Nevada Science Standards
10.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
10.2.1	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
10.2.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
10.3.5	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CONTENT STANDARD 11.0: INVESTIGATE TRANSPORTATION SYSTEMS

Performance Indicators	Common Core State Standards and Nevada Science Standards
11.1.1	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
11.1.2	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
11.1.3	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

ALIGNMENT OF AUTOMOTIVE TECHNOLOGY STANDARDS AND THE COMMON CORE MATHEMATICAL PRACTICES

Common Core Mathematical Practices	Automotive Technology Performance Indicators
1. Make sense of problems and persevere in solving them.	
2. Reason abstractly and quantitatively.	
3. Construct viable arguments and critique the reasoning of others.	
4. Model with mathematics.	8.1.2
5. Use appropriate tools strategically.	1.2.2, 1.2.3, 1.2.5 3.1.5, 3.1.6; 3.2.1; 3.3.1, 3.3.2, 3.3.4, 3.3.5 4.1.2, 4.1.3; 4.2.4 5.1.2; 5.2.1; 5.4.1; 5.5.2, 5.5.3; 5.6.1 6.2.2, 6.2.3, 6.2.13; 6.3.1; 6.4.1, 6.4.3, 6.4.7 7.2.1, 7.2.4; 7.3.1, 7.3.2, 7.3.5, 7.3.6; 7.4.5, 7.4.7, 7.4.8 8.1.4, 8.1.8; 8.2.1; 8.3.1, 8.3.2; 8.4.1, 8.4.4 10.1.4, 10.1.3, 10.1.5
6. Attend to precision.	1.2.2, 1.2.3, 1.2.5 3.1.5, 3.1.6; 3.2.1; 3.3.1, 3.3.2, 3.3.4, 3.3.5 4.1.2, 4.1.3; 4.2.4 5.1.2; 5.2.1; 5.4.1; 5.5.2, 5.5.3; 5.6.1 6.2.2, 6.2.3, 6.2.13; 6.3.1; 6.4.1, 6.4.3, 6.4.7 7.2.1, 7.2.4; 7.3.1, 7.3.2, 7.3.5, 7.3.6; 7.4.5, 7.4.7, 7.4.8 8.1.4, 8.1.8; 8.2.1; 8.3.1, 8.3.2; 8.4.1, 8.4.4 10.1.4, 10.1.3, 10.1.5
7. Look for and make use of structure.	
8. Look for and express regularity in repeated reasoning.	

CROSSWALKS OF AUTOMOTIVE TECHNOLOGY STANDARDS AND THE COMMON CAREER TECHNICAL CORE

Transportation, Distribution & Logistics Career Cluster™ (TD)	Performance Indicators
1. Describe the nature and scope of the Transportation, Distribution & Logistics Career Cluster™ and the role of transportation, distribution and logistics in society and the economy.	11.1.1
2. Describe the application and use of new and emerging advanced techniques to provide solutions for transportation, distribution and logistics problems.	11.1.3
3. Describe the key operational activities required of successful transportation, distribution and logistics facilities.	11.1.4
4. Identify governmental policies and procedures for transportation, distribution and logistics facilities.	11.1.4
5. Describe transportation, distribution and logistics employee rights and responsibilities and employers' obligations concerning occupational safety and health.	1.1.1, 1.1.15; 11.1.4
6. Describe career opportunities and means to achieve those opportunities in each of the Transportation, Distribution & Logistics Career Pathways.	11.1.6

Facility & Mobile Equipment Maintenance Career Pathway (TD-MTN)	Performance Indicators
1. Develop preventative maintenance plans and systems to keep facility and mobile equipment inventory in operation.	1.2.4; 11.1.4
2. Design ways to improve facility and equipment system performance.	11.1.4