AUTOMOTIVE TECHNOLOGY STANDARDS

This document was prepared by:

Office of Career Readiness, Adult Learning & Education Options
Nevada Department of Education
755 N. Roop Street, Suite 201
Carson City, NV 89701

www.doe.nv.gov

Adopted by the Nevada State Board of Education on
August 27, 2020

NEVADA STATE BOARD OF EDUCATION

Elaine Wynn..... President
Mark Newburn .....Vice President
Robert Blakely .....Member
Katherine Dockweiler.....Member
Tamara Hudson .....Member
Cathy McAdoo.....Member
Kevin Melcher.....Member
Dawn Miller .....Member
Felicia Ortiz.....Member
Wayne Workman .....Member
Alex Gallegos ..... Student Representative

NEVADA DEPARTMENT OF EDUCATION

Jhone M. Ebert
Superintendent of Public Instruction

Craig Statucki, Director
Office of Career Readiness, Adult Learning & Education Options

VISION

All Nevadans ready for success in the 21st century

MISSION

To improve student achievement and educator effectiveness by ensuring opportunities, facilitating learning, and promoting excellence

Nevada Department of Education
Nevada Ready!

TABLE OF CONTENTS

* Indicates related Automotive Service Excellence (ASE) Automotive Standards

ACKNOWLEDGEMENTS

The development of Nevada career and technical standards and assessments is a collaborative effort sponsored by the Office of Career Readiness, Adult Learning & Education Options at the Department of Education and the Career and Technical Education Consortium of States. The Department of Education relies on teachers and industry representatives who have the technical expertise and teaching experience to develop standards and performance indicators that truly measure student skill attainment. Most important, however, is recognition of the time, expertise and great diligence provided by the writing team members in developing the career and technical standards for Automotive Technology.

STANDARDS DEVELOPMENT MEMBERS

Scott Bennett	Postsecondary Instructor	College of Southern Nevada, Las Vegas
John Gonzalez	Industry Representative	Findlay Auto Group, Henderson
Tristan Hays	CTE Coordinator	Clark County School District, Las Vegas
Stephen Ludwig	Automotive Technology Instructor	Spring Valley High School, Las Vegas
Dawnne Smith	Automotive Technology Instructor	Coronado High School, Las Vegas
Todd Teague	Automotive Technology Instructor	Edward C. Reed High School, Sparks
Paul Tick	CTE Project Facilitator	Clark County School District, Las Vegas
Scott Tomlinson	Automotive Technology Instructor	Elko High School, Elko
Adam Tucker	Automotive Technology Instructor	Shadow Ridge High School, Las Vegas

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 through active participation of business and industry representatives on the development team.

The Automotive Technology standards are adapted from the Automotive Service Excellence (ASE) Education Foundation Automobile Program Standards, 2018.

PROJECT COORDINATOR

Denise Burton, Education Programs Professional
Skilled and Technical Sciences
Office of Career Readiness, Adult Learning & Education Options
Nevada Department of Education

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 two-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 Nevada Academic Content Standards. Where correlation with an academic content standard exists, students in the Automotive Technology program perform learning activities that support, either directly or indirectly, achievement of the academic content standards that are listed.

All students are encouraged to participate in the career and technical student organization (CTSO) that relates to the Automotive Technology program. CTSOs are co-curricular national organizations that directly reinforce 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.

The **Standards Reference Code** is used to identify or align performance indicators listed in the standards to daily lesson plans, curriculum documents, or national standards. The Standards Reference Code is the abbreviated name for the program, and the content standard, performance standard and performance indicator are referenced in the program standards. This abbreviated code for identifying standards uses each of these items. For example, AUTO is the Standards Reference Code for Automotive Technology. For Content Standard 2, Performance Standard 3 and Performance Indicator 4 the Standards Reference Code would be AUTO.2.3.4.

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 safety data sheets (SDS)

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 (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 (manual or electronic)
2.2.2 Identify purpose and demonstrate proper use of fender covers, seat covers, floor mats, wheel chocks
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, clean interior and exterior, return seat to original position, 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	Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert
3.1.5	Identify hybrid vehicle internal combustion engine service precautions
3.1.6	Install engine covers using gaskets, seals and sealers as required
3.1.7	Inspect, remove and replace timing belt, chains, or gears; verify correct camshaft timing

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	Inspect and test coolant; drain and recover coolant; flush and refill cooling system; fluid type per manufacturer specification
3.3.2	Perform oil and filter change
3.3.3	Remove, inspect, and replace thermostat and gasket/seal
3.3.4	Perform cooling system pressure and dye tests; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action
3.3.5	Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment

* Related ASE Automotive Standards

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
4.1.5	Identify drivetrain component and configuration

PERFORMANCE STANDARD 4.2: PERFORM IN-VEHICLE TRANSMISSION/TRANSAXLE SERVICE AND REPAIR	
4.2.1	Inspect powertrain mounts
4.2.2	Drain and replace fluid and filter(s); use proper fluid type per manufacturer specifications
4.2.3	Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral position switch

PERFORMANCE STANDARD 4.3: INVESTIGATE CHARACTERISTICS OF OFF-VEHICLE TRANSMISSION/TRANSAXLE SERVICE AND REPAIR	
4.3.1	Describe the operational characteristics of transmissions; including a continuously variable transmission (CVT)
4.3.2	Describe the operational characteristics of a hybrid vehicle drivetrain

* Related ASE Automotive Standards

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

PERFORMANCE STANDARD 5.1: PERFORM GENERAL DRIVETRAIN SERVICE
5.1.1 Research vehicle service information, fluid type, vehicle service history, service precautions, and technical service bulletins
5.1.2 Check fluid condition; check for leaks
5.1.3 Identify manual drivetrain and axle components and configuration
5.1.4 Drain and refill manual transmission/transaxle and final drive unit; use proper fluid type per manufacturer specification

PERFORMANCE STANDARD 5.2: INVESTIGATE CLUTCH SYSTEMS FOR SERVICE AND REPAIR
5.2.1 Check and adjust clutch master cylinder fluid level; use proper fluid type per manufacturer specification
5.2.2 Check for hydraulic system leaks

PERFORMANCE STANDARD 5.3: ANALYZE TRANSMISSION/TRANSAXLE COMPONENTS
5.3.1 Describe the operational characteristics of an electronically controlled transmission/transaxle

PERFORMANCE STANDARD 5.4: ASSESS DIFFERENTIAL CASE ASSEMBLY FOR SERVICE
5.4.1 Clean and inspect differential housing; check for leaks; inspect housing vent
5.4.2 Check and adjust differential housing fluid level, use proper fluid type per manufacturer specification
5.4.3 Drain and fill differential housing; use proper fluid per manufacturer specification

PERFORMANCE STANDARD 5.5: ASSESS FOUR-WHEEL DRIVE/ALL-WHEEL DRIVE COMPONENT FOR SERVICE AND REPAIR
5.5.1 Check for leaks at drive assembly seals, check vents; check lube level
5.5.2 Inspect front-wheel bearings and locking hubs

* Related ASE Automotive Standards

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 vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins
6.1.2	Identify suspension and steering system components and configurations
6.1.3	Disable and enable supplemental restraint system (SRS); verify indicator lamp operation

PERFORMANCE STANDARD 6.2: PERFORM STEERING SYSTEMS SERVICE AND REPAIR	
6.2.1	Inspect power steering fluid level and condition
6.2.2	Inspect for power steering fluid leakage
6.2.3	Inspect rack and pinion steering, inner tie rod ends (sockets) and bellows boots
6.2.4	Flush, fill, and bleed power steering system; use proper fluid type per manufacturer specification
6.2.5	Remove, inspect, replace, and/or adjust power steering pump belt
6.2.6	Inspect and replace power steering hoses and fittings
6.2.7	Inspect steering gear box, pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper
6.2.8	Inspect tie rod ends (sockets), tie rod sleeves, and clamps
6.2.9	Inspect upper and lower control arms, bushings, and shafts
6.2.10	Inspect and/or replace rebound and jounce bumpers
6.2.11	Inspect track bar, strut rods/radius arms, and related mounts and bushings
6.2.12	Inspect upper and lower ball joints (with or without wear indicators)
6.2.13	Inspect suspension system coil springs and spring insulators (silencers)
6.2.14	Inspect suspension system torsion bars and mounts
6.2.15	Inspect and/or replace front/rear stabilizer bar (sway bar) bushings, brackets, and links
6.2.16	Inspect strut cartridge or assembly, front strut bearing and mount
6.2.17	Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms
6.2.18	Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts
6.2.19	Inspect, remove, and/or replace shock absorbers; inspect mounts and bushings
6.2.20	Inspect electric power-assisted steering
6.2.21	Identify hybrid vehicle power steering system electrical circuits and safety precautions
6.2.22	Identify and describe the function of steering and suspension control systems, safety precautions and components, (i.e. active suspension, and stability control)

PERFORMANCE STANDARD 6.3: INVESTIGATE WHEEL ALIGNMENT CONDITIONS	
6.3.1	Perform pre-alignment inspection and measure vehicle ride height
6.3.2	Describe alignment angles (camber, caster, toe, and steering axis inclination [SAI])

PERFORMANCE STANDARD 6.4: PERFORM WHEEL AND TIRE SERVICE AND REPAIR	
6.4.1	Inspect tire condition; identify tire wear patterns; check for correct tire size and application (load and speed ratings) and air pressure as listed on the tire information placard/label
6.4.2	Rotate tires according to manufacturer's recommendations, including vehicles equipped with tire pressure monitoring systems (TPMS)
6.4.3	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static or dynamic)
6.4.4	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor (TPMS)
6.4.5	Inspect tire and wheel assembly for air loss; determine necessary action
6.4.6	Repair tire following vehicle manufacturer approved procedure
6.4.7	Identify indirect and direct tire pressure monitoring systems (TPMS); calibrate system; verify operation of instrument panel lamps
6.4.8	Research/demonstrate the steps to remove and replace sensors in a tire pressure monitoring system (TPMS), including relearn procedure

* Related ASE Automotive Standards

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 vehicle service information, fluid type, 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 an anti-lock brake system (ABS)
7.1.3	Install wheel and torque lug nuts to manufacturer specifications
7.1.4	Identify brake system components and configuration

PERFORMANCE STANDARD 7.2: PERFORM HYDRAULIC SYSTEM SERVICE AND REPAIR	
7.2.1	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, and loose fittings and supports
7.2.2	Select, handle, store, and fill brake fluids to proper level, use proper fluid type per manufacturer specification
7.2.3	Identify components of hydraulic brake warning light system
7.2.4	Test brake fluid for contamination
7.2.5	Check master cylinder for internal/external leaks and proper operation
7.2.6	Bleed and/or flush brake system

PERFORMANCE STANDARD 7.3: PERFORM DRUM BRAKE SERVICE AND REPAIR	
7.3.1	Remove, clean, inspect, and/or replace brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble
7.3.2	Install wheel and torque lug nuts to manufacturer specification
7.3.3	Remove, clean, and inspect brake drum; measure brake drum diameter; determine serviceability
7.3.4	Refinish brake drum and measure final drum diameter; compare with specifications
7.3.5	Inspect wheel cylinders for leaks and proper operation; remove and replace as needed
7.3.6	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies, wheel bearings; make final checks and adjustments

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/or replace brake pads and retaining hardware; determine necessary action
7.4.4	Lubricate and reinstall caliper, brake pads, and related hardware; seat brake pads and inspect for leaks
7.4.5	Clean and inspect rotor and mounting surface, measure rotor thickness, thickness variation, and lateral runout; determine necessary action
7.4.6	Remove and reinstall/replace rotor
7.4.7	Refinish rotor off vehicle; measure final rotor thickness and compare with manufacturer specification
7.4.8	Retract and re-adjust caliper piston on an integral parking brake system
7.4.9	Check brake pad wear indicator; determine necessary action
7.4.10	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	Identify components of the brake power assist system (vacuum and hydraulic); check vacuum supply (manifold or auxiliary pump) to vacuum type power booster

PERFORMANCE STANDARD 7.6: PERFORM MISCELLANEOUS SERVICE AND REPAIR (WHEEL BEARINGS, PARKING BRAKES, ELECTRICAL, ETC.)	
7.6.1	Check operation of brake stop light system
7.6.2	Remove, clean, inspect, repack, and install wheel bearings/race; replace seals; install hub and adjust bearings
7.6.3	Check parking brake system components for wear, binding, and corrosion; clean, lubricate, adjust and/or replace as needed
7.6.4	Check parking brake operation and parking brake indicator light system operation; determine necessary action
7.6.5	Inspect and replace wheel studs

PERFORMANCE STANDARD 7.7: ASSESS ELECTRONIC BRAKE, TRACTION AND STABILITY CONTROL SYSTEMS	
7.7.1	Disable electronic parking brake

* Related ASE Automotive Standards

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

PERFORMANCE STANDARD 8.1: PERFORM GENERAL ELECTRONIC SYSTEMS DIAGNOSTICS AND SERVICE

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

PERFORMANCE STANDARD 8.2: PERFORM BATTERY SERVICE

- 8.2.1 Inspect and clean battery; fill battery cells; check and clean battery cables, connectors, clamps, and hold downs; determine necessary action
- 8.2.2 Perform slow/fast battery charge according to manufacturer's recommendations
- 8.2.3 Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply
- 8.2.4 Perform battery state-of-charge test; determine necessary action
- 8.2.5 Confirm proper battery capacity for vehicle application; perform battery capacity test and load test; determine necessary action
- 8.2.6 Maintain or restore electronic memory functions
- 8.2.7 Remove and replace battery cables and battery

PERFORMANCE STANDARD 8.3: PERFORM STARTING SYSTEM DIAGNOSIS, 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 DIAGNOSIS, SERVICE AND REPAIR
8.4.1 Perform charging system output test; determine necessary action
8.4.2 Inspect, adjust, and/or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment
8.4.3 Remove, inspect, and/or reinstall generator (alternator)
8.4.4 Perform charging circuit voltage drop tests; determine necessary action

PERFORMANCE STANDARD 8.5: PERFORM LIGHT SYSTEM AND ACCESSORIES SERVICE AND REPAIR
8.5.1 Describe the operation of keyless entry/remote-start systems
8.5.2 Verify windshield wiper and washer operation; replace wiper blades
8.5.3 Inspect interior and exterior lamps and sockets, including headlights and auxiliary lights (fog lights/driving lights); replace as needed
8.5.4 Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators

* Related ASE Automotive Standards

CONTENT STANDARD 9.0: ANALYZE HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) SYSTEMS (A7*)

PERFORMANCE STANDARD 9.1: DEMONSTRATE KNOWLEDGE OF HVAC SYSTEMS
9.1.1 Research vehicle and service information, including refrigerant/oil type, vehicle service history, service precautions, and technical service bulletins
9.1.2 Identify heating, ventilation, and air conditioning (HVAC) components and configuration

PERFORMANCE STANDARD 9.2: INSPECT HEATING, VENTILATION, AND ENGINE COOLING SYSTEMS
9.2.1 Inspect engine cooling and heater system hoses and pipes; determine necessary action

* Related ASE Automotive Standards

CONTENT STANDARD 10.0: ANALYZE ENGINE PERFORMANCE (A8*)

PERFORMANCE STANDARD 10.1: PERFORM GENERAL ENGINE SERVICE	
10.1.1	Research vehicle and service information, including fluid type, vehicle service history, service precautions, and technical service bulletins
10.1.2	Perform engine absolute manifold pressure tests (vacuum/boosts); document results
10.1.3	Perform cylinder power balance test; document results
10.1.4	Perform cylinder cranking and running compression tests; document results
10.1.5	Perform cylinder leakage test; document results
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: EXPLORE COMPUTERIZED CONTROLS	
10.2.1	Retrieve and record diagnostic trouble codes (DTC), on-board diagnostics (OBD) monitor status, and freeze-frame data; clear codes when applicable
10.2.2	Describe the use of the OBD monitors for repair verification

PERFORMANCE STANDARD 10.3: ASSESS FUEL, AIR INDUCTION, AND EXHAUST SYSTEMS SERVICE AND REPAIR	
10.3.1	Replace fuel filter(s) where applicable
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; determine necessary action

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

* Related ASE Automotive Standards

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

CROSSWALKS AND ALIGNMENTS

CROSSWALKS (ACADEMIC STANDARDS)

The crosswalk of the Automotive Technology Standards shows links to the Nevada Academic Content 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 Nevada Academic Content Standards in English Language Arts, Mathematics, and Science.

ALIGNMENTS (MATHEMATICAL PRACTICES)

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

ALIGNMENTS (SCIENCE AND ENGINEERING PRACTICES)

In addition to correlation with the Nevada Academic Content Standards for Science, many performance indicators support the Science and Engineering Practices. The following table illustrates the alignment of the Automotive Technology Standards Performance Indicators and the Science and Engineering Practices. This alignment identifies the performance indicators in which the learning objectives in the Automotive Technology program support academic learning.

CROSSWALKS (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 crosswalked to the Transportation, Distribution & Logistics Career Cluster™ and the Facility & Mobile Equipment Maintenance Career Pathway.

This Page was Intentionally Left Blank.

CROSSWALK OF AUTOMOTIVE TECHNOLOGY STANDARDS AND THE NEVADA ACADEMIC CONTENT STANDARDS

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

Performance Indicators	Nevada Academic Content 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.
1.1.2	**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.
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.

Performance Indicators	Nevada Academic Content Standards
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	Nevada Academic Content 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.

Performance Indicators	Nevada Academic Content Standards
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.

Performance Indicators	Nevada Academic Content Standards
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	Nevada Academic Content 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	Nevada Academic Content 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	Nevada Academic Content 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	Nevada Academic Content 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.
6.2.2	**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	Nevada Academic Content 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.
7.4.10	**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	Nevada Academic Content 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.
8.1.3	**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.
8.5.1	**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, VENTILATION, AND AIR CONDITIONING (HVAC) SYSTEMS (A7*)

Performance Indicators	Nevada Academic Content 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.

CONTENT STANDARD 10.0: ANALYZE ENGINE PERFORMANCE (A8*)

Performance Indicators	Nevada Academic Content 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.

CONTENT STANDARD 11.0: INVESTIGATE TRANSPORTATION SYSTEMS

Performance Indicators	Nevada Academic Content 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.

Performance Indicators	Nevada Academic Content Standards
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 MATHEMATICAL PRACTICES

Mathematical Practices	Automotive Technology Performance Indicators
1. Make sense of problems and persevere in solving them.	3.1.3, 3.3.4 6.4.5 7.3.3, 7.4.1, 7.4.2, 7.4.9 8.2.1; 8.3.1 - 8.3.3, 8.3.5; 8.4.1, 8.4.4 10.3.3, 10.3.4 11.1.4
2. Reason abstractly and quantitatively.	3.1.3, 3.3.4 6.4.5 7.3.3; 7.4.1, 7.4.2, 7.4.9 8.2.1; 8.3.1 - 8.3.3, 8.3.5; 8.4.1, 8.4.4 10.3.3, 10.3.4 11.1.4
3. Construct viable arguments and critique the reasoning of others.	1.1.1 2.1.3 5.1.3 6.4.8 7.1.2
4. Model with mathematics.	3.3.4 6.3.2 7.3.4; 7.4.5 8.1.3, 8.1.5, 8.1.9, 8.2.5
5. Use appropriate tools strategically.	1.2.2, 1.2.3, 1.2.5 7.3.3; 7.4.6 8.1.5, 8.1.9 10.1.3 - 10.1.5

Mathematical Practices	Automotive Technology Performance Indicators
6. Attend to precision.	1.2.2, 1.2.5 3.2.1; 3.3.1, 3.3.3 4.1.2 - 4.1.5; 4.2.2 5.1.4; 5.2.1; 5.2.2 6.2.4; 6.3.1, 6.3.2; 6.4.5 7.4.5 8.1.5
7. Look for and make use of structure.	1.1.1, 1.1.4 2.3.1 3.3.2 5.1.4; 5.2.1; 5.5.2 6.2.4; 6.4.2 7.1.3; 7.2.2; 7.4.7 8.2.2, 8.2.10
8. Look for and express regularity in repeated reasoning.	1.2.6; 1.3.2 2.3.2

ALIGNMENT OF AUTOMOTIVE TECHNOLOGY STANDARDS AND THE SCIENCE AND ENGINEERING PRACTICES

Science and Engineering Practices	Automotive Technology Performance Indicators
1. Asking questions (for science) and defining problems (for engineering).	2.1.1 - 2.1.3; 2.2.1 3.1.3; 3.3.4 6.4.5 7.3.3; 7.4.1 – 7.4.3, 7.4.5; 7.6.4 8.1.10; 8.2.4, 8.2.5; 8.3.1 – 8.3.3, 8.3.5; 8.4.1, 8.4.4 9.2.1, 9.2.3; 9.3.1; 9.4.1 10.3.3, 10.3.4
2. Developing and using models.	8.1.4 10.1.2 – 10.1.5
3. Planning and carrying out investigations.	1.2.1 3.3.4, 3.3.5 4.2.3 5.4.1, 5.4.2 7.3.3; 7.4.1 8.1.7; 8.2.4,8.2.5, 8.3.1 – 8.3.3, 8.3.5; 8.4.1, 8.4.4 10.1.2 – 10.1.5; 10.4.1
4. Analyzing and interpreting data.	1.2.5 2.1.3, 2.1.5 4.3.1, 4.3.2 5.3.1 6.3.2.; 6.4.8 7.1.2; 7.4.10; 7.7.3 8.1.3, 8.1.5; 8.3.6 10.2.2 11.1.1, 11.1.4
5. Using mathematics and computational thinking.	1.1.2; 1.2.5 6.3.1, 6.3.2 7.2.7; 7.3.4; 7.4.5 8.1.3, 8.1.5, 8.1.6, 8.1.9

Science and Engineering Practices	Automotive Technology Performance Indicators
6. Constructing explanations (for science) and designing solutions (for engineering).	4.3.1, 4.3.2 5.3.1 6.3.2 7.1.2; 7.4.10 8.5.1 10.2.2
7. Engaging in argument from evidence.	2.1.3 3.1.3; 3.3.4 7.3.3; 7.4.1 – 7.4.3. 7.4.5, 7.4.9; 7.6.4 8.1.10; 8.2.1, 8.2.4; 8.3.1 – 8.3.3, 8.3.5; 8.4.1, 8.4.4 10.3.3, 10.3.4; 10.4.1
8. Obtaining, evaluating, and communicating information.	2.1.1 – 2.1.3 5.3.1 10.1.2 – 10.1.5; 10.2.2

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.	11.1.2
4. Identify governmental policies and procedures for transportation, distribution and logistics facilities.	11.1.1
5. Describe transportation, distribution and logistics employee rights and responsibilities and employers' obligations concerning occupational safety and health.	11.1.2
6. Describe career opportunities and means to achieve those opportunities in each of the Transportation, Distribution & Logistics Career Pathways.	11.1.2

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.	2.1.1 – 2.1.6
2. Design ways to improve facility and equipment system performance.	1.1.1; 1.2.1 – 1.2.4