EVERETT PUBLIC SCHOOLS
AUTOMOTIVE TECHNOLOGY

Course: Automotive Technology NATEF/ASE		**Total Framework Hours:** 540
CIP Code: 470604	☐Exploratory ☒Preparatory	**Date Last Modified:** 12.2013
Career Cluster: Transportation Distribution and Logistics		**Cluster Pathway:** Transportation Distribution and Logistics

Industry-Recognized Certificates:

Work-Based Learning:

Course Information:
Standards used in this framework are from the ASE Student Certification Test Specifications and Task Lists for the 2012 NATEF Standards - Automobile Series.

COMPONENTS AND ASSESSMENTS	
Performance Assessments: • Students will take an online safety training program and are evaluated by testing at the end of the program. Requires 80% to pass.	
Leadership Alignment:	
Standards and Competencies	
Unit: Safety	
Industry Standards and/or Competencies	**Total Learning Hours for Unit:** 8
• WR-5.1 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments. • WR-5.2 Explain emergency procedures to follow in response to workplace accidents. • WR-5.3 Create a disaster and/or emergency response plan. • WR-5.4 Identify and apply OSHA and other health and safety regulations that apply to specific tasks and jobs in the occupational area • WR-5.5 Identify and apply EPA and other environmental protection regulations that apply to specific tasks and jobs in the occupational area • WR-5.6 Identify and apply Right-To-Know (Hazard Communication Policy) and other communicative regulations that apply to specific tasks and jobs in the occupational area • WR-5.7 Explain procedures for documenting and reporting hazards to appropriate authorities • WR-5.8 List penalties for non-compliance with appropriate health and safety regulations • WR-5.9 Identify contact information for appropriate health and safety agencies and resources • WR-5.10 Create a systematic safety program which would achieve OSHA compliance and promote a safe working environment • WR-5.11 Illustrate a safe environment for students in printing • WR-5.12 Identify, describe and demonstrate the effective use of Material Safety Data Sheets (MSDS)	

- WR-5.13 Read chemical, product, and equipment labels to determine appropriate health and safety considerations
- WR-5.14 Identify, describe and demonstrate personal, shop and job site safety practices and procedures
- WR-5.15 Demonstrate safe dress and use of relevant safety gear and personal protective equipment (PPE), including wrist rests, adjustable workspaces and equipment, gloves,
- boots, earplugs, eye protection, and breathing apparatus
- WR-5.16 Illustrate appropriate safe body mechanics, including proper lifting techniques and ergonomics
- WR-5.17 Locate emergency equipment in your lab, shop, and classroom, including (where appropriate) eyewash stations, shower facilities, sinks, fire extinguishers, fire blankets,
- telephone, master power switches, and emergency exits
- WR-5.18 Demonstrate the safe use, storage, and maintenance of every piece of equipment in the lab, shop, and classroom
- WR-5.19 Describe safety practices and procedures to be followed when working with and around electricity
- WR-5.20 Illustrate proper handling and storage practices, including working with hazardous materials, disposal, and recycling
- WR-5.21 Demonstrate proper workspace cleaning procedures
- WR-5.22 Illustrate First Aid procedures for potential injuries and other health concerns in the occupational area
- WR-5.23 Describe the importance of emergency preparedness and an emergency action plan
- WR-5.24 Illustrate procedures used to handle emergency situations and accidents, including identification, reporting, response, evacuation plans, and follow-up procedures
- WR-5.25 Identify practices used to avoid accidents
- WR-5.26 Identify and describe fire protection, precautions and response procedures
- WR-5.27 Discuss the role of the individual and the company/organization in ensuring workplace safety
- WR-5.28 Discuss ways to identify and prevent workplace/school violence

Aligned Washington State Learning Standards	
English Language Arts	CC: College and Career Readiness Anchor Standards for Reading 1 - Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. 2 - Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. 3 - Analyze how and why individuals, events, and ideas develop and interact over the course of a text. Craft and Structure 4 - Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. 5 - Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole. 6 - Assess how point of view or purpose shapes the content and style of a text. Integration of Knowledge and Ideas 7 - Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. 8 - Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. 9 - Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take. Range of Reading and Level of Text Complexity 10 - Read and comprehend complex literary and informational texts independently and proficiently.

COMPONENTS AND ASSESSMENTS
Performance Assessments:

- Students will complete required NATEF tasks in Automotive Braking systems as per the brake task list and associated work sheets. Students take the ASE certification tests at the semesters end.

Leadership Alignment:
Students complete Skills USA PDP and compete in regional, state and national skills competitions for Automotive Repair.

Standards and Competencies

Unit: Brakes

Industry Standards and/or Competencies	**Total Learning Hours for Unit:** 90

- BRAKES (BR)
- BR - A. General
- 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- 2. Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS).
- BR - B. Hydraulic System
- 1. Measure brake pedal height, travel, and free play (as applicable); determine necessary action.
- 2. Check master cylinder for external leaks and proper operation.
- 3. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action.
- 4. Select, handle, store, and fill brake fluids to proper level.
- 5. Identify components of brake warning light system.
- 6. Bleed and/or flush brake system.
- 7. Test brake fluid for contamination.
- BR - C. Drum Brakes
- 1. Remove, clean, inspect, and measure brake drum diameter; determine necessary action.
- 2. Refinish brake drum and measure final drum diameter; compare with specifications.
- 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.
- 4. Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.
- 5. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments.
- 6. Install wheel and torque lug nuts.
- BR - D. Disc Brakes
- 1. Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.
- 2. Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.
- 3. Remove, inspect, and replace pads and retaining hardware; determine necessary action.
- 4. Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks.
- 5. Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action.
- 6. Remove and reinstall rotor.
- 7. Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.
- 8. Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.
- 9. Retract and re-adjust caliper piston on an integral parking brake system.
- 10. Check brake pad wear indicator; determine necessary action.
- 11. Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer’s recommendations.
- BR - E. Power-Assist Units
- 1. Check brake pedal travel with, and without, engine running to verify proper power booster operation.
- 2. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
- BR - F. Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.)

• 1. Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. • 2. Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. • 3. Check parking brake operation and parking brake indicator light system operation; determine necessary action. • 4. Check operation of brake stop light system. • 5. Replace wheel bearing and race. • BR - G. Electronic Brakes, and Traction and Stability Control Systems • 1. Identify traction control/vehicle stability control system components. • 2. Describe the operation of a regenerative braking system.

Aligned Washington State Learning Standards	
English Language Arts	CC: College and Career Readiness Anchor Standards for Language Conventions of Standard English 1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. 2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. 3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. Vocabulary Acquisition and Use 4 - Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate. CC: Reading for Literacy in Science and Technical Subjects Key Ideas and Details (9-10) 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. 3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text. Craft and Structure (9-10) 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 9–10 texts and topics. 5 - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). 6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. Integration of Knowledge and Ideas (9-10) 7 - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. 8 - Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. 9 - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. Range of Reading and Level of Text Complexity (9-10) 10 - By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently Key Ideas and Details (11-12)

	1 - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. 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. 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. Craft and Structure (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. 5 - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. 6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. Integration of Knowledge and Ideas (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. 8 - Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. Range of Reading and Level of Text Complexity (11-12) 10 - By the end of grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently.
Mathematics	CC: Mathematical Practices (MP) 1 - Make sense of problems and persevere in solving them. 2 - Reason abstractly and quantitatively. 4 - Model with mathematics. 5 - Use appropriate tools strategically. 6 - Attend to precision. 8 - Look for and express regularity in repeated reasoning.

COMPONENTS AND ASSESSMENTS	
Performance Assessments: • Students will complete required NATEF tasks in Steering and Suspension systems as per the SS task list and associated work sheets. Students take the ASE certification tests at the semesters end.	
Leadership Alignment: Students complete Skills USA Professional Development Program and compete in regional, state and national skills competitions	
Standards and Competencies	
Unit: Steering and suspension	
Industry Standards and/or Competencies	**Total Learning Hours for Unit:** 90
• SUSPENSION AND STEERING SYSTEMS (SS) • SS - A. General • 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. • 2. Disable and enable supplemental restraint system (SRS). • SS - B. Related Suspension and Steering Service	

- 1. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
- 2. Determine proper power steering fluid type; inspect fluid level and condition.
- 3. Flush, fill, and bleed power steering system.
- 4. Inspect for power steering fluid leakage; determine necessary action.
- 5. Remove, inspect, replace, and adjust power steering pump drive belt.
- 6. Inspect and replace power steering hoses and fittings.
- 7. Replace power steering pump filter(s).
- 8. Inspect pitman arm, relay (center link/intermediate) rod, idler arm and mountings, and steering linkage damper.
- 9. Inspect tie rod ends (sockets), tie rod sleeves, and clamps.
- 10. Inspect upper and lower control arms, bushings, and shafts.
- 11. Inspect and replace rebound and jounce bumpers.
- 12. Inspect track bar, strut rods/radius arms, and related mounts and bushings.
- 13. Inspect upper and lower ball joints (with or without wear indicators).
- 14. Inspect suspension system coil springs and spring insulators (silencers).
- 15. Inspect suspension system torsion bars and mounts.
- 16. Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links.
- 17. Inspect strut cartridge or assembly.
- 18. Inspect front strut bearing and mount.
- 19. Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms.
- 20. Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts
- 21. Inspect, remove, and replace shock absorbers; inspect mounts and bushings.
- 22. Inspect electric power-assisted steering.
- 23. Identify hybrid vehicle power steering system electrical circuits and safety precautions.
- 24. Describe the function of the power steering pressure switch.
- SS - C. Wheel Alignment
- 1. Perform realignment inspection and measure vehicle ride height; determine necessary action.
- SS - D. Wheels and Tires
- 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.
- 2. Rotate tires according to manufacturer’s recommendations.
- 3. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
- 4. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
- 5. Inspect tire and wheel assembly for air loss; perform necessary action.
- 6. Repair tire using internal patch.
- 7. Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps.
- 8. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.

Aligned Washington State Learning Standards	
English Language Arts	CC: College and Career Readiness Anchor Standards for Language Conventions of Standard English 1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. 2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. 3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. Vocabulary Acquisition and Use

	4 - Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate. 5 - Demonstrate understanding of word relationships and nuances in word meanings. 6 - Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
Mathematics	CC: Mathematical Practices (MP) 1 - Make sense of problems and persevere in solving them. 4 - Model with mathematics. 5 - Use appropriate tools strategically. 6 - Attend to precision. 7 - Look for and make use of structure. 8 - Look for and express regularity in repeated reasoning.
Science	Physical Science Force and Motion (Newton's Laws) 9-11 PS1A: Average velocity is defined as a change in position with respect to time. Velocity includes both speed and direction. 9-11 PS1B: Average acceleration is defined as a change in velocity with respect to time. Acceleration indicates a change in speed and/or a change in direction. 9-11 PS1C: An object at rest will remain at rest unless acted on by an unbalanced force. An object in motion at constant velocity will continue at the same velocity unless acted on by an unbalanced force. (Newton's First Law of Motion, the Law of Inertia) 9-11 PS1D: A net force will cause an object to accelerate or change direction. A less massive object will speed up more quickly than a more massive object subjected to the same force. (Newton's Second Law of Motion, F=ma) 9-11 PS1E: Whenever one object exerts a force on another object, a force of equal magnitude is exerted on the first object in the opposite direction. (Newton's Third Law of Motion) 9-11 PS1F: Gravitation is a universal attractive force by which objects with mass attract one another. The gravitational force between two objects is proportional to their masses and inversely proportional to the square of the distance between the objects. (Newton's Law of Universal Gravitation) 9-11 PS1G: Electrical force is a force of nature independent of gravity that exists between charged objects. Opposite charges attract while like charges repel. 9-11 PS1H: Electricity and magnetism are two aspects of a single electromagnetic force. Moving electric charges produce magnetic forces, and moving magnets produce electric forces. Matter Properties and Change (Chemical Reactions) 9-11 PS2A: Atoms are composed of protons, neutrons, and electrons. The nucleus of an atom takes up very little of the atom's volume but makes up almost all of the mass. The nucleus contains protons and neutrons, which are much more massive than the electrons surrounding the nucleus. Protons have a positive charge, electrons are negative in charge, and neutrons have no net charge. 9-11 PS2B: Atoms of the same element have the same number of protons. The number and arrangement of electrons determines how the atom interacts with other atoms to form molecules and ionic arrays. 9-11 PS2C: When elements are listed in order according to the number of protons, repeating patterns of physical and chemical properties identify families of elements with similar properties. This Periodic Table is a consequence of the repeating pattern of outermost electrons. 9-11 PS2D: Ions are produced when atoms or molecules lose or gain electrons, thereby gaining a positive or negative electrical charge. Ions of opposite charge are attracted to each other, forming ionic bonds. Chemical formulas for ionic compounds represent the proportion of ion of each element in the ionic array. 9-11 PS2E: Molecular compounds are composed of two or more elements bonded together in a fixed proportion by sharing electrons between atoms, forming covalent bonds. Such

	compounds consist of well-defined molecules. Formulas of covalent compounds represent the types and number of atoms of each element in each molecule. 9-11 PS2F: All forms of life are composed of large molecules that contain carbon. Carbon atoms bond to one another and other elements by sharing electrons, forming covalent bonds. Stable molecules of carbon have four covalent bonds per carbon atom. 9-11 PS2G: Chemical reactions change the arrangement of atoms in the molecules of substances. Chemical reactions release or acquire energy from their surroundings and result in the formation of new substances. 9-11 PS2H: Solutions are mixtures in which particles of one substance are evenly distributed through another substance. Liquids are limited in the amount of dissolved solid or gas that they can contain. Aqueous solutions can be described by relative quantities of the dissolved substances and acidity or alkalinity (pH). 9-11 PS2I: The rate of a physical or chemical change may be affected by factors such as temperature, surface area, and pressure. 9-11 PS2J: The number of neutrons in the nucleus of an atom determines the isotope of the element. Radioactive isotopes are unstable and emit particles and/or radiation. Though the timing of a single nuclear decay is unpredictable, a large group of nuclei decay at a predictable rate, making it possible to estimate the age of materials that contain radioactive isotopes. 9-11 PS2K: Nuclear reactions convert matter into energy, releasing large amounts of energy compared with chemical reactions. Fission is the splitting of a large nucleus into smaller pieces. Fusion is the joining of nuclei and is the process that generates energy in the Sun and other stars. Energy Transfer, Transformation, and Conservation 9-11 PS3A: Although energy can be transferred from one object to another and can be transformed from one form of energy to another form, the total energy in a closed system is constant and can neither be created nor destroyed. (Conservation of Energy) 9-11 PS3B: Kinetic energy is the energy of motion. The kinetic energy of an object is defined by the equation: EK = ½ MV2

COMPONENTS AND ASSESSMENTS	
Performance Assessments: • Students will complete required NATEF tasks in Automotive Engine Performance as per the EP task list and associated work sheets. Students take the ASE certification tests at the semesters end.	
Leadership Alignment: Students complete Skills USA Professional Development Program and compete in regional, state and national competitions.	
Standards and Competencies	
Unit: Engine Performance	
Industry Standards and/or Competencies	**Total Learning Hours for Unit:** 90
• ENGINE PERFORMANCE (EP) • EP - A. General • 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. • 2. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action • 3. Perform cylinder power balance test; determine necessary action. • 4. Perform cylinder cranking and running compression tests; determine necessary action. • 5. Perform cylinder leakage test; determine necessary action. • 6. Verify engine operating temperature. • 7. Remove and replace spark plugs; inspect secondary ignition components for wear and damage. • EP - B. Computerized Engine Controls • 1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. • 2. Describe the importance of operating all OBDII monitors for repair verification. • EP - C. Fuel, Air Induction, and Exhaust Systems	

- 1. Replace fuel filter(s).
- 2. Inspect, service, or replace air filters, filter housings, and intake duct work.
- 3. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action.
- 4. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed.
- 5. Check and refill diesel exhaust fluid (DEF)
- EP - D. Emissions Control Systems
- 1. Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.

Aligned Washington State Learning Standards	
English Language Arts	CC: College and Career Readiness Anchor Standards for Language Conventions of Standard English 1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. 2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. Knowledge of Language 3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. Vocabulary Acquisition and Use 4 - Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate. 5 - Demonstrate understanding of word relationships and nuances in word meanings. 6 - Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. CC: Reading for Literacy in Science and Technical Subjects Key Ideas and Details (9-10) 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text. Craft and Structure (9-10) 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 9–10 texts and topics. Integration of Knowledge and Ideas (9-10) 7 - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. 8 - Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. 9 - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. 10 - By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently Key Ideas and Details (11-12) 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. 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.

	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. Craft and Structure (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. 5 - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. 6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. Integration of Knowledge and Ideas (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. 8 - Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. Range of Reading and Level of Text Complexity (11-12) 10 - By the end of grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently.
Mathematics	CC: Mathematical Practices (MP) 1 - Make sense of problems and persevere in solving them. 4 - Model with mathematics. 5 - Use appropriate tools strategically. 6 - Attend to precision. 7 - Look for and make use of structure. 8 - Look for and express regularity in repeated reasoning.
Science	Physical Science Force and Motion (Newton's Laws) 9-11 PS1A: Average velocity is defined as a change in position with respect to time. Velocity includes both speed and direction. 9-11 PS1B: Average acceleration is defined as a change in velocity with respect to time. Acceleration indicates a change in speed and/or a change in direction. 9-11 PS1C: An object at rest will remain at rest unless acted on by an unbalanced force. An object in motion at constant velocity will continue at the same velocity unless acted on by an unbalanced force. (Newton's First Law of Motion, the Law of Inertia) 9-11 PS1D: A net force will cause an object to accelerate or change direction. A less massive object will speed up more quickly than a more massive object subjected to the same force. (Newton's Second Law of Motion, F=ma) 9-11 PS1E: Whenever one object exerts a force on another object, a force of equal magnitude is exerted on the first object in the opposite direction. (Newton's Third Law of Motion) 9-11 PS1F: Gravitation is a universal attractive force by which objects with mass attract one another. The gravitational force between two objects is proportional to their masses and inversely proportional to the square of the distance between the objects. (Newton's Law of Universal Gravitation) 9-11 PS1G: Electrical force is a force of nature independent of gravity that exists between charged objects. Opposite charges attract while like charges repel. 9-11 PS1H: Electricity and magnetism are two aspects of a single electromagnetic force. Moving electric charges produce magnetic forces, and moving magnets produce electric forces. Matter Properties and Change (Chemical Reactions) 9-11 PS2A: Atoms are composed of protons, neutrons, and electrons. The nucleus of an atom takes up very little of the atom's volume but makes up almost all of the mass. The nucleus contains protons and neutrons, which are much more massive than the

	electrons surrounding the nucleus. Protons have a positive charge, electrons are negative in charge, and neutrons have no net charge. 9-11 PS2B: Atoms of the same element have the same number of protons. The number and arrangement of electrons determines how the atom interacts with other atoms to form molecules and ionic arrays. 9-11 PS2G: Chemical reactions change the arrangement of atoms in the molecules of substances. Chemical reactions release or acquire energy from their surroundings and result in the formation of new substances. 9-11 PS2H: Solutions are mixtures in which particles of one substance are evenly distributed through another substance. Liquids are limited in the amount of dissolved solid or gas that they can contain. Aqueous solutions can be described by relative quantities of the dissolved substances and acidity or alkalinity (pH). 9-11 PS2I: The rate of a physical or chemical change may be affected by factors such as temperature, surface area, and pressure. Energy Transfer, Transformation, and Conservation 9-11 PS3A: Although energy can be transferred from one object to another and can be transformed from one form of energy to another form, the total energy in a closed system is constant and can neither be created nor destroyed. (Conservation of Energy)

COMPONENTS AND ASSESSMENTS

Performance Assessments:

- Students will complete required NATEF tasks in Engine Performance systems as per the EP task list and associated work sheets. Students take the ASE certification tests at the semesters end.

Leadership Alignment:

Students complete the Skills USA Professional Development Program and compete in regional, state and national skills competitions.

Standards and Competencies

Unit: Engine performance 2

Industry Standards and/or Competencies	**Total Learning Hours for Unit:** 90

- ENGINE PERFORMANCE (EP)
- EP - A. General
- 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- 2. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action
- 3. Perform cylinder power balance test; determine necessary action.
- 4. Perform cylinder cranking and running compression tests; determine necessary action.
- 5. Perform cylinder leakage test; determine necessary action.
- 6. Verify engine operating temperature.
- 7. Remove and replace spark plugs; inspect secondary ignition components for wear and damage.
- EP - B. Computerized Engine Controls
- 1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.
- 2. Describe the importance of operating all OBDII monitors for repair verification.
- EP - C. Fuel, Air Induction, and Exhaust Systems
- 1. Replace fuel filter(s).
- 2. Inspect, service, or replace air filters, filter housings, and intake duct work.
- 3. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action.
- 4. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed.
- 5. Check and refill diesel exhaust fluid (DEF)
- EP - D. Emissions Control Systems

• 1. Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	
Aligned Washington State Learning Standards	
English Language Arts	CC: Reading for Literacy in Science and Technical Subjects Key Ideas and Details (9-10) 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. 3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text. Craft and Structure (9-10) 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 9–10 texts and topics. 5 - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). Integration of Knowledge and Ideas (9-10) 7 - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. 8 - Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. 9 - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. Range of Reading and Level of Text Complexity (9-10) 10 - By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently Key Ideas and Details (11-12) 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. 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. 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. Craft and Structure (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. 5 - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. 6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. Integration of Knowledge and Ideas (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. 8 - Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. Range of Reading and Level of Text Complexity (11-12)

	10 - By the end of grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently. CC: College and Career Readiness Anchor Standards for Reading Key Ideas and Details 1 - Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. 2 - Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. 3 - Analyze how and why individuals, events, and ideas develop and interact over the course of a text. Craft and Structure 4 - Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. 5 - Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole. 6 - Assess how point of view or purpose shapes the content and style of a text. Integration of Knowledge and Ideas 7 - Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. 8 - Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. 9 - Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take. Range of Reading and Level of Text Complexity 10 - Read and comprehend complex literary and informational texts independently and proficiently.
Mathematics	CC: Mathematical Practices (MP) 1 - Make sense of problems and persevere in solving them. 2 - Reason abstractly and quantitatively. 4 - Model with mathematics. 5 - Use appropriate tools strategically. 6 - Attend to precision. 7 - Look for and make use of structure. 8 - Look for and express regularity in repeated reasoning.
Science	Physical Science Force and Motion (Newton's Laws) 9-11 PS1A: Average velocity is defined as a change in position with respect to time. Velocity includes both speed and direction. 9-11 PS1B: Average acceleration is defined as a change in velocity with respect to time. Acceleration indicates a change in speed and/or a change in direction. 9-11 PS1C: An object at rest will remain at rest unless acted on by an unbalanced force. An object in motion at constant velocity will continue at the same velocity unless acted on by an unbalanced force. (Newton's First Law of Motion, the Law of Inertia) 9-11 PS1D: A net force will cause an object to accelerate or change direction. A less massive object will speed up more quickly than a more massive object subjected to the same force. (Newton's Second Law of Motion, F=ma) 9-11 PS1E: Whenever one object exerts a force on another object, a force of equal magnitude is exerted on the first object in the opposite direction. (Newton's Third Law of Motion) 9-11 PS1F: Gravitation is a universal attractive force by which objects with mass attract one another. The gravitational force between two objects is proportional to their masses and inversely proportional to the square of the distance between the objects. (Newton's Law of Universal Gravitation)

	9-11 PS1G: Electrical force is a force of nature independent of gravity that exists between charged objects. Opposite charges attract while like charges repel. 9-11 PS1H: Electricity and magnetism are two aspects of a single electromagnetic force. Moving electric charges produce magnetic forces, and moving magnets produce electric forces. Matter Properties and Change (Chemical Reactions) 9-11 PS2A: Atoms are composed of protons, neutrons, and electrons. The nucleus of an atom takes up very little of the atom's volume but makes up almost all of the mass. The nucleus contains protons and neutrons, which are much more massive than the electrons surrounding the nucleus. Protons have a positive charge, electrons are negative in charge, and neutrons have no net charge. 9-11 PS2B: Atoms of the same element have the same number of protons. The number and arrangement of electrons determines how the atom interacts with other atoms to form molecules and ionic arrays. 9-11 PS2C: When elements are listed in order according to the number of protons, repeating patterns of physical and chemical properties identify families of elements with similar properties. This Periodic Table is a consequence of the repeating pattern of outermost electrons. 9-11 PS2D: Ions are produced when atoms or molecules lose or gain electrons, thereby gaining a positive or negative electrical charge. Ions of opposite charge are attracted to each other, forming ionic bonds. Chemical formulas for ionic compounds represent the proportion of ion of each element in the ionic array. 9-11 PS2E: Molecular compounds are composed of two or more elements bonded together in a fixed proportion by sharing electrons between atoms, forming covalent bonds. Such compounds consist of well-defined molecules. Formulas of covalent compounds represent the types and number of atoms of each element in each molecule. 9-11 PS2F: All forms of life are composed of large molecules that contain carbon. Carbon atoms bond to one another and other elements by sharing electrons, forming covalent bonds. Stable molecules of carbon have four covalent bonds per carbon atom 9-11 PS2G: Chemical reactions change the arrangement of atoms in the molecules of substances. Chemical reactions release or acquire energy from their surroundings and result in the formation of new substances. 9-11 PS2H: Solutions are mixtures in which particles of one substance are evenly distributed through another substance. Liquids are limited in the amount of dissolved solid or gas that they can contain. Aqueous solutions can be described by relative quantities of the dissolved substances and acidity or alkalinity (pH). 9-11 PS2I: The rate of a physical or chemical change may be affected by factors such as temperature, surface area, and pressure. 9-11 PS2J: The number of neutrons in the nucleus of an atom determines the isotope of the element. Radioactive isotopes are unstable and emit particles and/or radiation. Though the timing of a single nuclear decay is unpredictable, a large group of nuclei decay at a predictable rate, making it possible to estimate the age of materials that contain radioactive isotopes. 9-11 PS2K: Nuclear reactions convert matter into energy, releasing large amounts of energy compared with chemical reactions. Fission is the splitting of a large nucleus into smaller pieces. Fusion is the joining of nuclei and is the process that generates energy in the Sun and other stars. Energy Transfer, Transformation, and Conservation 9-11 PS3A: Although energy can be transferred from one object to another and can be transformed from one form of energy to another form, the total energy in a closed system is constant and can neither be created nor destroyed. (Conservation of Energy) 9-11 PS3B: Kinetic energy is the energy of motion. The kinetic energy of an object is defined by the equation: EK = ½ MV2 9-11 PS3C: Gravitational potential energy is due to the separation of mutually attracting masses. Transformations can occur between gravitational potential energy and kinetic energy, but the total amount of energy remains constant. 9-11 PS3D: Waves (including sound, seismic, light, and water waves) transfer energy when they interact with matter. Waves can have different wavelengths, frequencies, and amplitudes, and travel at different speeds.

COMPONENTS AND ASSESSMENTS
Performance Assessments:

- Students will complete required NATEF tasks Electrical/Electronic systems as per the EE task list and associated work sheets. Students take the ASE certification tests at the semesters end.

Leadership Alignment:
Students complete Skills USA Professional Development Program and participate in regional, state and national skills competitions.

Standards and Competencies

Unit: Electrical/electronics

Industry Standards and/or Competencies	**Total Learning Hours for Unit:** 90

- ELECTRICAL/ELECTRONIC SYSTEMS (EE)
- EE - A. General
- 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- 2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).
- 3. Use wiring diagrams to trace electrical/electronic circuits.
- 4. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance.
- 5. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
- 6. Check operation of electrical circuits with a test light.
- 7. Check operation of electrical circuits with fused jumper wires.
- 8. Measure key-off battery drain (parasitic draw).
- 9. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
- 10. Perform solder repair of electrical wiring.
- 11. Replace electrical connectors and terminal ends.
- EE - B. Battery Service
- 1. Perform battery state-of-charge test; determine necessary action.
- 2. Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.
- 3. Maintain or restore electronic memory functions.
- 4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.
- 5. Perform slow/fast battery charge according to manufacturer's recommendations.
- 6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.
- 7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
- 8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.
- 9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.
- EE - C. Starting System
- 1. Perform starter current draw test; determine necessary action.
- 2. Perform starter circuit voltage drop tests; determine necessary action.
- 3. Inspect and test starter relays and solenoids; determine necessary action.
- 4. Remove and install starter in a vehicle.
- 5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.
- EE - D. Charging System
- 1. Perform charging system output test; determine necessary action.
- 2. Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
- 3. Remove, inspect, and re-install generator (alternator).
- 4. Perform charging circuit voltage drop tests; determine necessary action.
- EE - E. Lighting Systems
- 1. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.

• 2. Aim headlights. • 3. Identify system voltage and safety precautions associated with high-intensity discharge headlights. • EE - F. Accessories • 1. Disable and enable airbag system for vehicle service; verify indicator lamp operation. • 2. Remove and reinstall door panel. • 3. Describe the operation of keyless entry/remote-start systems. • 4. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. • 5. Verify windshield wiper and washer operation; replace wiper blades.	
Aligned Washington State Learning Standards	
English Language Arts	CC: College and Career Readiness Anchor Standards for Language Conventions of Standard English 1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. 2 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. Knowledge of Language 3 - Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. Vocabulary Acquisition and Use 4 - Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate. 5 - Demonstrate understanding of word relationships and nuances in word meanings. 6 - Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. CC: Reading for Literacy in Science and Technical Subjects 1 - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. 3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text. Craft and Structure (9-10) 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 9–10 texts and topics. 5 - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). 6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. Integration of Knowledge and Ideas (9-10) 8 - Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. 9 - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. Range of Reading and Level of Text Complexity (9-10) 10 - By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently

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Science	Physical Science 9-11 PS2A: Atoms are composed of protons, neutrons, and electrons. The nucleus of an atom takes up very little of the atom volume but makes up almost all of the mass. The nucleus contains protons and neutrons, which are much more massive than the electrons surrounding the nucleus. Protons have a positive charge, electrons are negative in charge, and neutrons have no net charge. 9-11 PS2B: Atoms of the same element have the same number of protons. The number and arrangement of electrons determines how the atom interacts with other atoms to form molecules and ionic arrays. 9-11 PS2C: When elements are listed in order according to the number of protons, repeating patterns of physical and chemical properties identify families of elements with similar properties. This Periodic Table is a consequence of the repeating pattern of outermost electrons. 9-11 PS2D: Ions are produced when atoms or molecules lose or gain electrons, thereby gaining a positive or negative electrical charge. Ions of opposite charge are attracted to each other, forming ionic bonds. Chemical formulas for ionic compounds represent the proportion of ion of each element in the ionic array. 9-11 PS2E: Molecular compounds are composed of two or more elements bonded together in a fixed proportion by sharing electrons between atoms, forming covalent bonds. Such compounds consist of well-defined molecules. Formulas of covalent compounds represent the types and number of atoms of each element in each molecule.

	9-11 PS2F: All forms of life are composed of large molecules that contain carbon. Carbon atoms bond to one another and other elements by sharing electrons, forming covalent bonds. Stable molecules of carbon have four covalent bonds per carbon atom. 9-11 PS2G: Chemical reactions change the arrangement of atoms in the molecules of substances. Chemical reactions release or acquire energy from their surroundings and result in the formation of new substances. 9-11 PS2H: Solutions are mixtures in which particles of one substance are evenly distributed through another substance. Liquids are limited in the amount of dissolved solid or gas that they can contain. Aqueous solutions can be described by relative quantities of the dissolved substances and acidity or alkalinity (pH). 9-11 PS2I: The rate of a physical or chemical change may be affected by factors such as temperature, surface area, and pressure. 9-11 PS2J: The number of neutrons in the nucleus of an atom determines the isotope of the element. Radioactive isotopes are unstable and emit particles and/or radiation. Though the timing of a single nuclear decay is unpredictable, a large group of nuclei decay at a predictable rate, making it possible to estimate the age of materials that contain radioactive isotopes. 9-11 PS2K: Nuclear reactions convert matter into energy, releasing large amounts of energy compared with chemical reactions. Fission is the splitting of a large nucleus into smaller pieces. Fusion is the joining of nuclei and is the process that generates energy in the Sun and other stars. Energy Transfer, Transformation, and Conservation 9-11 PS3A: Although energy can be transferred from one object to another and can be transformed from one form of energy to another form, the total energy in a closed system is constant and can neither be created nor destroyed. (Conservation of Energy) 9-11 PS3B: Kinetic energy is the energy of motion. The kinetic energy of an object is defined by the equation: EK = ½ MV2 9-11 PS3C: Gravitational potential energy is due to the separation of mutually attracting masses. Transformations can occur between gravitational potential energy and kinetic energy, but the total amount of energy remains constant. 9-11 PS3D: Waves (including sound, seismic, light, and water waves) transfer energy when they interact with matter. Waves can have different wavelengths, frequencies, and amplitudes, and travel at different speeds.

COMPONENTS AND ASSESSMENTS	
Performance Assessments: • Students will complete required NATEF tasks in Maintenance and Light Repair as per the MLR task list and associated work sheets. Students take the ASE certification tests at the semesters end.	
Leadership Alignment: Students complete the Skills USA Professional Development Program and compete in regional, state and national competitions.	
Standards and Competencies	
Unit: Maintenance and light repair	
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•	
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21st Century Skills		
Check those that students will demonstrate in this course:		
LEARNING & INNOVATION **Creativity and Innovation** ☒Think Creatively ☒Work Creatively with Others ☒Implement Innovations **Critical Thinking and Problem Solving** ☒Reason Effectively ☒Use Systems Thinking ☒Make Judgments and Decisions ☒Solve Problems **Communication and Collaboration** ☒Communicate Clearly ☒Collaborate with Others	**INFORMATION, MEDIA & TECHNOLOGY SKILLS** **Information Literacy** ☒Access and /evaluate Information ☒Use and Manage Information **Media Literacy** ☒Analyze Media ☒Create Media Products **Information, Communications and Technology (ICT Literacy)** ☒Apply Technology Effectively	**LIFE & CAREER SKILLS** **Flexibility and Adaptability** ☒Adapt to Change ☒Be Flexible **Initiative and Self-Direction** ☒Manage Goals and Time ☒Work Independently ☒Be Self-Directed Learners **Social and Cross-Cultural** ☒Interact Effectively with Others ☒Work Effectively in Diverse Teams **Productivity and Accountability** ☒Manage Projects ☒Produce Results **Leadership and Responsibility** ☒Guide and Lead Others ☒Be Responsible to Others