AUTOMOTIVE SERVICE FUNDAMENTALS A	
CURRICULUM/CONTENT AREA	COURSE LENGTH
Applied & Technical Education (ATE)	*1 Term*
GRADE LEVEL	DATE LAST REVIEWED
10-12	*2023*
PREREQUISITE(s) *if applicable*	BOARD APPROVAL DATE
Power Systems: Small Engines and Auto preferred but not required	*9/10/2024*
PRIMARY RESOURCE *if applicable*	

DESIRED RESULTS

COURSE DESCRIPTION AND PURPOSE

This automotive course focuses on developing skills in professionalism, safety, and the use of basic hand and power tools in accordance with industry standards. Students are introduced to the automotive service industry and learn to use service information to perform basic under-hood and under-car services. Classroom activities will stress automotive fundamentals and theories. Shop activities will center on basic servicing of the automobile with safety being a priority.

ENDURING UNDERSTANDINGS *Students will understand that...*	ESSENTIAL QUESTIONS *Students will keep considering...*
Creativity, innovation, and critical thinking are essential for success in a technologically advanced world.	Why is creativity and innovation important? How is creativity and innovation used in the automotive field?
	How do teams efficiently and effectively solve problems in an increasingly complex world?
	What strategies and processes can I use to become a more effective creator, thinker and problem solver?
The ability to communicate and collaborate with people with diverse backgrounds and perspectives is key to participation in a global economic society.	Why is communication and collaboration important? How do positive work behaviors and personal qualities impact communication and collaboration?

	What is effective teamwork? What strategies can I use/teams use to work better together? How can perspectives and experiences of a diverse group develop innovative solutions to a given problem?
Career and technical education provides pathways to high-demand, high-wage career opportunities, and personal fulfillment.	Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?
	How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?
	What are employability skills? How do I prepare myself for a career that is in demand now and in 5, 10, or 20 years from now?

PRIORITY CAREER & TECHNICAL STANDARDS
Students will be skilled at...

Creativity, Critical Thinking, Communication and Collaboration
4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.
a: I develop effective resolutions for a given problem, decision or opportunity using available information.
b: I develop and implement a resolution for a new situation using personal knowledge and experience.

Career Development
CD4: Students will identify and apply employability skills.
a: I identify and demonstrate positive work behaviors and personal qualities needed to be employable.
b: I demonstrate skills related to seeking and applying for employment to find and obtain a desired job.
c: I identify and exhibit traits for retaining employment.
d: I develop positive relationships with others.

Information, Media, Technology
IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.
a: I choose appropriate sources of data and information for a given purpose.
b: I determine the relevance, validity and timeliness of data and information.
c: I select relevant information necessary for making decisions and solving problems
d: I apply data and information to communicate ideas and create new opportunities.

PRIORITY CONTENT STANDARDS
Students will know...

Standard: BB1: Students will analyze the core concepts of technology.

Standard: ENG1: Students will analyze and demonstrate the attributes of design.

Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.
Standard: ICT1: Students will analyze, select and use information and communication technologies.
Standard: MNF1: Students will be able to select and use manufacturing technologies.

Potential INDUSTRY-RECOGNIZED CREDENTIALS (IRCs) Opportunties associated with the course	Potential WORK BASED LEARNING (WBL) opportunities associated with the course
Student ASE Certification (G1-Maintenance & Light Repair)	Dealership/Shop Job Shadow
Safety Certification	Youth Apprenticeship-1 or 2 year
Lift Certification	
Potential DUAL CREDIT Opportunties associated with the course	
Auto Service Fundamentals Transcripted Credit (WCTC)	

UNIT 1: INTRODUCTION TO THE AUTOMOTIVE IND/SAFETY		
STAGE 1: Desired Unit Results *What will students understand as a result of the unit?*		**STAGE 2: Assessment Evidence** *By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?*
ESSENTIAL QUESTION (s) *What thought-provoking questions will foster inquiry, understanding, and transfer of learning?*		**Success Criteria with Standards** *The criteria for evaluating performance on standards is constant.*
Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?		CTE standards-based Rubric: Throughout course, students and teachers use rubric for communication of success criteria, reflection, goal setting, and feedback. Students continually reflect on and discuss essential questions in their notebook and orally in class.
How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?		
PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Creativity, Critical Thinking, Communication and Collaboration **4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.**		
a: I develop effective resolutions for a given problem, decision or opportunity using available information.	4C2.a.11.h: I can determine the information needed to address an identified problem.	Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation). Other assessments may include: oral presentations journals self & peer assessment tools (rubric/checklists rating scales) demonstrations paper-and-pencil tests laboratory reports portfolio analysis
Career Development **CD4: Students will identify and apply employability skills.**		
a: I identify and demonstrate positive work behaviors and personal qualities needed to be employable.	CD4.a.6.h: I can evaluate how selfdiscipline, self-worth, positive attitude and integrity displayed in a work situation affect employment status.	
Information, Media, Technology **IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.**		
d: I apply data and information to communicate ideas and create new opportunities.	IMT1.d.6.h: I can defend a proposal for a new product or service based on data and information analysis.	
PRIORITY CONTENT STANDARDS & Learning Targets		
Standard: BB1: Students will analyze the core concepts of technology.	**BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	
Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		

Standard TR1: Students will be able to select and use transportation technologies.	*I can describe the types of jobs available in the automotive industry.*	
	I can explain training and education options for technicians.	
	I can explain the areas of ASE certification.	
	I can describe the resons for the changes in automotive design and construction.	
	I can explain how to safely operate vehicles in the shop. (NATEF RST SAFETY #5)	
	I can identify and demonstrate proper safety in the automotive shop. (NATEF SAFETY #3,4,8,&10) *I can inspect and demonstrate the use of basic shop equipment. (NATEF RST SAFETY #2)*	
	I can idenitfy and demonstrate correct behaviors for the automotive shop. (NATEF RST SAFTEY #1,6,7,9,11&12)	
	I can identify and use emergency showers and eyewash statioins. (NATEF RST SAFETY #2)	
	I can locate, read, and interpret material safety data sheets. (NATEF RST SAFETY #15	
	I can demonstrate safe battery handling.	
	I can identify chemical hazards and demonstrate safe use and disposal of various automotive chemicals. (NATEF RST SAFETY #2 & 5)	
	I can identify fire hazards and fire extinguishers and demonstrate fire extinguisher use. (NATEF RST SAFETY #7)	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		

GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
Name some of the new features that are now included on todays' vehicles.	Key Vocabulary: ASE Education Foundation, collision technician, entry-level technician, express technician, line technician, National Institute for Automotive Service Excellence (ASE), parts technician, service advisor	
What are some of the aera's that a technician needs to be highly qualified?		
What are some of the careers in the automotive industry? Name them.		
Name some of the certifications the a technician can earn.		
Why must a technician have safe working habits?		
Name some PPE that a techniciain should be aware of.		
How does one raise and support a vehicle properly?		
How does one remove and charge a batter safely?		
What are some key safety items that a technician should know where and how to use them in a shop?		
What is the purpose of an MSDS?		
What is the difference between orange and red wiring on a vehicle?		

<table>
<tr><th colspan="3">UNIT 2 :TOOLS & EQUIPMENT/SHOP ORIENTATION</th></tr>
<tr><th colspan="2">STAGE 1: Desired Unit Results
What will students understand as a result of the unit?</th><th>STAGE 2: Assessment Evidence
By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?</th></tr>
<tr><td colspan="2">ESSENTIAL QUESTION (s)
What thought-provoking questions will foster inquiry, understanding, and transfer of learning?</td><td>Success Criteria with Standards
The criteria for evaluating performance on standards is constant.</td></tr>
<tr><td colspan="2">Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?</td><td rowspan="3">CTE standards-based Rubric: Throughout course, students and teachers use rubric for communication of success criteria, reflection, goal setting, and feedback.

Students continually reflect on and discuss essential questions in their notebook and orally in class.</td></tr>
<tr><td colspan="2">How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?</td></tr>
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Students may be given options to show their learning in varied ways.</td></tr>
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4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.</td><td rowspan="11">Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation).
Other assessments may include:
oral presentations
journals
self & peer assessment tools
(rubric/checklists rating scales)
demonstrations
paper-and-pencil tests
laboratory reports
portfolio analysis</td></tr>
<tr><td rowspan="2">a: I develop effective resolutions for a given problem, decision or opportunity using available information.</td><td rowspan="2">4C2.a.15.h: I can determine the best resolution for a problem, decision or opportunity based on given criteria.</td></tr>
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<tr><td rowspan="2">b: I develop and implement a resolution for a new situation using personal knowledge and experience.</td><td rowspan="2">4C2.b.6.h: I can use existing knowledge to develop a resolution for a new situation, problem or opportunity.</td></tr>
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<tr><td colspan="2">Career Development
CD4: Students will identify and apply employability skills.</td></tr>
<tr><td rowspan="2">a: I identify and demonstrate positive work behaviors and personal qualities needed to be employable.</td><td rowspan="2">CD4.a.10.h: I can manage work roles and responsibilities to balance them with other life roles and responsibilities.</td></tr>
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<tr><td rowspan="2">b: I demonstrate skills related to seeking and applying for employment to find and obtain a desired job.</td><td rowspan="2">CD4.b.7.h: I can employ critical thinking and decision-making skills to exhibit qualifications to a potential employer in an interview.</td></tr>
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<tr><td colspan="2">Information, Media, Technology
IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.</td></tr>
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</table>

and solving problems	IMT1.c.6.h: I can interpret and select appropriate information to develop a resolution for a given situation.	
d: I apply data and information to communicate ideas and create new opportunities.		
	IMT1.d.8.h: I can manage and share stored data and information for a specific purpose.	
PRIORITY CONTENT STANDARDS & Learning Targets		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Standard: BB1: Students will analyze the core concepts of technology.	**BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	
Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can identify the job requirements, routines, and housekeeping procedures for automotive technicians. (NATEF RST SAFETY #1)*	
	I can Identify basic hand and power tools and the correct operation for these tools. (NATEF RST TOOLS #1,2,3&4)	
	I can Demonstrate safe operation of vehicle hoists and jacking equipment. (NATEF RST SAFETY #3 &4)	
	I can Identify and locate vehicle identification information. (NATEF RST SERVICE #1)	
	I can Identify and coplete a repair order and maintain customer technician records. (NATEF RST SERVICE #1&5)	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	**STRATEGIES/ACTIVITIES** *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	**RESOURCES/MATERIALS** *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What are some of skills needed in the automotive career and auto repair industry?	*Key vocabulary:* *above ground lift, air hamer, battery charger, bench grinders, calibration decal, chain of command, combination wrench, dead blow hammer, emissions decal, fastener, impact wrench, in-ground lift, parts washer, pliers, punches, repair order, rubber mallet, screwdriver, service order, sockets, VIN, vice*	
What are the tools that a technician would use in the automotive field?		
What are the common drive end sizes for the common ratchet?		
Describe how to fix and repair damaged threads.		

Name the tools used to fix repair and fix damaged threads.		
What are the two common types of power tools that a technician would use on a vehicle?		
How do you torque a fastner to the correct torque?		
What does YMM stand for and why is it so important for a technician to know?		
Where is the VECI located and what information would it be used for?		
What are the types of lifts and how they operate that could be found in an automotive shop?		

UNIT 3: BASIC TECHNICIAN SKILLS		
STAGE 1: Desired Unit Results *What will students understand as a result of the unit?*		**STAGE 2: Assessment Evidence** *By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?*
ESSENTIAL QUESTION (s) *What thought-provoking questions will foster inquiry, understanding, and transfer of learning?*		**Success Criteria with Standards** *The criteria for evaluating performance on standards is constant.*
Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?		CTE standards-based Rubric: Throughout course, students and teachers use rubric for communication of success criteria, reflection, goal setting, and feedback. Students continually reflect on and discuss essential questions in their notebook and orally in class.
How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?		
PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Creativity, Critical Thinking, Communication and Collaboration **4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.**		*Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation).* *Other assessments may include:* *oral presentations* *journals* *self & peer assessment tools (rubric/checklists rating scales)* *demonstrations* *paper-and-pencil tests* *laboratory reports* *portfolio analysis*
b: I develop and implement a resolution for a new situation using personal knowledge and experience.	4C2.b.6.h: I can use existing knowledge to develop a resolution for a new situation, problem or opportunity.	
Career Development **CD4: Students will identify and apply employability skills.**		
a: I identify and demonstrate positive work behaviors and personal qualities needed to be employable.	CD4.a.6.h: I can evaluate how selfdiscipline, self-worth, positive attitude and integrity displayed in a work situation affect employment status.	
b: I demonstrate skills related to seeking and applying for employment to find and obtain a desired job.	CD4.b.6.h: I can prepare a resume, cover letter, employment application.	
	CD4.b.7.h: I can employ critical thinking and decision-making skills to exhibit qualifications to a potential employer in an interview.	
c: I identify and exhibit traits for retaining employment.	CD4.c.4.h: I can model behaviors that demonstrate reliability and dependability.	
	CD4.c.6.h: I can complete required employment forms and documentation.	
	CD4.c.7.h: I can summarize key activities necessary to retain a job in an industry.	
d: I develop positive relationships with others.	CD4.d.6.h: I can evaluate the best method to assist co-workers in accomplishing goals and tasks.	
	CD4.d.8.h: I can use a systematic approach to academic and career planning for students to achieve their learning, socio-cultural and work goals.	

Information, Media, Technology **IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.**		
d: I apply data and information to communicate ideas and create new opportunities.		
	IMT1.d.7.h: I can synthesize data and information from multiple sources to identify new trends.	
	IMT1.d.8.h: I can manage and share stored data and information for a specific purpose.	
PRIORITY CONTENT STANDARDS & Learning Targets		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Standard: BB1: Students will analyze the core concepts of technology.	**BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	
Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	I can Identify and demonstrate skills neessary for employment.	
	I can Demonstrate proper communication skills.	
	I can Identify and apply math skills related to automotive application.	
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Stage 3: Learning Activities

A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?

GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	**STRATEGIES/ACTIVITIES** *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	**RESOURCES/MATERIALS** *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What are the employability skills that technician needs for the automotive industry?	Key vocabulary: aftermarket, chemical reaction, employability skills, flat-rate guide, hydraulics, initiative, linear measurement, metric measurement, motivation, nonverbal communication, body language, OE parts, percentage, ratio, resume, specific gravity, torque, vacuum, warranty time	
Why is non-verbal communication skills important to the job?		
What are the two different measuring systems that a technician would use? and show how to use both?		
What are atoms and how are they used in the automobile?		

What is the difference between atmospheric pressure and vacuum pressure?		
What are the different characteristics of electricity?		
What information is located on a resume and cover letter?		
What information is on a repair order and how they are used?		
What is the difference between flat-rate compaired to hourly rate?		

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Other assessments may include:
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<tr><td colspan="2">Career Development
CD4: Students will identify and apply employability skills.</td></tr>
<tr><td>d: I develop positive relationships with others.</td><td>CD4.d.5.h: I can participate in cocurricular and community activities to enhance the school experience.</td></tr>
<tr><td colspan="2">Information, Media, Technology
IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.</td></tr>
<tr><td>a: I choose appropriate sources of data and information for a given purpose.</td><td>IMT1.a.6.h: I can justify the selection of various information sources for a given purpose.</td></tr>
<tr><td rowspan="2">b: I determine the relevance, validity and timeliness of data and information.</td><td></td></tr>
<tr><td>IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.</td></tr>
<tr><td rowspan="2">c: I select relevant information necessary for making decisions and solving problems</td><td></td></tr>
<tr><td>IMT1.c.6.h: I can interpret and select appropriate information to develop a resolution for a given situation.</td></tr>
<tr><td rowspan="3">d: I apply data and information to communicate ideas and create new opportunities.</td><td></td></tr>
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<tr><td>IMT1.d.8.h: I can manage and share stored data and information for a specific purpose.</td></tr>
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Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can Identify different types of tires and their construction. (NATEF MLR 4.D.1)*	
	I can Rotate tires per the manufacturer's specifictions. (NATEF MLR 4.D.2)	
	I can Check and adjust tire pressure. (NATEF MLR 4.D.1)	
	I can Inspect the wheel and tire for air loss and repair tire. (NATEF MLR 4.D.5 & 4.D.6)	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What are some the similarities and differences between radial tire and run-flat tires?	Key vocabulary: air pressure, all-season tires, asymmetrical tires, centerbore, contact patch, direct TPMS, directional tires, dynamic wheel balance, hubcap, indirect TMPS, lateral renout, performance tires, pounds per square inch, radial runout, run-flat tires, shimmy, static wheel balance, temperature rating, tire rotation, TPMS reset, traction rating, tramp, treadwear rating, wheel bearing, wheel offset	
What are the benefits of a kneumatic tire on a vehicle?		
What information is located on the tire and what does it mean?		
What is the difference between direct and indirect TPMS systems?		
Describe how and when a TPMS should be reset or relearned.		
Name all the items that are included on a tire inspection.		
How and why are tire rotation part of vehicle maintenance?		

<table>
<tr><th colspan="3">UNIT 5: SUSPENSION SYSTEM PRINCIPLES</th></tr>
<tr><th colspan="2">STAGE 1: Desired Unit Results
What will students understand as a result of the unit?</th><th>STAGE 2: Assessment Evidence
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<tr><td colspan="2">How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?</td></tr>
<tr><td colspan="2">PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets</td><td>Performance Tasks Options/ Assessment Strategies by Standard
Students may be given options to show their learning in varied ways.</td></tr>
<tr><td colspan="2">Creativity, Critical Thinking, Communication and Collaboration
4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.</td><td rowspan="15">Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation).

Other assessments may include:
oral presentations
journals
self & peer assessment tools
(rubric/checklists rating scales)
demonstrations
paper-and-pencil tests
laboratory reports
portfolio analysis</td></tr>
<tr><td rowspan="2">a: I develop effective resolutions for a given problem, decision or opportunity using available information.</td><td>4C2.a.11.h: I can determine the information needed to address an identified problem.</td></tr>
<tr><td>4C2.a.15.h: I can determine the best resolution for a problem, decision or opportunity based on given criteria.</td></tr>
<tr><td colspan="2">Career Development
CD4: Students will identify and apply employability skills.</td></tr>
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IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.</td></tr>
<tr><td>a: I choose appropriate sources of data and information for a given purpose.</td><td>IMT1.a.6.h: I can justify the selection of various information sources for a given purpose.</td></tr>
<tr><td rowspan="2">b: I determine the relevance, validity and timeliness of data and information.</td><td></td></tr>
<tr><td>IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.</td></tr>
<tr><td rowspan="2">c: I select relevant information necessary for making decisions and solving problems</td><td></td></tr>
<tr><td>IMT1.c.6.h: I can interpret and select appropriate information to develop a resolution for a given situation.</td></tr>
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Standard: BB1: Students will analyze the core concepts of technology.	**BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	
Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can Describe the functions and operational principles of modern suspension systems.*	
	I can Identify the types of front and rear suspensions.	
	I can identify the components and their functions of the front and rear suspension systems.	
	I can Explain how changes in wheels and tires affect the suspension.	
	I can Explain the basic operation of electroncally controlled suspension systems.	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What are the components of a suspension system and how does it work?	*Key vocabulary:* *axle puller, camber, camber roll, caster, corrective alignment, geometric centerline, grease fitting, maintenance alignment, prealignment inspection, ride height, spring compressors, strut spring compressor, thrust line, toe, visual inspection*	
What is the reason for the suspension system?		
How does a dependent suspension system work?		
What is the difference between sprung and unsprung weight on a suspension system?		
How does reading a tire help the technician with diagnosing suspension problems?		
What is the purpose and how do shock obsorber work?		
What is the purpose ball joints and where are they located?		

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<tr><th colspan="3">UNIT 6: STEERING SYSTEM PRINCIPLES</th></tr>
<tr><th colspan="2">STAGE 1: Desired Unit Results
What will students understand as a result of the unit?</th><th>STAGE 2: Assessment Evidence
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Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Identify the components and functions of the steering system.* *Describe the operation of the rack and pinion and recirculating ball gearboxes.* *Explain the various types of steering linkage arrangements and components.* *Explain the operation of power and electric power assist systems.* *Decribe the function of steering angle sensors. (NATEF MLR 4.B.23)* *Describe the function of the power steering pressure switch. (NATEF mlr 4.b.23)*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What is the purpose of the steering system?	*Key vocabulary:* *bump steer, clock spring, collapsible steering column, drive belt, electric power steering, end-takeoff rack, flexible coupler, parallelogram linkage, power steering pump, rack and pinion, recirculating ball gearbox, steering angle sensor (SAS), steering ratio*	
Why is power steering system located on vehicle today?		
Explain how a power steering system works and name the components that are locate in the system.		
What are the pros and cons of a rack and pinion and parallelogram steering system?		
What steering system is mainly used on vehicle today and why?		
Wht are the two types of systems that can assist in power steering?		

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<tr><td colspan="2">STAGE 1: Desired Unit Results
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By what criteria will performances of understanding be assessed?
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<tr><td colspan="2">Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?</td><td rowspan="3">CTE standards-based Rubric: Throughout course, students and teachers use rubric for communication of success criteria, reflection, goal setting, and feedback.

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Students may be given options to show their learning in varied ways.

Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation).

Other assessments may include:
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journals
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Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Describe how leverage and hydraulic principles are used in brake systems operation.* *Explain how the master cylinder operates.* *Discuss the construction and purpose of brake lines and hoses.* *Describe how brake calipers and whell cylinders function.* *Describe the operation of the regenerative braking system.*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
How do the brakes operate on a vehicle?	*Key vocabulary:* *brake fade, brake fluid, brake light switches, calipers, coefficient of friction (CoF), F = P.A, hydraulics, hygroscopic, master cylinder, P = FIA*	
What are reasons for brake pedal free play?		
What are the main parts of the brake system?		
What is the difference between a proportioning valve and a metering valve?		
How are floating and fixed calipers different?		
What is the unique quality of the brake fluid?		
How is DOT 4 and DOT 5 brake fluid simular and diffenent?		
What is regenerative braking is and what vehicle can it be found on?		

UNIT 8: ELECTRICAL/ELECTRONIC SYSTEM PRINCIPLES	
STAGE 1: Desired Unit Results *What will students understand as a result of the unit?*	**STAGE 2: Assessment Evidence** *By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?*
ESSENTIAL QUESTION (s) *What thought-provoking questions will foster inquiry, understanding, and transfer of learning?*	**Success Criteria with Standards** *The criteria for evaluating performance on standards is constant.*
Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?	CTE standards-based Rubric: Throughout course, students and teachers use rubric for communication of success criteria, reflection, goal setting, and feedback. Students continually reflect on and discuss essential questions in their notebook and orally in class.
How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?	
PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets	**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Creativity, Critical Thinking, Communication and Collaboration **4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.**	*Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation).* *Other assessments may include:* *oral presentations* *journals* *self & peer assessment tools (rubric/checklists rating scales)* *demonstrations* *paper-and-pencil tests* *laboratory reports* *portfolio analysis*
a: I develop effective resolutions for a given problem, decision or opportunity using available information. — 4C2.a.11.h: I can determine the information needed to address an identified problem.	
4C2.a.15.h: I can determine the best resolution for a problem, decision or opportunity based on given criteria.	
Career Development **CD4: Students will identify and apply employability skills.**	
d: I develop positive relationships with others. — CD4.d.5.h: I can participate in cocurricular and community activities to enhance the school experience.	
Information, Media, Technology **IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.**	
a: I choose appropriate sources of data and information for a given purpose. — IMT1.a.6.h: I can justify the selection of various information sources for a given purpose.	
b: I determine the relevance, validity and timeliness of data and information.	
IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.	
c: I select relevant information necessary for making decisions and solving problems	
IMT1.c.6.h: I can interpret and select appropriate information to develop a resolution for a given situation.	
d: I apply data and information to communicate ideas and create new opportunities.	
IMT1.d.8.h: I can manage and share stored data and information for a specific purpose.	
PRIORITY CONTENT STANDARDS & Learning Targets	
Standard: BB1: Students will analyze the core concepts of technology. — **BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	

Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Explain the differences between AC and DC curent flows.* *Describe how AC and DC are used in the modern automobile.* *Explain curcuit types and thier operation. (NATEF MLR 6.A.2)* *Use Ohm's Law to explain circuit operations. (NATEF MLR 6.A.2)* *Decribe circuit protection and types of protection devices.* *Explain types of circuit faults and their causes.* *Explain the fundamentals of elcectromagnetism.* *Explain the purpose of operation of relays.* *Describe automotive wiring, connections, and terminals.* *Describe the basic electronic devices and their operation.*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What type electricity is used on todays vehicles?	*Key vocabulary:* *alternating current (AC), amperage, chassis ground, circuit, circuit breakers, circuit protection, conductor, connectors, data bus, digital multimeter, diode, direct current, electrical noise, electricity, electromagnetism, electronics, fuse, fuse links, ground, network, ohm, Ohm's law, parallel circuit, power source, relay, resistance, semiconductor, seris circuit, stranded wire, terminals, transistors, voltage, wire guage, wiring harness*	
What are some of the test that can be done on an vehicles electrical system?		
When would a digital multimeter and test light be used to diagnos a vehicles electrical system?		
What are the three pathways for electricity to flow?		
What is the purpose of a fuse and is it necessary?		
Describe the difference beteen AC and DC current.		
Why are diodes and transistors used in today's vehciles?		

<table>
<tr><th colspan="3">UNIT 9: BATTERY, STARTING, & CHARGING SYSTEM PRINCIPLES</th></tr>
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Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Identify battery ratings and battery types.* *Identify battery service safety precautions.* *Identify starter types and starter components, and describe starter operation.* *Identify componnets of the starting system.* *Identify high-voltage starting system components in hybrid vehicles.* *Explain how AC generators operate.* *Identify components of the AC generator.* *Determine how generator output is regulated.* *Identify components of the high-voltage charging system on hybrid vehicles. (NATEF MLR 6.B.7)*	

Stage 3: Learning Activities

A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?

GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What are the three components found in any battery?	*Key vocabulary:* *absorbed glass mat (AGM) battery, amp-hour rating, anode, battery cycle, battery reserve capacity, BCI group, cathode, cold cranking amps (CCA), cranking amps (CA), electrolyte, high-voltage battery, induction, insulated circuit, lead-acid battery*	
What chemicals are located in an automotive battery?		
What are the four stages of a battery called?		
What is the chemical change in the battery if it sits to long without being charged?		
What is the benefit of a maintenance free battery?		
How does the starting system operate?		
What color is the high voltage wire on a electric or hybrid vehicle?		
How does a internal combustion engine vehicle and a hybrid vehicle battery get recharged?		
What controlls the generators voltage output?		

UNIT 10: LIGHTING & ELECTRICAL ACCESSORIES		
STAGE 1: Desired Unit Results *What will students understand as a result of the unit?*		**STAGE 2: Assessment Evidence** *By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?*
ESSENTIAL QUESTION (s) *What thought-provoking questions will foster inquiry, understanding, and transfer of learning?*		**Success Criteria with Standards** *The criteria for evaluating performance on standards is constant.*
Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?		CTE standards-based Rubric: Throughout course, students and teachers use rubric for communication of success criteria, reflection, goal setting, and feedback. Students continually reflect on and discuss essential questions in their notebook and orally in class.
How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?		
PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Creativity, Critical Thinking, Communication and Collaboration **4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.**		*Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation).* *Other assessments may include:* *oral presentations* *journals* *self & peer assessment tools (rubric/checklists rating scales)* *demonstrations* *paper-and-pencil tests* *laboratory reports* *portfolio analysis*
a: I develop effective resolutions for a given problem, decision or opportunity using available information.	4C2.a.11.h: I can determine the information needed to address an identified problem.	
	4C2.a.15.h: I can determine the best resolution for a problem, decision or opportunity based on given criteria.	
Career Development **CD4: Students will identify and apply employability skills.**		
d: I develop positive relationships with others.	CD4.d.5.h: I can participate in cocurricular and community activities to enhance the school experience.	
Information, Media, Technology **IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.**		
a: I choose appropriate sources of data and information for a given purpose.	IMT1.a.6.h: I can justify the selection of various information sources for a given purpose.	
b: I determine the relevance, validity and timeliness of data and information.		
	IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.	
c: I select relevant information necessary for making decisions and solving problems		
	IMT1.c.6.h: I can interpret and select appropriate information to develop a resolution for a given situation.	
d: I apply data and information to communicate ideas and create new opportunities.		
	IMT1.d.8.h: I can manage and share stored data and information for a specific purpose.	
PRIORITY CONTENT STANDARDS & Learning Targets		
Standard: BB1: Students will analyze the core concepts of technology.	**BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	

Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Inspect and service interior and exterior lighting components. (NATEF MLR 6.E.1)* *Aim headlights. (NATEF MLR 6.E.2)* *Identify system voltage and safety precautions associated with high-intensity discharge headlights. (NATEF MLR 6.E.3)*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
How is the instrument panel illumination controlled?	*Key vocabulary:* *bulb check, CHMSL, dimmer switch, fob, halogen insert headlamp, high-intensity discharge (HID) lamp, incandescent bulb, indicator lights, instrument panel RKE, trade number, warning lights, window regulator*	
What are the safety prodicals when working on HID headlamps?		
Why and when do day time running lights operate?		
What are the rules when installing halagen light bulbs? and why?		
Why would a vehicles headlights need to be aimed?		
How does a solid-state flasher work?		

UNIT 11: ENGINE PERFORMANCE PRINCIPLES		
STAGE 1: Desired Unit Results *What will students understand as a result of the unit?*		**STAGE 2: Assessment Evidence** *By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?*
ESSENTIAL QUESTION (s) *What thought-provoking questions will foster inquiry, understanding, and transfer of learning?*		**Success Criteria with Standards** *The criteria for evaluating performance on standards is constant.*
Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?		CTE standards-based Rubric: Throughout course, students and teachers use rubric for communication of success criteria, reflection, goal setting, and feedback. Students continually reflect on and discuss essential questions in their notebook and orally in class.
How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?		
PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Creativity, Critical Thinking, Communication and Collaboration **4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.**		*Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation).* *Other assessments may include:* *oral presentations* *journals* *self & peer assessment tools (rubric/checklists rating scales)* *demonstrations* *paper-and-pencil tests* *laboratory reports* *portfolio analysis*
a: I develop effective resolutions for a given problem, decision or opportunity using available information.	4C2.a.11.h: I can determine the information needed to address an identified problem.	
	4C2.a.15.h: I can determine the best resolution for a problem, decision or opportunity based on given criteria.	
Career Development **CD4: Students will identify and apply employability skills.**		
d: I develop positive relationships with others.	CD4.d.5.h: I can participate in cocurricular and community activities to enhance the school experience.	
Information, Media, Technology **IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.**		
a: I choose appropriate sources of data and information for a given purpose.	IMT1.a.6.h: I can justify the selection of various information sources for a given purpose.	
b: I determine the relevance, validity and timeliness of data and information.		
	IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.	
c: I select relevant information necessary for making decisions and solving problems		
	IMT1.c.6.h: I can interpret and select appropriate information to develop a resolution for a given situation.	
d: I apply data and information to communicate ideas and create new opportunities.		
	IMT1.d.8.h: I can manage and share stored data and information for a specific purpose.	
PRIORITY CONTENT STANDARDS & Learning Targets		
Standard: BB1: Students will analyze the core concepts of technology.	**BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	

Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		**Performance Tasks Options/ Assessment Strategies by Standard** *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Explain the principles of engine operation.* *Identify components of the engine and its various subsystems.* *Describe four-cycle gasoline operation.* *Describe four-cycle diesel engine operation.* *Describe Atkinson cycle engine operation.*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	**STRATEGIES/ACTIVITIES** *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	**RESOURCES/MATERIALS** *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What are the two dominant fuels used in today's vehicles?	*Key vocabulary:* *additives, Atkinson cycle, atmosspheric pressure, biodiesel, camshaft, combustion stroke, compression ratio, compression stroke, cooling system, crankshaft, exhaust stroke, exhaust system, horsepower, hydrocarbons, ignition system, intake stroke, lubrication system*	
What is the difference between atmospheric pressure and vacuum pressure?		
How is the Atkinson cycle engine and Rotary engine similar/different?		
What is the name of the area above the piston in the cylinder?		
What is the benefit of a wet sump lubrication system?		
What controlls the amount of airflow into an engine?		
How does the ignition operate?		
What is the main job of the cooling system?		
What are the four cycles in a internal combustion engine?		
What is the difference between a gas and diesel internal combustion engine?		

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<tr><th colspan="2">STAGE 1: Desired Unit Results
What will students understand as a result of the unit?</th><th>STAGE 2: Assessment Evidence
By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?</th></tr>
<tr><td colspan="2">ESSENTIAL QUESTION (s)
What thought-provoking questions will foster inquiry, understanding, and transfer of learning?</td><td>Success Criteria with Standards
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Other assessments may include:
oral presentations
journals
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<tr><td rowspan="2">b: I determine the relevance, validity and timeliness of data and information.</td><td></td></tr>
<tr><td>IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.</td></tr>
<tr><td rowspan="2">c: I select relevant information necessary for making decisions and solving problems</td><td></td></tr>
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Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Inspect components of the positive crankcase ventilation (PCV) system. (NATEF MLR 8.D.1)* *Explain OBD II operation.* *Explain OBD II monitors, thier functions, and how to determine monitor status. (NATEF MLR 8.B.2)* *Retrieve and understand OBD II diagnostic trouble codes. (NATEF MLR 8.B.1)*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
Where are fuel filters located on todays vehicles?	*Key vocabulary:* *active test, air filter, comprehensive component monitor (CCM), continous monitor, drive cycle, enhanced OBD (EOBD), freeze frame, fuel trim, global OBD, history code, intrusive test, misfire monitor, monitor, noncontinuous monitors, oxygen sensor monitor, passive test, PCV valves, pending code, trip*	
What is the benefit of using VIN specific data?		
What is the procedure for inspecting the PCV system?		
What information does a vehicles OBDII system provide?		
Why is it important to look at the vehicles DTC's to help diagnose a problem?		

<table>
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<tr><td>IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.</td></tr>
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Standard: BB1: Students will analyze the core concepts of technology.	**BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	
Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Identify, check, and adjust transmission fluid levels. (NATEF MLR 8.C.1)* *Inspect for fluid leaks. (NATEF MLR 2.A.4 & 3.A.2)* *Inspect powertrain mounts. (NATEF MLR 2.B.3)* *Inspect and service front-wheel drive shafts. (NATEF MLR 3.D.2)* *Inspect the differential and refill with the correct lubricant. (NATEF MLR 3.E.1, 3.E.2 & 3.E.3)*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What is the purpose of the transmission?	*Key vocabulary:* *automatic transmission fluid (ATF), clutch disc, constant velocity joints, continuously variable transmission (CVT), differential, dual-clutch transmission (DCT), gear reduction, half shafts, limited-slip differential (LSD), overdrive, planetary gearset, power-split device, pressure plate, release bearing, shift solenoid, torque converter, transaxle*	
How is a u-joint and a CV joint inspected?		
How does a CVT transmission differ from an automatic transmission?		
Describe how does a manual transmission work?		
What is the propper procedure for check the automatic transmission fluid?		
What happens if the wrong fluid is put into an automatic transmission?		

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<tr><td rowspan="2">b: I determine the relevance, validity and timeliness of data and information.</td><td></td></tr>
<tr><td>IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.</td></tr>
<tr><td rowspan="2">c: I select relevant information necessary for making decisions and solving problems</td><td></td></tr>
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Standard: BB1: Students will analyze the core concepts of technology.	**BB1.a.5.h:** I can describe how systems can fail because of design flaws, defect parts, poorly matched parts or they were used beyond their design capabilities.	
Standard: ENG3: Students will demonstrate and analyze the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	**ENG3.a.5.h:** I can explain technological problems must be researched before they can be solved.	
SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *identify cooling system components and configurations (ASE Education Foundation MLR 1.D.1)* *perform cooling system pressure and dye tests to idnetify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core, and gallery (ASE Edcuation Foundation MLR 1.D.3)* *identify causes of engine overheating (ASE MLR 1.D.4)* *remove, inspect, and replace the engine thermostat following recommended service procedures (ASE MLR 1.D.8)* *inspect and test coolant; drain and recover coolant, flush and/or refill cooling system; use proper fluid type per manufacturers specifications; bleed the cooling system following recommended serve procedures (ASE MLR 1.D.6)* *Inspect and service cooling and heater system hoses following recommended service procedures (ASE MLR 7.C.1)* *Identify hybrid vehicle high-voltage aire conditioning components (ASE Foundational Task Shop and Personal Safety 14)* *Describe the components and operation of the heating and air conditioning systems. (ASE MLR 7..A.2)* *Inspect air conditioning drive belts (ASE MLR 7.A.3)* *Retrieve and record HVAC systems DTCs (ASE MLR 7.A.3)* *Inspect the air conditioning condenser for airflow restrictions (ASE MLR 7.B.2)*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
What is the main function of the vehicles cooling system?	*Key vocabulary:* *air bleed valve, blend door, blower motor, cabin air filter, coolant, compressor, condenser, evaporator, heater core, HVAC system, performance test, pressure tank, radiator, radiator fan, refractometer, refrigerant, thermostat, water pump*	
Today's car and truck use what type of cooling system?		
What are some of the safety proticals when inspecting the cooling system?		
Why is it important to flush the cooling system?		

What are some of the problems if the cabin air filter is not changed?		
What are the three types of radiator fans used on todays modern engines?		

<table>
<tr><th colspan="3">UNIT 15: VEHICLE MAINTENANCE</th></tr>
<tr><td colspan="2">STAGE 1: Desired Unit Results
What will students understand as a result of the unit?</td><td>STAGE 2: Assessment Evidence
By what criteria will performances of understanding be assessed? Through what authentic performance tasks will students demonstrate the desired unit results?</td></tr>
<tr><td colspan="2">ESSENTIAL QUESTION (s)
What thought-provoking questions will foster inquiry, understanding, and transfer of learning?</td><td>Success Criteria with Standards
The criteria for evaluating performance on standards is constant.</td></tr>
<tr><td colspan="2">Why is career and life readiness important? What jobs and careers are available to meet individual and societal needs locally, regionally, and nationally?</td><td rowspan="3">CTE standards-based Rubric: Throughout course, students and teachers use rubric for communication of success criteria, reflection, goal setting, and feedback.

Students continually reflect on and discuss essential questions in their notebook and orally in class.</td></tr>
<tr><td colspan="2">How might technical knowledge and skills influence one's employability and advancement opportunities within various work settings?</td></tr>
<tr><td colspan="2">PRIORITY CAREER & TECHNICAL STANDARDS & Learning Targets</td><td>Performance Tasks Options/ Assessment Strategies by Standard
Students may be given options to show their learning in varied ways.</td></tr>
<tr><td colspan="2">Creativity, Critical Thinking, Communication and Collaboration
4C2: Students will formulate and defend judgments and decisions by employing critical thinking skills.</td><td rowspan="15">Performance assessments: Project based assessments will be used in all units to assess student mastery. In addition other performance assessments will include lab reports/ portfolios, performance tests, demonstrations and employability review. All labs will be assessed using the rubric provided by NATEF (National Automotive Technicians Education Foundation).

Other assessments may include:
oral presentations
journals
self & peer assessment tools
(rubric/checklists rating scales)
demonstrations
paper-and-pencil tests
laboratory reports
portfolio analysis</td></tr>
<tr><td>a: I develop effective resolutions for a given problem, decision or opportunity using available information.</td><td>4C2.a.11.h: I can determine the information needed to address an identified problem.</td></tr>
<tr><td></td><td>4C2.a.15.h: I can determine the best resolution for a problem, decision or opportunity based on given criteria.</td></tr>
<tr><td colspan="2">Career Development
CD4: Students will identify and apply employability skills.</td></tr>
<tr><td>d: I develop positive relationships with others.</td><td>CD4.d.5.h: I can participate in cocurricular and community activities to enhance the school experience.</td></tr>
<tr><td colspan="2">Information, Media, Technology
IMT1: Students will access, interpret and evaluate information from a variety of sources in order to inform and support premises, arguments, decisions, ideas and initiatives.</td></tr>
<tr><td>a: I choose appropriate sources of data and information for a given purpose.</td><td>IMT1.a.6.h: I can justify the selection of various information sources for a given purpose.</td></tr>
<tr><td rowspan="2">b: I determine the relevance, validity and timeliness of data and information.</td><td></td></tr>
<tr><td>IMT1.b.8.h: I can compare and contrast validity of information from electronic and non-electronic sources.</td></tr>
<tr><td rowspan="2">c: I select relevant information necessary for making decisions and solving problems</td><td></td></tr>
<tr><td>IMT1.c.6.h: I can interpret and select appropriate information to develop a resolution for a given situation.</td></tr>
<tr><td rowspan="3">d: I apply data and information to communicate ideas and create new opportunities.</td><td></td></tr>
<tr><td></td></tr>
<tr><td>IMT1.d.8.h: I can manage and share stored data and information for a specific purpose.</td></tr>
<tr><td colspan="2">PRIORITY CONTENT STANDARDS & Learning Targets</td><td></td></tr>
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SUPPORTING STANDARDS AND LEARNING TARGETS		Performance Tasks Options/ Assessment Strategies by Standard *Students may be given options to show their learning in varied ways.*
Standard TR1: Students will be able to select and use transportation technologies.	*I can...* *Explain how maintenance differs from repair.* *Explain why periodic mantenance is important for modern vehicles.* *Interpret vehicle maintenance schedules and indicators displays.* *Locate technical service bullitens (TSB's) and other service information. (NATEF MLR 1-8.A.1)* *Perform an oil and filter change. (NATEF MLR 1.C.5)* *Inspect and service engine coolant. (NATEF MLR 1.C.4)* *Inspect automatic transmission fluid. (NATEF MLR 2.A.2 , 2.A.3, & 2.A.4)* *Inspect manual transmission fluid. (NATEF MLR 3.A.2 & 3.A.3)* *Inspect and service engine air filters. (NATEF MLR 8.C.2)*	
Stage 3: Learning Activities *A brief summary of the key learning activities- How will students build knowledge & develop skills? How will learning be relevant, accessible, and engaging? How will the learning unforld in a natural flow?*		
GUIDING UNIT QUESTIONS *Using Costas Level of Thinking, what questions will hook and hold students so that they develop a deep understanding of the desired results? The guiding questions are more topic-specific to the particular unit. They guide the exploration of the essential questions and rigor of the standards. This may include questions that guide project based/ problem based learning*	STRATEGIES/ACTIVITIES *What learning strategies and experiences will authentically engage students so that they gain understanding the desired results? This includes strategies and activities that help learners acquire targeted knowledge and skills, make meaning of important ideas, and transfer their learning to new situations. Consider how the learning will be tailored and flexible to address the interests and learning styles of all students.*	RESOURCES/MATERIALS *This includes an applicable textbooks, software, industry recognized certification software/tools, subcriptions (such asPLTW), etc.*
Why is periodic maintenance on vehicle important?	*Key vocabulary:* *ACEA standards, air filter, American Petroleum Institute (API), diesel exhaust fluid (DEF), hybrid organic acid technology (HOAT), ILSAC, maintenance, maintenance reminder, multiviscosity oils, organic acid technology (OAT), severe service, Society of Automotive Engineers (SAE)*	
What is the purpose of preventive maintanance?		
What happens if you fail to do any maintanance on a vehicle?		
How would one know how and when vehicle maintanance accures?		
What are some types of maintenance reminder systems?		
How does one do a steering and suspension inspection?		
How many different fluids are located on a vehicle?		
Name the different types of vehicle coolants.		
What are the different color fluids located on a vehicle?		