Automotive II

Unit Title: **Shop and Machine Safety Review**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.12.CI.1:	Demonstrate the ability to reflect, analyze, and use creative skills and ideas.	With a growth mindset, failure is an important part of success.
9.4.12.CI.3:	Investigate new challenges and opportunities for personal growth, advancement, and transition.	Innovative ideas or innovation can lead to career opportunities.
9.4.12.IML.3:	Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions.	Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.IML.4:	Assess and critique the appropriateness and impact of existing data visualizations for an intended audience	Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.TL.4:	Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.	Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.
9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth	There are strategies to improve one's professional value and marketability.
9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Automotive II

Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
Students will understand that… ● The machines must be used properly or injury may occur. ● A clean workspace can prevent many injuries from occurring in the first place.	● What hazards are associated with each machine found in the shop? ● What preventative measures do we take to prevent injury? ● Where is the safety equipment located in the shop and how do we operate it?
Content: ● Machine safety. ● Machine operation. ● Hand tools. ● Hand tool safety. ● Chemical safety. ● Chemical use. ● Fire suppression. ● Locations of all safety equipment in the classroom. ● Power tools. ● Power tool safety ● Air tools. ● Air tool safety.	**Skills(Objectives):** Students will be able to… ● Safely operate all machines. ● Safely use all hand tools. ● Safely use and handle chemicals. ● Safely use all power tools. ● Safely use all air tools. ● Properly use all fire suppression equipment ● Identify hazards in the shop

Interdisciplinary Connections

NJSLSA.R7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
RST.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.
WHST.9-12.1: Write arguments focused on discipline-specific content.
HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.
8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.
8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.
RL.11-12.1 Cite strong and thorough textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
RL.9-10.2 Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details and provide an objective summary of the text.
RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently
CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.

Automotive II

REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Stage 2: Assessment Evidence

Performance Task(s):
- Chapter/Unit Test
- Presentations/Projects
- Practical Demonstration

Other Evidence:
- Do Now
- Concept Map
- Notebook

Stage 3: Learning Plan

Learning Opportunities/Strategies:
- Observation
- Homework
- Class participation
- Writing Assignments
- Hands on Demonstrations

Resources:
- Shop Safety Equipment
- Fire Extinguisher Information Sheet
- Fire Evacuation Review
- Shop Tools
- Shop Equipment

Differentiation

*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Extra credit assignments for faster paced students	Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Pair students with a partner if needed	Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Response to Intervention (RTI) www.help4teachers.com (search tiered lesson plan template) Pair students with a partner if needed Pacing deadlines for slower paced students	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

Automotive II

Unit Title: **Vehicle Maintenance Review**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth	There are strategies to improve one's professional value and marketability.
9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
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9.4.12.IML.4:	Assess and critique the appropriateness and impact of existing data visualizations for an intended audience	Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.TL.4:	Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.	Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.

Central Idea/Enduring Understanding:

Students will understand that…

- Proper vehicle maintenance is critical to vehicle longevity, performance and economy.

Essential/Guiding Question:

- What is the difference between normal service and severe service?
- What is preventative maintenance?

Automotive II

Content:	**Skills(Objectives):**
• Ignition components. • Fuel system components. • Intake components. • Oils and viscosities. • Transmission & gear fluids. • Coolant/Antifreeze types. • Tires. • Belts & hoses.	Students will be able to… • Remove, inspect and replace spark plugs and other ignition components. • Replace fuel filters and inspect fuel system components. • Replace air filters, MAF sensors and diagnose intake or vacuum problems. • Describe the difference in oil viscosities. • Explain where specific transmission and gear fluids go in a particular vehicle. • Explain the difference in automotive coolants/antifreeze. • Read and explain tire information. • Inspect, remove and replace worn belts and hoses

Interdisciplinary Connections

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RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently
CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.
REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Automotive II

Stage 2: Assessment Evidence

Performance Task(s):
- Chapter/Unit Test
- Presentations/Projects
- Practical Demonstration

Other Evidence:
- Do Now
- Concept Map
- Notebook

Stage 3: Learning Plan

Learning Opportunities/Strategies:
- Observation
- Homework
- Class participation
- Writing Assignments
- Hands on Demonstrations

Resources:
- Scan Tool
- Shop Vehicle(s)
- Ignition part examples
- Belt and hose examples
- Fuel filter examples
- Engine oil samples
- Transmission fluid samples
- Gear oil samples
- Air filter samples
- Tire and tire handouts

Differentiation

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Automotive II

Unit Title: **Automotive Systems Review**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth	There are strategies to improve one's professional value and marketability.
9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
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Central Idea/Enduring Understanding:

Students will understand that…

- Failure to maintain one particular system in a vehicle can have adverse effects on one or more of the vehicles other systems.

Essential/Guiding Question:

- What are the major systems of an automobile?

Automotive II

Content:	**Skills(Objectives):**
• Engines. • Drivetrains. • Exhaust Systems. • Steering Systems. • Suspension Systems. • Electrical Systems. • Cooling Systems. • Heat & AC Systems. • Fuel Systems. • Brake Systems. • Safety & Restraint Systems	Students will be able to… • Describe the basic function of an engine and drivetrain. • Explain how an exhaust system works. • Explain how a basic steering system works. • Explain how a basic suspension system works • Describe some of the simple electrical systems. • Explain how the cooling system works. • Explain how heating and AC works. • Explain how a basic gasoline fuel system works. • Explain how a basic brake system works. • Describe some of components in a restraint system and how they work together.

Interdisciplinary Connections

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Stage 2: Assessment Evidence

Performance Task(s):	**Other Evidence:**
• Chapter/Unit Test • Presentations/Projects • Practical Demonstration	• Do Now • Concept Map • Notebook

Automotive II

Stage 3: Learning Plan

Learning Opportunities/Strategies:	**Resources:**
• Observation • Homework • Class participation • Writing Assignments • Hands on Demonstrations	• Shop Vehicle(s) • Scan Tool • Vehicle Systems Chart • System sample parts

Differentiation

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Automotive II

Unit Title: **Computer Systems and Diagnostics**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
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Automotive II

Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
Students will understand that… ● Computer systems have had a huge role in making automobiles more efficient, powerful and safer.	● What is On-Board Diagnostics? ● What are the differences between OBD-I and OBD-II?
Content: ● Scan Tools. ● On-Board Diagnostics I & II. ● System function tests. ● Computer override features. ● Live data output	**Skills(Objectives):** Students will be able to… ● Use multiple features in a scan tool. ● Retrieve information from OBD-I & OBD-II Systems. ● Perform system tests with a scan tool. ● Turn vehicle components on and off with a scan tool. ● Read and understand live data coming from a vehicle

Interdisciplinary Connections

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Stage 2: Assessment Evidence

Performance Task(s):	**Other Evidence:**
● Chapter/Unit Test ● Presentations/Projects ● Practical Demonstration	● Do Now ● Concept Map ● Notebook

Automotive II

Stage 3: Learning Plan

Learning Opportunities/Strategies:

- Observation
- Homework
- Class participation
- Writing Assignments
- Hands on Demonstrations

Resources:

- Shop Vehicle(s)
- Scan Tool
- DVOM
- AllData
- ECM/PCM examples

Differentiation

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Automotive II

Unit Title: **Advanced Brake Systems**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
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Automotive II

Central Idea/Enduring Understanding: Students will understand that… ● The brake system is one of the most important systems in an automobile. Proper working condition is critical	**Essential/Guiding Question:** ● What are the major components of a brake system? ● What are common causes for brake system failure?
Content: ● Brake pad compounds. ● Brake fluid types. ● Brake lines and hoses. ● Brake shoes. ● Brake rotor types. ● Brake drum types. ● Master cylinders. ● Brake boosters.	**Skills(Objectives):** Students will be able to… ● Describe the different types of brake pads. ● Explain the differences in brake fluids. ● Describe different types of brake lines and hoses. ● Explain how drum brakes work. ● Explain how disc brakes work. ● Describe how a vacuum booster works. ● Explain how a master cylinder works.

Interdisciplinary Connections

NJSLSA.R7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
RST.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.
WHST.9-12.1: Write arguments focused on discipline-specific content.
HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.
8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.
8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.
RL.11-12.1 Cite strong and thorough textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
RL.9-10.2 Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details and provide an objective summary of the text.
RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently
CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.
REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Automotive II

Stage 2: Assessment Evidence

Performance Task(s):
- Chapter/Unit Test
- Presentations/Projects
- Practical Demonstration

Other Evidence:
- Do Now
- Concept Map
- Notebook

Stage 3: Learning Plan

Learning Opportunities/Strategies:
- Observation
- Homework
- Class participation
- Writing Assignments
- Hands on Demonstrations

Resources:
- Brake pads
- Brake rotor(s)
- Brake shoes
- Brake drum
- Master cylinder
- Vacuum booster
- Brake lines and hoses
- Shop Vehicle(s)

Differentiation

*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Extra credit assignments for faster paced students	Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Pair students with a partner if needed	Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Response to Intervention (RTI) www.help4teachers.com (search tiered lesson plan template) Pair students with a partner if needed Pacing deadlines for slower paced students	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

Automotive II

Unit Title: **Advanced Steering and Suspension Systems**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.12.CI.1:	Demonstrate the ability to reflect, analyze, and use creative skills and ideas.	With a growth mindset, failure is an important part of success.
9.4.12.CI.3:	Investigate new challenges and opportunities for personal growth, advancement, and transition.	Innovative ideas or innovation can lead to career opportunities.
9.4.12.IML.3:	Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions.	Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.IML.4:	Assess and critique the appropriateness and impact of existing data visualizations for an intended audience	Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.TL.4:	Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.	Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.
9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth	There are strategies to improve one's professional value and marketability.
9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Automotive II

Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
Students will understand that… ● Worn or broken steering and suspension components can cause severe damage to other systems, parts or the vehicles occupants.	● Why is proper steering and suspension maintenance important? ● What adverse effects can poor alignment cause
Content: ● Power steering fluid types. ● Linkage steering. ● Rack-and-pinion steering. ● Power steering pumps. ● Suspension components.	**Skills(Objectives):** Students will be able to… ● Identify the major parts of a steering system. ● Explain the differences between linkage steering and rack-and-pinion steering. ● Describe the operation of hydraulic assist power steering. ● Identify the major parts of a suspension system ● Describe how a basic suspension system works. ● Explain the different types of suspension systems

Interdisciplinary Connections

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RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently
CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.
REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Automotive II

Stage 2: Assessment Evidence

Performance Task(s):
- Chapter/Unit Test
- Presentations/Projects
- Practical Demonstration

Other Evidence:
- Do Now
- Concept Map
- Notebook

Stage 3: Learning Plan

Learning Opportunities/Strategies:
- Observation
- Homework
- Class participation
- Writing Assignments
- Hands on Demonstrations

Resources:
- Shop Vehicle(s)
- Rack-and-pinion
- Steering linkage
- Power steering fluid examples
- Springs
- Strut
- Shock
- Control arm
- Ball joint

Differentiation

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High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
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Automotive II

Unit Title **Fuel Systems**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.12.CI.1:	Demonstrate the ability to reflect, analyze, and use creative skills and ideas.	With a growth mindset, failure is an important part of success.
9.4.12.CI.3:	Investigate new challenges and opportunities for personal growth, advancement, and transition.	Innovative ideas or innovation can lead to career opportunities.
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9.4.12.TL.4:	Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.	Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.
9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth	There are strategies to improve one's professional value and marketability.
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Automotive II

9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Central Idea/Enduring Understanding:

Students will understand that…

- Gasoline and diesel fuel are both combustible fluids but have different properties and should only be used in a vehicle they were designed for.

Essential/Guiding Question:

- What are the parts of a carburetor system?
- What are the parts of a gasoline injection system?
- What are the parts of a diesel injection system?

Content:

- Gasoline and diesel fuel properties.
- Octane and octane ratings.
- Cetane and cetane ratings.
- Combustion.
- Air-Fuel ratios.
- Detonation.
- Knock.
- Carburetors.
- Gasoline injection.
- Diesel fuel injection.

Skills(Objectives):

Students will be able to…

- Describe the properties of gasoline and diesel fuel.
- Explain octane ratings.
- Describe normal combustion cycles and some abnormal conditions.
- Describe how a carburetor works.
- Describe how a gasoline fuel injector works.
- Describe how a diesel fuel injector works.

Interdisciplinary Connections

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Automotive II

Stage 2: Assessment Evidence

Performance Task(s):	**Other Evidence:**
• Chapter/Unit Test • Presentations/Projects • Practical Demonstration	• Do Now • Concept Map • Notebook

Stage 3: Learning Plan

Learning Opportunities/Strategies:	**Resources:**
• Observation • Homework • Class participation • Writing Assignments • Hands on Demonstrations	• Shop Vehicle(s) • Gasoline engine • Diesel engine • Gasoline and diesel fuel samples • Gasoline fuel injectors • Knock sensor • Carburetor

Differentiation

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Automotive II

Unit Title: **Transmissions and Differentials**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.12.CI.1:	Demonstrate the ability to reflect, analyze, and use creative skills and ideas.	With a growth mindset, failure is an important part of success.
9.4.12.CI.3:	Investigate new challenges and opportunities for personal growth, advancement, and transition.	Innovative ideas or innovation can lead to career opportunities.
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9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth	There are strategies to improve one's professional value and marketability.
9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Automotive II

Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
Students will understand that… ● Automatic transmissions are very complex and internal repairs should not be attempted by general service technicians.	● What types of automatic transmissions are found in vehicles? ● What is a torque converter? ● How does a clutch operate?
Content: ● Automatic transmission fluids. ● Manual transmission fluids. ● Gear oils. ● Torque converters. ● Clutch types. ● Clutch release mechanisms. ● Differential types. ● Axle types.	**Skills(Objectives):** Students will be able to… ● Do basic service and repairs on automatic transmissions. ● Do basic service and repairs on manual transmissions. ● Do basic service and repairs on differentials. ● Explain how a clutch operates. ● Explain how a torque converter operates. ● Describe the different fluids used in transmissions and drivetrain components.

Interdisciplinary Connections

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Automotive II

Stage 2: Assessment Evidence

Performance Task(s):
- Chapter/Unit Test
- Presentations/Projects
- Practical Demonstration

Other Evidence:
- Do Now
- Concept Map
- Notebook

Stage 3: Learning Plan

Learning Opportunities/Strategies:
- Observation
- Homework
- Class participation
- Writing Assignments
- Hands on Demonstrations

Resources:
- Shop Vehicle(s)
- Manual transmission
- Clutch set
- Automatic transmission
- Torque converter
- Transmission fluid samples
- Gear oil samples

Differentiation

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Automotive II

Unit Title: **Engine Design and Construction**

Stage 1: Desired Results

Standards & Indicators:

9.3.12.TD-MTN.1 Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation.

9.3.12.TD-HSE.1 Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
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9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Automotive II

Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
Students will understand that… ● Today's engines are not only more efficient, but also more powerful too ● More sensors and electronics are getting added to engines each year and only expertly trained technicians will be able to service them as they get more complex.	● What are the parts of an engine? ● Are all engines the same? ● What is an interference engine?
Content: ● Engine parts and function. ● Engine block design. ● Cylinder head design. ● Cylinder head components. ● Engine configurations. ● Engine displacement.	**Skills(Objectives):** Students will be able to… ● Identify different engine parts. ● Explain the purpose or function of each engine part. ● Explain different engine block materials. ● Describe different engine block configurations. ● Explain how to calculate engine displacement. ● Describe different cylinder head designs.

Interdisciplinary Connections

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8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.
8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.
RL.11-12.1 Cite strong and thorough textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
RL.9-10.2 Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details and provide an objective summary of the text.
RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently
CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.
REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

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Stage 2: Assessment Evidence

Performance Task(s):	**Other Evidence:**
• Chapter/Unit Test • Presentations/Projects • Practical Demonstration	• Do Now • Concept Map • Notebook

Stage 3: Learning Plan

Learning Opportunities/Strategies:	**Resources:**
• Observation • Homework • Class participation • Writing Assignments • Hands on Demonstrations	• Shop Vehicle(s) • Engine block(s) • Engine parts (crankshaft, pistons, rings, connecting rods) • Cylinder heads

Differentiation

*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	**On Grade Level Students**	**Struggling Students**	**Special Needs/ELL**
Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Extra credit assignments for faster paced students	Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Pair students with a partner if needed	Teacher tutoring Peer tutoring Cooperative learning groups Differentiated instruction Response to Intervention (RTI) www.help4teachers.com (search tiered lesson plan template) Pair students with a partner if needed Pacing deadlines for slower paced students	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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Pacing Guide

Course Name	Resource	Standards
MP 1		
UNIT 1 Shop and Machine Safety Review 5 Days	• Shop Safety Equipment • Fire Extinguisher Information Sheet • Fire Evacuation Review • Shop Tools • Shop Equipment	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces. **9.3.12.TD-HSE.2** Develop solutions to improve performance of health, safety and environmental management services.
MP 1		
UNIT 2 Vehicle Maintenance Review 10 Days	• Scan Tool • Shop Vehicle(s) • Ignition part examples • Belt and hose examples • Fuel filter examples • Engine oil samples • Transmission fluid samples • Gear oil samples • Air filter samples • Tire and tire handouts	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces. **9.3.12.TD-HSE.2** Develop solutions to improve performance of health, safety and environmental management services.
MP 1		
UNIT 3 Automotive Systems Review 20 Days	• Shop Vehicle(s) • Scan Tool • Vehicle Systems Chart • System sample parts	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.

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		9.3.12.TD-HSE.2 Develop solutions to improve performance of health, safety and environmental management services.
MP 1		
UNIT 4 Computer Systems and Diagnostics 10 Days	• Shop Vehicle(s) • Scan Tool • DVOM • AllData • ECM/PCM examples	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces. **9.3.12.TD-HSE.2** Develop solutions to improve performance of health, safety and environmental management services.
MP 2		
UNIT 5 Advanced Brake Systems 10 Days	• Brake pads • Brake rotor(s) • Brake shoes • Brake drum • Master cylinder • Vacuum booster • Brake lines and hoses • Shop Vehicle(s)	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces. **9.3.12.TD-HSE.2** Develop solutions to improve performance of health, safety and environmental management services.
MP 2		
UNIT 6 Advanced Steering and Suspension Systems 10 Days	• Shop Vehicle(s) • Rack-and-pinion • Steering linkage • Power steering fluid examples • Springs	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental rules and regulations in

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	• Strut • Shock • Control arm • Ball joint •	transportation, distribution and logistics workplaces. **9.3.12.TD-HSE.2** Develop solutions to improve performance of health, safety and environmental management services.
MP 2		
UNIT 7 Fuel Systems 10 Days	• Shop Vehicle(s) • Gasoline engine • Diesel engine • Gasoline and diesel fuel samples • Gasoline fuel injectors • Knock sensor • Carburetor	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces. **9.3.12.TD-HSE.2** Develop solutions to improve performance of health, safety and environmental management services.
MP 2		
UNIT 8 Transmissions and Differentials 7 Days	• Shop Vehicle(s) • Manual transmission • Clutch set • Automatic transmission • Torque converter • Transmission fluid samples • Gear oil samples	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces. **9.3.12.TD-HSE.2** Develop solutions to improve performance of health, safety and environmental management services.
MP 2		
UNIT 9 Engine Design and Construction 8 Days	• Shop Vehicle(s) • Engine block(s) • Engine parts (crankshaft, pistons, rings, connecting rods) • Cylinder heads	**9.3.12.TD-MTN.1** Develop preventative maintenance plans and systems to keep facility and equipment inventory in operation. **9.3.12.TD-HSE.1** Describe the health, safety and environmental

		rules and regulations in transportation, distribution and logistics workplaces. **9.3.12.TD-HSE.2** Develop solutions to improve performance of health, safety and environmental management services.