

Automotive III

Course Description

This course will introduce students to the operational and automotive component systems focusing on the power-plant and transmission. Specifically but not restricted to fuel, intake, exhaust, ignition and automatic and manual transmission systems. Practical application of safe work habits and the correct use of tools and precision test instruments will be throughout the course. In addition, to meet the needs of changing technology, this program offers students the opportunity to master the necessary skills to pass the Automotive Service Excellence Certification (ASE) examination.

Automotive III

Pacing Guide		
Unit	Topic	Suggested Timing
Unit 1	Automotive Electronics	approx. 9 weeks
Unit 2	Automotive Heating and Cooling	approx. 9 weeks
Unit 3	Automotive Advanced Engine Repair I	approx. 8 weeks
Unit 4	Automotive Advanced Engine Repair II	approx. 9 weeks

Educational Technology Standards

8.1.12.A.1, 8.1.12.B.2, 8.1.12.C.1, 8.1.12.D.1, 8.1.12.E.1, 8.1.12.F.1

- **Technology Operations and Concepts**
 - Create a personal digital portfolio, which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
- **Creativity and Innovation**
 - Apply previous content knowledge by creating and piloting a digital learning game or tutorial.
- **Communication and Collaboration**
 - Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **Digital Citizenship**
 - Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
- **Research and Information Literacy**
 - Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **Critical Thinking, Problem Solving, Decision Making**
 - Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

Career Ready Practices

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

CRP1. Act as a responsible and contributing citizen and employee

Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

CRP2. Apply appropriate academic and technical skills.

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

CRP3. Attend to personal health and financial well-being.

Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.

CRP4. Communicate clearly and effectively and with reason.

Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

CRP5. Consider the environmental, social and economic impacts of decisions.

Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.

CRP6. Demonstrate creativity and innovation.

Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

CRP7. Employ valid and reliable research strategies.

Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

CRP9. Model integrity, ethical leadership and effective management.

Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.

CRP10. Plan education and career paths aligned to personal goals.

Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

CRP11. Use technology to enhance productivity.

Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

CRP12. Work productively in teams while using cultural global competence.

Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Differentiated Instruction

Strategies to Accommodate Students Based on Individual Needs

<u>Time/General</u>	<u>Processing</u>	<u>Comprehension</u>	<u>Recall</u>
<ul style="list-style-type: none"> • Extra time for assigned tasks • Adjust length of assignment • Timeline with due dates for projects • Communication system between home and school • Provide notes/outline 	<ul style="list-style-type: none"> • Extra Response time • Have students verbalize steps • Repeat, clarify or reword directions • Mini-breaks between tasks • Provide a warning for transitions • Work partners 	<ul style="list-style-type: none"> • Precise step-by-step directions • Short manageable tasks • Brief and concrete directions • Provide immediate feedback • Small group instruction • Emphasize multi-sensory learning 	<ul style="list-style-type: none"> • Teacher-made checklist • Use visual graphic organizers • Reference resources to promote independence • Visual and verbal reminders • Graphic organizers
<u>Assistive Technology</u>	<u>Tests/Quizzes/Grading</u>	<u>Behavior/Attention</u>	<u>Organization</u>
<ul style="list-style-type: none"> • Computer/whiteboard • Audio Recorder • Spell-checker • Audio-taped books 	<ul style="list-style-type: none"> • Extended time • Study guides • Shortened tests • Read directions aloud 	<ul style="list-style-type: none"> • Consistent daily structured routine • Simple and clear classroom rules • Frequent feedback 	<ul style="list-style-type: none"> • Individual daily planner • Display a written agenda • Note-taking assistance • Color code activities

Enrichment

Strategies Used to Accommodate Based on Students Individual Needs:

- Adaption of Material and Requirements
- Evaluate Vocabulary
- Elevated Activity Complexity
- Additional Projects
- Independent Student Options
- Projects completed individual or with Partners
- Self Selection of Project
- Tiered/Multilevel Projects
- Learning Centers
- Individual Response Blog
- Independent Studies of Manuals
- Open-ended Projects
- Community/Subject expert mentorships

Assessments

Suggested Formative/Summative Classroom Assessments

- Graphic Organizers
- Teacher-created Unit Assessments, Chapter Assessments, Quizzes
- Systematic Skills assessment
- Accountable Talk, Oral Report, Think Pair, and Share
- Projects, Portfolio,
- Homework
- Schematic Mapping
- Photo, Video problem solving analysis
- NATEF task sheets
- NATEF end of program exams

Interdisciplinary Connections

English Language Arts

- Journal writing
- Close reading of Automotive-related content
- Create a brochure for a Auto industry
- Keep a running word wall of Automotive vocabulary

Social Studies

- Research the history of a given Automotive Industry
- Research prominent historical individuals in Automotive Industry
- Use historical references to solve problems

World Language

- Translate Automotive/Transportation-content
- Create a translated index of Automotive vocabulary
- Generate a translated list of words and phrases related to workplace safety

Math

- Research Automotive occupation salaries for a geographic area and juxtapose against local cost of living
- Go on a geometry scavenger hunt within Automotive repair shop
- Track various data, such as Transportation's impact on the GDP, career opportunities or among individuals currently occupying Automotive careers

Fine & Performing Arts

- Create a poster advertising your Automotive Repair Shop
- Design a flag or logo to represent your shop

Science

- Research the environmental impact of Automotive industry
- Research latest developments in automotive technology
- Investigate automotive applicable-careers in STEM fields

New Jersey Student Learning Standards

9.3– Career and Technical Education

TRANSPORTATION, DISTRIBUTION & LOGISTICS CAREER CLUSTER

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

Pathway: FACILITY & MOBILE EQUIPMENT MAINTENANCE (TD□MTN)/ TRANSPORTATION OPERATIONS (TD□OPS)

- 9.3.12.TD□MTN.1: Develop preventative maintenance plans and systems to keep facility and mobile equipment inventory in operation.
- 9.3.12.TD□MTN.2: Design ways to improve facility and equipment system performance.
- 9.3.12.TD□OPS.1: Develop and evaluate transportation plans to move people and/or goods to meet customer requirements.
- 9.3.12.TD□OPS.2: Analyze performance of transportation operations in order to improve quality and service levels and increase efficiency.

Common Career Technical Core (CCTC)

Career Cluster Education & Training

TD 01 – Describe the nature and scope of the Transportation, Distribution & Logistics Career Cluster and the role of transportation, distribution and logistics in society and the economy.

- TD 01.3 – Identify the major modes of transportation and their role in society.

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

- TD-MTN 01.1 – Develop preventive maintenance plans and systems to meet equipment manufacturer requirements.
- TD-MTN 01.2 – Apply strategies used to monitor and evaluate the performance of maintenance plans and systems.

TD-MTN 2– Design ways to improve equipment performance.

- TD-MTN 02.1 – Develop plans for improving equipment performance.
- TD-MTN 02.2 – Execute repair plans for mobile equipment.
- TD-MTN 02.3 – Develop and execute repair plans based upon an assessment of the equipment inventory.

TD-HSE 1- Describe the health, safety and environmental rules and regulations in transportation workplace.

- TD-HSE 1.1 – Conduct audits and inspections and evaluate compliance with company policies and government laws and regulations.
- TD-HSE 1.3– Manage the ongoing implementation of health, safety and environmental policies, procedures and documentation systems including development of communication plans that promote and support the effort.

Common Core State Standards (CCSS)

CCSS - English-Language Arts

Key Ideas and Details:

- CCSS.ELA-LITERACY.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.

Craft and Structure:

- CCSS.ELA-LITERACY.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.

Integration of Knowledge and Ideas:

- CCSS.ELA-LITERACY.RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Range of Reading and Level of Text Complexity:

- CCSS.ELA-LITERACY.RST.11-12.10 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Common Core State Standards (CCSS)

CCSS - Mathematics

Explain volume formulas and use them to solve problems:

- CCSS.MATH.CONTENT.HSG.GMD.A.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder.
- CCSS.MATH.CONTENT.HSG.GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

Apply geometric concepts in modeling situations:

- CCSS.MATH.CONTENT.HSG.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder)
- CCSS.MATH.CONTENT.HSG.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., BTUs per cubic foot).
- CCSS.MATH.CONTENT.HSG.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost).

Reason quantitatively and use units to solve problems:

- CCSS.MATH.CONTENT.HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
- CCSS.MATH.CONTENT.HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

<p>Course: Automotive III</p> <p>Unit: III– Advanced Engine Repair and Performance I</p> <p>Grade Level: 9-12</p>	<p>Unit Overview:</p> <p>This course will introduce students to the operational and diagnostic phase of the automotive component systems. Utilizing the latest Computerized Engine Controls Diagnostic systems students will Inspect, test, adjust, and replace computerized engine control system sensors, powertrain control module (PCM), actuators, and circuits. Practical application of safe work Repair and Performance I students will focus on advanced Ignition System Diagnosis and Repair. Understanding of advanced automotive tools; safety practices and problem solving diagnostics are the essential next step in fulfilling the training that is needed for an automotive service career.</p>
<p>New Jersey Student Learning Standards (NJSLS): 9.3.12.TD.1, 9.3.12.TD.6,9.3.12.TD.5, 9.3.12.TD OPS.2</p>	
<p>Common Career Technical Core (CCTC): TD 01.3, TD-MTN 02.2, TD-MTN 02.3,TD-HSE 1.1</p>	
<p>Common Core State Standards (CCSS): RST.11-12.3; RST.11-12.4; RST.11-12.7; RST.11-12.10; HSG.GMD.A.1; HSG.GMD.A.3; HSG.MG.A.1; HSG.MG.A.2; HSG.MG.A.3; HSN.Q.A.1; HSN.Q.A.3</p>	

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
<p>Diagnose and Analyze engine performance of engines equipped with on-board computers by performing cylinder compression test.</p> <p>NJSLS: 9.3.12.TD.1, 9.3.12.TD.6,9.3.12.TD.5, 9.3.12.TD OPS.2</p> <p>CCTC: TD 01.3, TD-</p>	<p>What are the primary needs for running cylinder compression tests?</p> <p>What are specialty tools used to assess proper compression?</p> <p>How do we properly work around running engines in order to</p>	<ul style="list-style-type: none"> ▪ Describe the function and operation of an engine analyzer ▪ Demonstrate operation of an engine analyzer ▪ Explain primary circuit ▪ Explain secondary circuit ▪ Describe and demonstrate 	<p>Lab</p> <p>Given a vehicle, service manual, access to an engine analyzer and other test equipment, perform an engine performance test. Record any malfunction in the primary circuit, secondary circuit, computer control and sensors, fuel system,</p>	<p>EPA</p> <p>Automotive Electrical Diagnosis https://www.youtube.com/watch?v=g5n8zt7shD4</p> <p>EPA</p> <p>Environmental Compliance Guide for Auto Repair Shops https://www.ericthecargu.com/faq/solving-automotive-electrical-</p>

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
<p>MTN 02.2, TD-MTN 02.3,TD-HSE 1.1</p> <p>CCSS: CCSS: RL.9-10.1; RI.9-10.5; SL.9-10.1 HSG.GMD.A.3; HSG.MG.A.1; HSN.Q.A.1; HSN.Q.A.3</p>	<p>assess problem?</p> <p>What parts of the engine can be damaged because of bad compression?</p>	<p>emission test</p> <ul style="list-style-type: none"> ▪ Describe and demonstrate power balance test ▪ Demonstrate safety precautions when testing an operating engine ▪ Describe steps in preparing an engine for a cylinder compression test ▪ Describe how to install gauge and take reading ▪ Explain “wet” and “dry” test and the importance of each ▪ Explain all deviations found during test 	<p>emission system and power balance.</p> <p>Inspection/Checklist Provided an engine at normal operating temperatures, tools, gauges and service manual, perform a cylinder compression test. Cylinder pressure variation must test within manufacturer’s specifications. Perform wet and dry tests for significant deviations..</p>	<p>problems OSHA Hazardous Materials https://www.osha.gov/Publications/electrical_safety.html</p>
<p>Given a typical shop repair order Inspect, remove and replace points and condensers. Check distributor using a distributor tester and remove and replace</p>	<p>What are points and condensers? What is their function?</p> <p>What types of vehicles have points and condensers?</p>	<ul style="list-style-type: none"> ▪ Explain dwell settings ▪ Describe the condenser effect ▪ Inspect points and condensers for defects in wear ▪ Install points and 	<p>Lab Exercise Given a distributor (or vehicle) requiring point or condenser replacement, access to proper service manual and tools, remove and replace the points and</p>	<p>Downloadable Auto Repair Invoice http://www.tidyforms.com/auto-repair-invoice.html</p> <p>Autorestomod How to Install Adjust and Set Breaker Points</p>

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<p>distributor.</p> <p>NJSLS: 9.3.12.TD.1, 9.3.12.TD.6,9.3.12.TD.5, 9.3.12.TD OPS.2</p> <p>CCTC: TD 01.3, TD-MTN 02.2, TD-MTN 02.3,TD-HSE 1.1</p> <p>CCSS: CCSS: RL.9-10.1; RI.9-10.5; SL.9-10.1 HSG.GMD.A.3; HSG.MG.A.1; HSN.Q.A.1; HSN.Q.A.3</p>	<p>What unique equipment is necessary?</p>	<p>condenser and adjust points</p> <ul style="list-style-type: none"> ▪ Explain function of distributor ▪ Describe engine timing with distributor ▪ Explain timing setting at 180 degrees out ▪ Remove and test distributor ▪ Install and adjust distributor ▪ Explain spark advance curve ▪ Describe equipment hookup ▪ Demonstrate use of specification manual 	<p>condenser within manufacturer' specifications. All connections must be secure and positioned to avoid shortage in electrical circuit.</p> <p>Lab Exercise # 2 Given a vehicle with distributor ignition problem, proper service manual, access to necessary tools, remove and replace distributor unit according to manufacturer's timing specifications within +/- one degree. Tighten down bolt and insert all distributor secondary wires securely in the distributor cap..</p>	<p>https://www.youtube.com/watch?v=ZxcOnoWZD_4</p>

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
<p>Given a vehicle with ignition wiring problem, access to necessary tools and equipment, test primary wire circuit to coil from battery for resistance on both circuits. Also remove and replace Ignition Switch.</p> <p>NJSLS: 9.3.12.TD.1, 9.3.12.TD.6,9.3.12.TD.5, 9.3.12.TD□OPS.2</p> <p>CCTC: TD 01.3, TD-MTN 02.2, TD-MTN 02.3,TD-HSE 1.1</p> <p>CCSS: CCSS: RL.9-10.1; RI.9-10.5; SL.9-10.1 HSG.GMD.A.3; HSG.MG.A.1; HSN.Q.A.1; HSN.Q.A.3</p>	<p>What is the coil's function?</p> <p>What special tools are used in assessing coil?</p> <p>What precautions are necessary when working with battery and electrical components?</p> <p>Where are ignition switches located?</p>	<ul style="list-style-type: none"> ▪ Explain function of coil ▪ Describe wiring procedure of coil ▪ Demonstrate use of test equipment ▪ Remove and replace coil ▪ Demonstrate safety precautions necessary to disconnect battery when working with electrical system ▪ Explain operation of the ignition switch ▪ Demonstrate removing and replacing the switch ▪ Demonstrate operation of the ignition switch after installation 	<p>Lab Exercise</p> <p>Given a vehicle with defective coil, access to proper service manual and test equipment, test coil for deviation from manufacturer's specifications. Any variation from specifications is cause for replacement of unit.</p> <p>Lab Exercise</p> <p>Given a vehicle, necessary service manuals and tools, remove and replace an ignition switch. Care must be taken when installing the ignition switch so the switch locks the steering wheel and operates the ignition system.</p> <p>Science Lab/Math Lab</p> <p>Utilize math formulas and scientific methods to</p>	<p>Carparts.com Ignition Coil Testing https://www.youtube.com/watch?v=La9ku6O1qvw</p> <p>AC Delco How Battery Ignition System Works https://www.youtube.com/watch?v=OMLSNwQiiKg</p>

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<p>Develop the necessary skills needed for Inspection removal and replacement of ignition wire, cap, rotor and spark plugs.</p> <p>NJSLS: 9.3.12.TD.1, 9.3.12.TD.6, 9.3.12.TD.5, 9.3.12.TD.2 OPS.2</p> <p>CCTC: TD 01.3, TD-MTN 02.2, TD-MTN 02.3, TD-HSE 1.1</p> <p>CCSS: CCSS: RL.9-10.1; RI.9-10.5; SL.9-10.1 HSG.GMD.A.3; HSG.MG.A.1; HSN.Q.A.1; HSN.Q.A.3</p>	<p>How do check for electronic problems using a wiring schematic to trace circuits?</p> <p>What dangers are present when checking for electrical functions?</p> <p>What is the job of the rotor? The cap? The Spark plugs?</p>	<ul style="list-style-type: none"> ▪ Describe engine firing order ▪ Explain routing of plug wires ▪ Demonstrate replacement of wires ▪ Describe operation of the distributor cap and rotor ▪ Demonstrate replacement of cap and rotor. ▪ Describe spark plug heat range and sizes ▪ Explain spark plug gap settings (standard and electronic) ▪ Demonstrate removal, gap setting and torque of spark plug 	<p>explain relationship between coil and Battery electrical charge.</p> <p>Lab Given a vehicle with defective spark plug wires, necessary service manuals and tools, replace each plug wire, routing wires according to manufacturer's specifications. Replacement wires must meet or exceed manufacturer's specifications.</p> <p>Video Create a video with fellow classmates outlining proper procedure for a vehicle needing spark plugs, necessary tools and equipment, remove and replace spark plugs, set plug gap and torque plugs to manufacturer's</p>	<p>AutoZone Car Care How to Replace Your Spark Plugs https://www.youtube.com/watch?v=g2IPAUBk2ek</p> <p>Automotive Diagnostic and Publishing Auto HVAC Vacuum Repair https://www.youtube.com/watch?v=PsBwQogCtUQ</p>

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<p>Given circumstances of problematic air and fuel mixture service electronic ignition system and oxygen feedback system.</p> <p>NJSLS: 9.3.12.TD.1, 9.3.12.TD.6,9.3.12.TD.5, 9.3.12.TD OPS.2</p> <p>CCTC: TD 01.3, TD-MTN 02.2, TD-MTN 02.3,TD-HSE 1.1</p> <p>CCSS: CCSS: RL.9-10.1; RI.9-10.5; SL.9-10.1 HSG.GMD.A.3; HSG.MG.A.1; HSN.Q.A.1; HSN.Q.A.3</p>	<p>What steps are involved in assessing electronic ignition system?</p> <p>What are the major components of electronic ignition system?</p> <p>What are some common precautions when dealing with computer control systems on modern vehicles?</p>	<ul style="list-style-type: none"> • Demonstrate proper safety procedures and use of correct testing equipment • Explain how the electronic ignition system works • Name the major components of the ignition system • Name the systems for Ford, GM, Chrysler • Define CCC, EEC, MCU, C_4, EMC, Hall Effect, C3I, SSI, TFI and HEI • Explain why computer controls are necessary • Describe common precautions and procedures for computer control service • Test and perform 	<p>specifications and replace wires securely.</p> <p>Lab Exercise Given a vehicle(s), necessary service manuals and tools, test and service electronic ignition system. Student should be able to test and service all makes. Test all systems and follow all test codes. Care must be taken to use proper test equipment.</p> <p>Lab Exercise #2 Given a vehicle, necessary service manuals and tools, test and service an oxygen feedback system. Take care to use proper test equipment</p> <p>Writing Exercise Outline steps in assessing air/fuel system functionality</p>	<p>OSHA Website https://www.osha.gov/law-regs.html</p> <p>Auto Safety Government Website http://www.autosafety.org/</p> <p>The Auto Parts Shop.com How Oxygen Sensor Works https://www.youtube.com/watch?v=FI3aD1qJrEg</p>

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
		<p>appropriate service on electronic ignition system</p> <ul style="list-style-type: none"> • Describe feedback system • Locate and test sensors for feedback system • Explain closed and open loop • Explain limp home mode • Explain trouble codes 		
<p>Referencing a customer work order Measure fuel flow and pressure. Inspect, remove and replace fuel filters and replace fuel lines.</p> <p>NJSLS: 9.3.12.TD.1, 9.3.12.TD.6,9.3.12.TD.5, 9.3.12.TD OPS.2</p> <p>CCTC: TD 01.3, TD-MTN 02.2, TD-MTN 02.3,TD-HSE 1.1</p>	<p>What special equipment is used to determine correct fuel flow and pressure and assess for functionality?</p> <p>What are fuel line schematics? How are they used in assessing damaged or faulty fuel system?</p> <p>What types of fuel pumps are on modern cars? Where are they</p>	<ul style="list-style-type: none"> ▪ Demonstrate safety precautions when working with automobile fuels ▪ Explain test procedure of fuel system and safety rules ▪ Explain fuel system operation and location • Demonstrate use of test equipment to determine fuel 	<p>Lab Given a vehicle, tools, equipment and service manual, measure fuel pump volume, pressure and vacuum. Check pressure and volume at specified time and RPM. Pressure, volume and vacuum will meet manufacturer's requirements</p>	<p><u>Strange Electrical Car Problems</u> Troubleshooting Dim Headlights and Other electrical problems https://www.youtube.com/watch?v=wcbMuGE3rL4</p> <p><u>How a Car AC System Works</u> https://www.youtube.com/watch?v=-INZ2sRrsuo</p>

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
<p>CCSS: CCSS: RL.9-10.1; RI.9-10.5; SL.9-10.1 HSG.GMD.A.3; HSG.MG.A.1; HSN.Q.A.1; HSN.Q.A.3</p>	<p>located in most cars?</p> <p>What is vapor lock? Why is it dangerous in a vehicle?</p>	<p>pressure</p> <ul style="list-style-type: none"> • Explain installation procedure; include proper location for safe operation • Inspect all connections very carefully for fuel leaks • Check fuel for contaminants and quality • Remove and replace fuel filter • Explain hose and line selection • Demonstrate line repair procedure for metal and flexible lines • Inspect all flexible lines for weather and heat cracks • Discuss the advantages and disadvantages of mechanical versus electric fuel pumps <p>Explain the</p>	<p>Lab #2</p> <p>Given a vehicle, service manual, necessary tools and parts, remove and replace the fuel pump. When completed, bolt tightening, gasket installation and proper line hookup and routing will be checked.</p> <p>Inspection/Checklist</p> <p>Conduct an inspection of fuel system, service manual and necessary tools, diagnose the problem and make necessary repairs. Upon completion the system will operate correctly.</p>	

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
		differences between a two-line and a three-line fuel pump <ul style="list-style-type: none"> • Describe fuel pump pressures, vacuums and "vapor lock" • Remove and replace fuel pump • Inspect connections carefully for fuel leaks 		
<p>After performing above repair procedures Clean and overhaul carburetor. Clean and adjust choke and check proper operation of electric choke. Adjust idle speed.</p> <p>NJSLS: 9.3.12.TD.1, 9.3.12.TD.6,9.3.12.TD.5, 9.3.12.TD OPS.2</p> <p>CCTC: TD 01.3, TD-MTN 02.2, TD-MTN 02.3,TD-HSE 1.1</p> <p>CCSS: CCSS: RL.9-10.1; RI.9-10.5; SL.9-</p>	<p>What essential information is needed before handling fuel?</p> <p>What types of carburetor(s) and chokes are used in older cars today?</p> <p>What steps are necessary to evaluate whether a carburetor is in need of rebuild?</p>	<ul style="list-style-type: none"> ▪ Explain function of idle adjustment ▪ Explain anti-dieseling solenoid ▪ Demonstrate test equipment and operation ▪ Adjust idle speed to manufacturer's specifications ▪ Explain choke operation ▪ Explain method of adjusting different types of chokes ▪ Demonstrate proper cold setting of a 	<p>Lab Exercise Given a vehicle, service manual and necessary tools and replacement parts, rebuild a carburetor. When completed the carburetor should have all screws, clamps and hoses secured. The carburetor should operate and be adjusted within manufacturer's specifications.</p> <p>Journal Write a journal entry describing steps in</p>	<p>EPA Environmental Compliance Guide for Auto Repair Shops http://www.epa.ohio.gov/portals/41/sb/publications/AutoRepairGuide.pdf</p> <p>OSHA Occupational Noise Exposure https://www.osha.gov/SLTC/noisehearingconservation</p>

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
10.1 HSG.GMD.A.3; HSG.MG.A.1; HSN.Q.A.1; HSN.Q.A.3		standard automatic choke assembly <ul style="list-style-type: none"> ▪ Demonstrate safety precautions when using carburetor cleaners ▪ Explain disassembly and assembly procedures (include testing and setting assembly parts) ▪ Demonstrate cleaning and "blowing" dry procedures and inspection of all parts to be reassembled ▪ Define carburetor and exhaust gas recirculation (EGR) ▪ Disassemble, clean and overhaul carburetor 	disposing of hazardous waste and use of carburetor cleaners.	

Unit 3 Vocabulary

Distributor
Choke
Idle speed
Solenoid
Catalysts
Vacuum
Ignition wire
Cap and rotor
Distributor

Component
Spark plug gap
Torque
Deviation
Advance curve
Points and condensers
Resistance
State-of-charge
Interrelated
Timing

Suggested Unit Projects

Choose At Least One

Management/Organizational Exercise

Develop relationship with local Dealership cooperative mentoring/intern program.

Individual/Group Project

Develop training tools for cooling system. Example: Refine use of new cooling chemicals and effective use and disposal.

Suggested Structured Learning Experiences

Technical Institute of America

AutoCAD Training
 New York City Location
 545 8th Avenue, 4th Floor
 New York, NY 10018
http://www.tiaedu.com/AutoCAD_Training_NYC_Class_Level_1.htm

Lincoln Tech
 70 McKee Dr, Mahwah, NJ 07430
 Phone: (201) 529-1414
 Email: info@allairevillage.org
<http://www.lincolntech-usa.com/>

BMW USA Corporate Headquarters

BMW of North America, LLC
 300 Chestnut Ridge Road
 Woodcliff Lake, NJ 07675
 Phone: 1-800-831-1117
<http://www.bmwusa.com/Standard/Content/CompanyInformation/>