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CTE Standards Unpacking
MLR Automotive Engine Repair and Performance

Course: MLR Automotive Engine Repair and Performance
Course Description: Completion of Automotive Engine Repair and Performance will help students prepare for post-secondary education and training. This course will further the students' technical education experience and help prepare them for the workforce.
Students will learn:

- How to work safely on the vehicle in a workshop situation.
- Engine operation based on the six operating systems: lubrication, cooling, fuel, ignition, air induction and exhaust systems.
- General engine maintenance to include valve train, lubrication and cooling system.
- General engine performance to include computerized controls, fuel, air induction, exhaust systems and emissions control systems.

Career Cluster: Transportation, Distribution & Logistics
Prerequisites: Introduction to Vehicle Systems and Maintenance or Maintenance and Light Repair - Recommended
Program of Study Application: N/A

INDICATOR #EPER 1: **Students will demonstrate automotive technology safety practices, as identified in Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements for an automotive repair facility.**		
SUB-INDICATOR 1.1 (Webb Level: 1 Recall): Demonstrate automotive technology safety practices.		
Knowledge (Factual): -General shop safety -OSHA 10 -EPA regulations	**Understand (Conceptual):** -Safety is critical component in engine repair.	**Do (Application):** -Identify and locate all safety equipment in the shop. -Simulate use of fire extinguishers. -Demonstrate use of jacks and stands. -Eye wash station demonstration.

Benchmarks:
Students will be assessed on their ability to:

- Pass safety exam.

Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): SL5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	**Sample Performance Task Aligned to the Academic Standard(s):** Students will create a video that demonstrates the correct use of a fire extinguisher

INDICATOR #EPER 2: **Students will demonstrate proper tool selection and usage.**

SUB-INDICATOR 2.1 (Webb Level: 1 Recall): Demonstrate proper tool selection and usage.

Knowledge (Factual):	**Understand (Conceptual):**	**Do (Application):**
-Tools and equipment	-Proper use of the right tool is critical to engine repair to avoid damage to fasteners and components.	-Identify tools used in automotive repair. -Demonstrate the use, maintenance, and storage of tools used in general engine repair.

Benchmarks:
Students will be assessed on their ability to:

- Identify tool and test equipment and their proper use.

Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): SL1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led)	**Sample Performance Task Aligned to the Academic Standard(s):** Students will discuss the proper use and maintenance of tools

INDICATOR #EPER 3: **Students will prepare the vehicle for service.**		
SUB-INDICATOR 3.1 (Webb Level: 2 Skill/Concept): Perform preparatory procedures for vehicle service.		
Knowledge (Factual): -Vehicle information, customer concerns, and work orders. -OSHA 10 -EPA regulations	**Understand (Conceptual):** -Important instructional material for technicians to follow.	**Do (Application):** **-**Identify information needed to write a work order.
Benchmarks: *Students will be assessed on their ability to:* • Provide a completed service repair order to include customer concerns and corrections.		
Academic Connections		
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): W4 4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	**Sample Performance Task Aligned to the Academic Standard(s):** Students will create a checklist of information that is needed to complete a workorder	

INDICATOR #EPER 4: **Students will perform engine repair.**		
SUB-INDICATOR 4.1 (Webb Level: 2 Skill/Concept): Perform engine maintenance operations.		
SUB-INDICATOR 4.2 (Webb Level: 2 Skill/Concept): Understand component operation and perform maintenance on cylinder head and valve train.		
SUB-INDICATOR 4.3 (Webb Level: 2 Skill/Concept): Test, inspect and perform maintenance on the lubrication and cooling system.		
Knowledge (Factual): -Cooling and lubrication system. -OSHA 10	**Understand (Conceptual):** -To extend vehicle life.	**Do (Application):** **-**Evaluate needs on maintenance on lubrication and cooling system.

Benchmarks:
Students will be assessed on their ability to:

- Research vehicle service information and bulletins, inspect for leaks, perform an engine oil and filter change.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
SL1 1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led)	Students will role play customer and technician discussing the maintenance of cooling system
A-CED1. Create equations and inequalities in one variable and use them to solve problems.	Students will create a formula modeling the pressure of the lubrication system

INDICATOR #EPER 5: **Students will test, diagnose, and repair engine performance issues.**

SUB-INDICATOR 5.1 (Webb Level: 3 Strategic Thinking): Perform engine diagnostics and analyze retrieved data.

SUB-INDICATOR 5.2 (Webb Level: 3 Strategic Thinking): Test the computerized controls and analyze retrieved data.

SUB-INDICATOR 5.3 (Webb Level: 2 Skill/Concept): Perform maintenance on the fuel, air Induction, and exhaust systems

SUB-INDICATOR 5.4 (Webb Level: 2 Skill/Concept): Perform maintenance operations on emissions control system.

Knowledge (Factual):	**Understand (Conceptual):**	**Do (Application):**
-Engine operation and computerized controls.	-Controlling emissions is essential to a clean and healthy environment.	-Analyze engine diagnostic data and read diagnostic trouble codes.

Benchmarks:
Students will be assessed on their ability to:

- Run engine diagnostics test and perform maintenance on fuel, air, and exhaust systems.

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Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
W6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	Students will create a website to promote various diagnostic systems for engines

Additional Resources
Please list any resources (e.g., websites, teaching guides, etc.) that would help teachers as they plan to teach these new standards.