

**Course Title – Automotive Technology**

**Implement start year – 2017-2018**

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**Unit #3 - Cooling and Lubrication**

**Transfer Goal –**

Students will be able to independently integrate and apply essential technical skills in order to identify, diagnose, maintain and repair cooling and lubrication systems.

**Stage 1 – Desired Results**

**Established Goals**

**2009 NJCCC Standard(s), Strand(s)/CPI #**  
(<http://www.nj.gov/education/cccs/2009/final.htm>)

**Common Core Curriculum Standards for Math and English**  
(<http://www.corestandards.org/>)

**8.2 Technology Education, Engineering, and Design**

All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world, as they relate to the individual, global society, and the environment.

G. The Designed World: The designed world is the product of a design process that provides the means to convert resources into products and systems.

- 8.2.12.G.1 Analyze the interactions among various technologies and collaborate to create a product or system demonstrating their interactivity.

**21<sup>st</sup> Century Themes**

( [www.21stcenturyskills.org](http://www.21stcenturyskills.org) )

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy

**21<sup>st</sup> Century Skills**

*Learning and Innovation Skills:*

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

*Information, Media and Technology Skills:*

- Information Literacy
- Media Literacy

<p>CCSS.ELA-LITERACY.RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.</p> <p>CCSS.ELA-LITERACY.WHST.9-10.2.F Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.1 21st-Century Life &amp; Career Skills All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.</p> <p>9.1.12.A.1 Apply critical thinking and problem-solving strategies during structured learning experiences.</p>	<p><input type="checkbox"/> ICT (Information, Communications and Technology) Literacy</p> <p><i>Life and Career Skills:</i></p> <p><input checked="" type="checkbox"/> Flexibility and Adaptability</p> <p><input checked="" type="checkbox"/> Initiative and Self-Direction</p> <p><input checked="" type="checkbox"/> Social and Cross-Cultural Skills</p> <p><input checked="" type="checkbox"/> Productivity and Accountability</p> <p><input checked="" type="checkbox"/> Leadership and Responsibility</p>
<p><b><u>Enduring Understandings:</u></b> <i>Students will understand that . . .</i></p> <p><i>EU 1</i> the cooling system removes excess combustion heat and maintains a constant engine operating temperature.</p> <p><i>EU 2</i> the lubrication system reduces friction and wear between internal engine parts.</p>	<p><b><u>Essential Questions:</u></b></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> <li>• What created the need for a cooling system in a vehicle?</li> <li>• How do we prove or justify the use of propylene glycol?</li> <li>• Where does the heat from an engine go?</li> </ul> <p><i>EU 2</i></p> <ul style="list-style-type: none"> <li>• What do oil weights reveal about the technology used in today's vehicles?</li> <li>• What are the implications of not servicing the lubrication system?</li> <li>• Why are different types of lubrication systems used?</li> </ul>

**Knowledge:**

Students will know . . .

**EU 1**

- how a cooling system operates.
- what path antifreeze takes through the cooling system.
- how air conditioning and heating impacts the cooling system.
- how to maintain the cooling system.
- explain the importance of antifreeze.

**EU 2**

- how a lubrication system operates.
- the lubrication system will absorb heat produced by the engine.
- how to maintain the lubrication system.
- the methods an engine uses to provide lubrication.

**Skills:**

Students will be able to . . .

**EU 1**

- summarize the functions of a cooling system.
- explain the operation and construction of major cooling system components.
- discuss safety procedures to follow when working on cooling systems.
- check the major parts of a cooling system for proper operation.

**EU 2**

- list the basic parts of the lubrication system.
- summarize the operation of a lubrication system.
- compare different lubrication system designs.
- explain the characteristics and ratings of engine oil.
- discuss safety procedures to follow when working on lubrication systems.
- change engine oil and filter.

**Stage 2 – Assessment Evidence****Other Recommended Evidence:**

- Quiz/Test
- Worksheets
- Workbooks
- Discussions
- Videos
- Software

### Stage 3 – Learning Plan

**Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections:** *Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.*

- Teacher led discussions on cooling and lubrication systems. (A)
- Use ProDemand software (M,T)
- Workbook on cooling and lubrication unit such as chapters 39, 40, 41, 42, 75, and 76 in Modern Automotive Technology Book (A)
- Demonstration of an oil change. (A)
- Demonstration of specialized cooling system tools (A)
- Videos on cooling and lubrication (A)
- Discuss environmental impact of recycling of hazardous materials (A, M)
- Discuss efficiency of cooling systems including air conditioning and the impact on society (A, M)
- Replace faulty cooling system components (T)
- Drain, flush, and refill a cooling system (T)
- Perform a compression test on a cooling system (T)