

# Unit 5 Heating and Cooling 2019

Content Area: **Applied Technology**  
Course(s):  
Time Period: **Marking Period 2**  
Length: **2 weeks**  
Status: **Published**

## Summary

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**In this unit students will learn how the automotive heating/cooling system operates. They will learn the names of major system components, their operation, simple diagnosis, and repair. Safety procedures will be emphasized while working around coolant and the high temperatures of a cooling system.**

### Introduction:

The goal of this unit is to teach the students the importance of the automotive heating and cooling system and how the science of thermodynamics is applied to achieve and maintain the proper operating temperature of an automobile engine. The content introduced will be in accordance with STEAM learning and incorporate the STEM elements in the acronym. The Science will be in learning about the pressurization and heat transfer of a fluid in accordance with thermodynamic principles and how it is applied in the automotive heating and cooling system. The Technology and Engineering being in the design and construction of heating and cooling system components such as heat exchangers and pumps and their application in a vehicles heating and cooling system. The Math involved will be the computation of how a fluids' boiling point is increased by pressurization.

July 2019

## Standards

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LA.RH.9-10.1	Accurately cite strong and thorough textual evidence, to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.
LA.RH.9-10.3	Analyze in detail a series of events described in a text; draw connections between the events, to determine whether earlier events caused later ones or simply preceded them.
LA.RH.9-10.7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text, to analyze information presented via different mediums.
MA.K-12.1	Make sense of problems and persevere in solving them.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.

CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
SCI.HS-PS3-4	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
CAEP.9.2.12.C.2	Modify Personalized Student Learning Plans to support declared career goals.
CAEP.9.2.12.C.4	Analyze how economic conditions and societal changes influence employment trends and future education.
CAEP.9.2.12.C.5	Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.

## **Essential Questions**

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**What are the functions of an automotive heating/cooling system and how the components work together to maintain operating temperature?**

**What precautions need to be taken when testing or working on the heating and cooling system and why?**

**How does the thermostat, water pump, and radiator operate and what are their functions?**

**What are two basic tests performed on heating/cooling systems and why is it necessary then be performed?**

## **Objectives**

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Students will know.....

how an automotive heating/cooling system operates and basic diagnostic procedures.

the precautions to take while working on heating/cooling system.

how to test the system in order to make a proper diagnosis.

Students will be skilled at.....

testing and diagnosing the functions of radiators, heater cores, and hoses

## **Learning Plan**

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**Preview the essential questions and connect to learning throughout the unit.**

**Teacher led discussion on what a heating/cooling system's purpose is and how it operates.**

**Hands on Task Sheets.**

**Written test on essential knowledge and lesson mastery.**

**Closing discussion and anticipatory set.**

## **Assessment**

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Answer essential questions on heating and cooling - Formative

quizzes and test on heating and cooling system operation, function, and purpose -Summative

participate in class discussions regarding proper tool use and safety procedures when working on or diagnosing heating and cooling system related problems – Formative

Job Sheets - Formative

## **Materials**

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Modern Automotive Technology Textbook

Video Clips

Internet Research

Automotive Data Base

## **Modifications**

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<https://docs.google.com/spreadsheets/d/1AckQSTINShzIM-rDV5YKYUFm2WMCxJQiS10rEZ4jCC8/edit?usp=sharing>