

# Unit 4 Brakes 2019

Content Area: **Applied Technology**  
Course(s):  
Time Period: **Marking Period 1**  
Length: **3 weeks**  
Status: **Published**

## Summary

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**Students will be taught the basic principles and operation of an automotive braking system. Hydraulic theory and Pascal's Law will be introduced along with component function, operation, and location. Students will also be taught basic diagnosis procedures and how to troubleshoot simple brake problems.**

**Introduction:** The goal of this unit is to teach the students the importance of the automotive braking system and how the science of hydraulics is applied to achieve the stopping of a vehicle in excess of two thousand pounds. The content introduced will be in accordance with STEAM learning and incorporate the STE elements in the acronym. The Science will be in learning about the pressurization of a fluid in accordance with Pascal's Law and how it is applied in the automotive braking system. The Technology and Engineering being in the design and construction of hydraulic components and their application in a vehicle hydraulic brake system.

**Revision Date:** July 2019

## Standards

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|---------------|--|
| LA.RST.9-10   | Reading Science and Technical Subjects   |
| LA.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.                          |
| LA.RST.9-10.4 | 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 9-10 texts and topics.                        |
| LA.RST.9-10.5 | Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).   |
| LA.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. |
| LA.RST.9-10.8 | Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.  |
| LA.RST.9-10.9 | Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.                       |

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|-------------------|---|
| CRP.K-12.CRP1     | Act as a responsible and contributing citizen and employee.   |
| CRP.K-12.CRP2     | Apply appropriate academic and technical skills.  |
| CRP.K-12.CRP4     | Communicate clearly and effectively and with reason.  |
| CRP.K-12.CRP8     | Utilize critical thinking to make sense of problems and persevere in solving them.  |
| CRP.K-12.CRP11    | Use technology to enhance productivity.   |
| SCI.HS-PS2-1      | Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.                                       |
| SCI.MS-ETS1-3     | Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. |
| SCI.MS-ETS1-4     | Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.   |
| CAEP.9.2.12.C.2   | Modify Personalized Student Learning Plans to support declared career goals.  |
| CAEP.9.2.12.C.3   | Identify transferable career skills and design alternate career plans.  |
| CAEP.9.2.12.C.8   | Assess the impact of litigation and court decisions on employment laws and practices.   |
| TECH.8.1.12.A.CS1 | Understand and use technology systems.  |
| TECH.8.1.12.E     | Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.  |
| TECH.8.2.12.C     | Design: The design process is a systematic approach to solving problems.  |

## **Essential Questions**

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**What is the automotive braking system?**

**What is the principle on which an automotive brake system operates?**

**What are the major components and how do they operate as a system?**

**What are the brake lines made of and why?**

## **Objectives**

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Students will know.....

how disc and drum brakes operate and the use of hydraulics in the brake system.

the components of each (disc and drum), type of brakes.

Pascal's law and how it pertains to a modern brake system.

how air affects the brake system and common problems that can occur.

Students will be skilled at.....

the identification, and location of major hydraulic components

## **Learning Plan**

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

**Teacher led discussion on operation of an automotive brake system**

**Task sheets and hands on application of learned material.**

**Written test**

**Closing discussion on lesson and anticipatory set.**

## **Assessment**

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answer essential questions in brakes unit- Formative

quizzes and test on hydraulic brake component operation, function, and purpose - Summative

participate in class discussions regarding proper tool use and safety procedures when working on or diagnosing brake related problems - Formative

Job Sheets - Formative

## **Materials**

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**Modern Automotive Technology text and workbook.**

**videos**

**internet**

**auto database**

## Modifications

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