Unit 5: Engines

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 3**
Length: **2-3 weeks**
Status: **Published**

Summary

This unit is designed to expand on the student's knowledge of the internal combustion engine. The unit will begin with a review of the typical four-stroke internal combustion engine. The review will include components, operation, and common problems associated with an engine. Students will then work in groups to begin a series of hands on learning experiences, during the disassembly process students will make measurements, hone cylinders, and perform various other tasks designed to maximize the learning experience. Emphasis will be placed on safety and proper use of shop equipment.

July2024

Essential Questions/Enduring understandings

Essential Questions:

- Why is it environmentally essential to maintain a properly running engine?
- Why is it important to know how an automobile engine and its internal components operate?

Enduring Understandings:

- a properly running engine will minimize exhaust emissions, and maximize fuel efficiency
- knowing how the engine operates and its components will aid in recognizing operating problems. consumption, and prolong engine life.
- being able to understand and perform simple diagnostic procedures will assist them when engine concerns occur.
- knowing how an engine operates and what can go wrong with it will save them time and money in the future

Objectives

Students Will Know:

- proper safety procedures when performing engine diagnostic operations.
- the specialized vocabulary related to the automotive engine.
- what a four-stroke internal combustion engine is, its operation, and major components.
- what misfires and other common complaints are and what may be the cause?
- how the internal components work together in an internal combustion engine.
- how can engine emissions affect the environment and climate

Students Will Be Skilled At:

- using the tools for diagnostic operations.
- following diagnostic procedures

- online research for diagnostic and repair procedure
- using the online program All Data

Learning Plan

- Preview the essential questions and connect them to learning throughout the unit.
- Teacher presentation and student research into the automotive engine.
- Modern Automotive Technology workbook and textbook assignments.
- Hands on job sheet on engine related procedures.
- Writing prompt on the value of maintaining engine performance.
- Written test on tasks and issues pertaining to automotive engines.
- Use of a cooperative learning technique to evaluate unit mastery.
- Closing discussion on the engine related issues.

Assessments

- **Formative**
- answer essential questions
- demonstrate proper safety procedures when performing engine diagnostic operations.
- use of specialized vocabulary related to the automotive engine during class discussion and observation.
- research and discussion on internal components work together in an internal combustion engine.
- exit tickets
- **Summative**
- writing prompts on tools and procedures for basic diagnostic operations.
- engine test
- tool identifiaction test

- **Alternative Assessment**
- presentation on diagnosis and repair procedures
- tool idetification video
- **Benchmark**
- Mid-Term/Final

Materials

- Modern Automotive Technology; Text and Workbooks
- Job Sheets
- Shop Cars
- Engines

- Automotive Repair tools
- Automotive Data System

Standards

Standards

- NJ Learning Standards
  ELA.L.KL.9–10.2 Apply knowledge of language to make effective choices for meaning, or style and to comprehend more fully when reading, writing, speaking or listening.
  ELA.L.KL.9–10.2.A Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level.
  ELA.L.KL.9–10.2.C Demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

- Computer Science and Design
  CS.9-12.8.1.12.CS.3 [*Performance Expectation*] - Compare the functions of application software, system software, and hardware.
  CS.9-12.8.1.12.CS.4 [*Performance Expectation*] - Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
  CS.9-12.8.2.12.EC.1 [*Performance Expectation*] - Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.

- NJ Career Readiness
  WRK.9.2.12.CAP.4 [*Performance Expectation*] - Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
  WRK.9.2.12.CAP.5 [*Performance Expectation*] - Assess and modify a personal plan to support current interests and post-secondary plans.
  WRK.9.2.12.CAP.2 [*Performance Expectation*] - Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.

- Mathematics
  MATH.9-12.F.BF.A.1 [*Standard*] - Write a function that describes a relationship between two quantities

- ELA Practices
  ELA.L.SS.9–10.1 Demonstrate command of the system and structure of the English language when writing or speaking.
  ELA.L.KL.9–10.2 Apply knowledge of language to make effective choices for meaning, or style and to comprehend more fully when reading, writing, speaking or listening.
  ELA.L.VL.9–10.3.E Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).
  ELA.RL.CR.9–10.1 Cite a range of thorough textual evidence and make relevant connections to strongly support analysis of multiple aspects of what a literary text says explicitly and inferentially, as well as including determining where the text leaves matters uncertain.

Integrated Accommodations and Modifications

https://docs.google.com/spreadsheets/d/1lEj-WZghahz_kVoSbGd5jrLwq1j70EoM4UU5jXISQZs/edit?usp=sharing