Unit 3: Electrical

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

Summary

Students will expand their knowledge of the automotive electrical system. Students will continue their study of batteries, and learn how the electrical system operates, the major components and their operation, the purpose and operation of alternators, circuits, fuses, and relays, as well as the use of hand-held diagnostic meters and scan tools. Students will utilize hands-on task sheets to complete component diagnosis, repair, and replacement of electrical components. Students will tear down and rebuild major electrical components such as alternators, starters, motors, etc. Emphasis will be placed on safety and proper use of shop equipment.

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Essential Question/Enduring Understandings

Essential Questions:

- How does the knowledge of basic electricity apply to the diagnosis and operation of the automotive electrical system?
- How will knowing electrical components and their function help the technician when diagnosing a problem in the electrical system?
- How do the battery, alternator, fuses, and wiring work together to operate the electronics in an automobile?

Enduring Understandings:

- a properly functioning electrical system and the battery are essential for a well-running vehicle.
- wearing safety equipment while servicing an automotive battery is essential.
- knowing how the electrical system functions and how to test it can be a benefit to them in the future.
- a properly functioning electrical system is essential for a well running vehicle and repair of faulty components can be costly and difficult to diagnose and repair.
- most automobiles are equipped with a multitude of electrical and electronic components.

Objectives

Students Will Know:

- the safety procedures specific to the automotive electrical system.
- vocabulary specific to the automotive electrical system.

- the functions of an automobiles electrical system includes, providing voltage for starting and all electrical components.
- that the battery, alternator, and electrical system work together and a problem in any one area can cause minor or major concerns.
- the different types of current and how they pertain to the automobile.
- common test procedures and precautions to take while servicing electrical.
- systems and components, these include a battery hydrometer and load test, voltage outputs and current draw tests etc.
- how to diagnose, repair, and replace common electrical components and problems (i.e. alternators, batteries, fuses etc).

Students Will Be Skilled At:

- diagnosing and repairing electrical problems
- replacing electrical components
- identifing and explaining elecrtrical commponents.

Learning Plan

- Preview the essential questions and connect them to learning throughout the unit.
- Teacher presentation and student research into the automotive electrical system.
- Modern Automotive Technology workbook and textbook assignments.
- Hands on job sheet on battery maintenance and replacement.
- Web based research on the latest electrical automotive components and developments.
- Writing prompt on the electrical system.
- Written test on the electrical system.
- Use of a cooperative learning technique to evaluate unit mastery.
- Closing discussion on the electrical system.

Assessment

- **Formative**
- answer the essential questions.
- participate in research and discussions regarding the electrical system.
- perform hands on tasks on system maintenance. Including but not limited to removing, dismantling, and reassembling electrical components such as alternators, starters, etc.
- demonstrate safe work habits.
- demonstrate the proper use of tools.
- **Summative**
- complete a writing prompt on the electrical system.
- complete a written test on the automotive electrical system.
- complete a web based research project on new automotive electrical technology

- **Alternative**
- presentation on electrical systems
- **Benchmark**
- Mid Term/Final

Materials

- Modern Automotive Technology; Text and Workbooks
- Job Sheets
- alternators, circuits, fuses, and relays, hand held diagnostic meters, scan tools
- Automotive Data System
- shop cars

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.

Intergrated Accommodation and Modifications

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