

BILLINGS PUBLIC SCHOOLS ELECTRICAL II

MISSION STATEMENT

The Career center is dedicated to providing Billings area students with an education that explores and enhances vocational and academic skills to promote critical thinking, self-discipline, and responsible citizenship.

BELIEF STATEMENTS

1. We believe in an environment that fosters mutual respect and dignity.
2. We believe that students and faculty should maintain pride in their work to improve their performance.
3. We believe that academic skills lay the foundations for critical thinking, problem solving, mathematical and communication skills.
4. We believe in the integration of academic and career areas.
5. We believe in the importance of current technology and its impact on the future.
6. We believe that students who are encouraged to set goals will gain confidence in their potential and ability to contribute to society.
7. We believe mutual support between school and community is an integral part of a students learning experience.

PHILOSOPHY

The automotive technician is a person who works in an exciting, rapidly changing and growing industry. The automotive technology curriculum is designed so students understand automobile systems and learn how to plan and perform repairs according to the various manufacturers recommended procedures.

These career and Vocational/Technical Education programs focus on career preparation, resource management, communication, technical skill development, applied academics, technological literacy; and personal skills and leadership.

LEARNING DOMAINS

- I. The student will demonstrate an understanding of automotive literacy.**
- II. The student will demonstrate an understanding of appropriate work place skills.**
- III. The student will apply basic skills in the understanding of electrical theory in classroom content and learning activities applied in lab setting.**
- IV. The student will apply basic skills in the starter overhaul and starter system diagnosis in the classroom content and learning activities applied in lab setting.**
- V. The student will apply basic skills in the alternator overhaul and charging system diagnosis in the classroom content and learning activities applied in lab setting.**
- VI. The student will apply basic skills in classroom instruction in tune-up content and student activities in lab setting.**
- VII. The student will apply basic skills in electrical accessories, advanced circuits and electronic instrumentation.**

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Learner Objectives

- I. The student will demonstrate an understanding of automotive literacy.**
- 1. Student will demonstrate the use of technical manuals in class and lab settings. (E)**
 - a. Disassemble and reassemble of automotive components.**
 - b. Use manufacturer procedures for inspection and diagnosing electrical components according to OEM (Original Equipment Manufacturing.)**
 - c. Identify all necessary defective components.**
 - d. Interpret technical data, wiring diagrams, and component figures while performing diagnostic checks.**
 - e. Comply with OSHA, State and Federal standards for safety.**
 - f. Identify recent advances in automotive training.**
 - g. Demonstrate proficiency in computerized service manuals.**
- II. The student will demonstrate an understanding of appropriate work skills.**
- 2. Student will demonstrate an understanding of automotive safety. (E)**
 - a. Complete required OSHA certified safety tests.**
 - b. View safety videos and completing test procedures.**
 - c. Work in a clean lab setting.**
 - d. Apply an understanding of hazardous material disposal.**
 - 3. Student will demonstrate procedures of work place skills while working with tools, equipment and materials. (E)**
 - a. Follow all safety rules and procedures.**
 - b. Maintain a safe and clean environment.**
 - c. Conduct shop activities and equipment operation in a safe manner.**
 - 4. Student will explore various aspects of work place readiness. (E)**
 - a. Understand that skills developed in academic and occupational programs relate to career goals.**
 - b. Understand the importance of reading, writing, speaking and the knowledge of mathematical skills in the work place.**
 - 5. Student will develop an understanding of post secondary options. (E)**
 - a. Research all opportunities that the automotive industry has to offer a prospective employee.**
 - b. Research all opportunities at post secondary educational opportunities.**
 - c. Explore career opportunities.**
 - d. Explore articulation agreements of high school to tech school to college.**
- III. The student will apply basic skills in understanding electrical theory in the content and learning activities.**
- 6. Students will understand digital electronic components and their operations.**
 - a) Explain the application and theory of diodes, transistors, and capacitors.**
 - 7. Students will comprehend OBD1 and OBD2 (On-Board Diagnostics) communication systems and use their knowledge for diagnosing faults.**
 - 8. Students will be able to define vehicle sensors and explain their operations.**

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IV. The student will apply basic skills in electrical diagnostics.

9. Students will demonstrate proper usage of industry tools to diagnose automotive electrical systems.

- a) Utilize DVOM's, test lights, graphing oscilloscopes, and scan tools effectively.**
- b) Create electrical faults in vehicles for peer training in diagnostics.**
- c) Diagnose computerized circuit boards and vehicles that have inserted electrical faults.**

V. The student will apply basic skills in computerized engine controls to understand its operation and follow diagnostic procedures.

10. Students will understand the vehicles communications system, OBD1 and OBD2.

11. Students will be able to recognize and diagnose engine system malfunctions.

- a) Use industry tools to communicate with the computer system.**
- b) Interpret system data and determining parameters that are out of range.**
- c) Perform the necessary repairs to fix the vehicle.**

VI. The student will understand basic operations of vehicle emissions.

12. Students will be able to identify the five main vehicle emissions and how they are produced.

13. Students will be able to describe how vehicle components were developed in reducing emissions.

14. Students will be able to explain the chemical reaction of the emission particles inside of the catalytic converter.

15. Students will be able to perform emission testing and interpret the data.

VII. The student will understand the basic operations of hybrid and electric vehicles.

16. Students will be able to identify components on electric vehicles.

17. Students will understand the theory of hybrid and electric vehicle operations.