BILLINGS PUBLIC SCHOOLS
ENGINE FUNDAMENTALS
Adoption Date April 12, 2004

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 foundation 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 to educate individuals to become competent auto technicians. The primary focus of the educating program is the diagnosis, service and repair of automobile systems and components. Students will perform service on modern automotive equipment using recommended procedures. Career and Vocational/Technical Education program 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 safety procedures utilized in the automotive industry.

II. The student will demonstrate an understanding of automotive literacy.

III. The student will demonstrate an understanding of automotive work place skills.

IV. The student will demonstrate an understanding of the various components utilized in gas and diesel engines.

V. The student will apply automotive technology to understand the various engine components and various engine components and various operations of the related systems within the gas and diesel engines.

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Learner Objectives

I. The student will demonstrate an understanding of safety procedures utilized in the automotive industry.

1. **Student will demonstrate an understanding of safety procedures to include small engine operations and safety, fire safety, carbon monoxide, personal protective equipment, hazardous materials, emergency plans and accident reports. (E)**

II. The student will demonstrate an understanding of automotive literacy.

2. **Student will define automotive terminology for gas and diesel engine fundamentals. (E)**
3. **Student will summarize the history of small engine development and the development of the small engine industry. (E)**
4. **Student will define and explain energy conversion principles as related to small engines. (E)**
5. **Student will be able to communicate and demonstrate the operational theory of gas and diesel engines that includes multiple-cylinder engine design, systems, and service procedures. (E)**
6. **Student will measure engine components to determine if they are reusable of need to be replaced.**
7. **Student will demonstrate trouble shooting methods and steps for small engines that include the fuel, governor, electrical, cooling and lubrication systems.**
8. **Student will complete an engine failure analysis.**

III. The student will demonstrate an understanding of automotive work place skills. (E)

9. **Student will demonstrate the use of measuring devices to measure engine components and all related parts.**
10. **Student will determine appropriate engine application and selections for specific energy needs. This engine selection will include the fuel, electrical, cooling systems needed along with maintenance and safety consideration.**
11. **Student will demonstrate complete rebuilding of engines by replacing components that don't meet factory specifications.**

IV. The student will demonstrate an understanding of the various components utilized in gas and diesel engines. (E)

12. **Student will demonstrate preventative maintenance, inspection and adjustments to gas engines that include compression release system and valve resurfacing service procedures.**
13. **Student will identify and define the use of all components needed within the engine compression system to include compression, valves, valve guides, valve seats, pistons, cylinder bore, crankcase breather system, compression release system and valve resurfacing service procedures.**
14. **Student will identify and define the use of all principles and design within the fuel system to include fuel, air pressure dynamics, carburetor operation principles, carburetor design, carburetor service procedures and governor system.**

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IV. The student will demonstrate an understanding of the various components utilized in gas and diesel engines. (E) (cont.)

15. **Student will identify and define the use of all components needed within the electrical system to include electrical principles, charging system, ignition system, starting system.**
16. **Student will identify and define components within the cooling lubrication systems to include: engine heat, engine materials and characteristics, air-cooled engine cooling systems, liquid-cooled engine cooling system, lubrication, and cooling and lubrication system service procedures.**

V. The student will apply automotive technology to understand the various engines components and various operations of the related systems within the gas and diesel engines. (E)

17. **Student will demonstrate the final inspection of a rebuilt or reassembled engine and check fluid, governor, electrical and lubrication systems and complete a test-run of the engine.**
18. **Student will understand the operations and components needed for four-stroke and two-stroke cycle engines, and diesel engine.**