

**BILLINGS PUBLIC SCHOOLS
DIGITAL CAREER TECHNOLOGY
Adopted December 2000**

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 the student 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 the 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 the student learning experience.

PHILOSOPHY

With the growing importance of technology to our society, our nation's economy, and the natural environment, it is vital that students receive an education that emphasizes technological literacy. The Digital Career Technology environment facilitates learning for all The student by focusing on creating a "community of The student" actively engaged in the pursuit of knowledge; recognizing the importance of cooperation and effective communication; seeing the interrelationships among technology-related skills and career opportunities, other disciplines and the world beyond school; and by building on the natural curiosity and fascination student shave for answering questions, seeking explanations and solving problems that are the hallmarks of technology education.

Given the philosophical framework described above, Digital Career Technology contributes to the development of all students as technologically literate and capable persons who will be prepared to take their places as productive and constructive citizens.

LEARNING DOMAINS

- I. The student will demonstrate an understanding of technological literacy.**
- II. The student will demonstrate an understanding of appropriate workplace skills.**
- III. The student will apply basic skills in communications appropriate to technological content and learning activities.**
- IV. The student will apply basic skills in mathematics appropriate to technological content and learning activities.**
- V. The student will apply basic skills in science appropriate to technological content and learning activities.**
- VI. The student will apply technological applications and workplace skills in career/occupational strands of learning.**

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Learner Objectives

I. The student will demonstrate an understanding of technological literacy.

1. The student will describe and explain steps in the design/problem-solving process. (E)

- a. Describe and explain steps in the design/problem-solving process.**
- b. Propose solutions to given problems.**
- c. Design and implement the optimal solution to a given problem.**

2. The student will demonstrate knowledge of technological developments. (I)

- a. Outline major historical technological developments or events.
- b. Identify recent advances in technology.
- c. Explain problem-solving roles of technology.
- d. Forecast a technological decision.
- e. Make a technological decision.
- f. Define technology.

3. The student will discuss the outputs of technology on society and the environment. (I)

- a. Discuss the outputs of technology on society and the environment.
- b. Discuss the impacts of technology on work.
- c. Identify the scope of technological impacts and identify means of controlling the world impacts of technology.
- d. Discuss how technology can solve and/or create problems.
- e. discussing expected and unexpected outputs of technology.

4. The student will demonstrate computer application and literacy. (E)

- a. Define terms related to computer parts and usage.**
- b. List ways in which computers are used in technology.**
- c. Discuss advantages and disadvantages in the use of computers.**
- d. Demonstrate the application of a computer.**

II. The student will demonstrate an understanding of appropriate workplace skills.

5. The student will demonstrate proper and safe procedures while working with technological tools, apparatuses, equipment, systems and materials. (R)

- a. Follow laboratory safety rules and procedures.
- b. Demonstrate good housekeeping at workstation within total laboratory.
- c. Conduct laboratory activities and equipment operations in a safe manner.

6. The student will display an understanding and appreciation for the dignity and worth of honest labor. (I)

- a. Form an understanding and appreciation for work after listening to or observing technology workers.
- b. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
- c. Form an understanding and appreciation for the roles and work of co-workers.

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II. The student will demonstrate an understanding of appropriate workplace skills. (cont)

7. The student will exhibit positive human relations and leadership skills. (R)
 - a. Exhibit positive human relations and leadership skills.
 - b. Work cooperatively with others.
8. The student will discuss individual interests and aptitudes as they relate to a career.
(I)
 - a. Describe individual strengths and weaknesses.
 - b. Discuss individual interests related to a career.
 - c. Identify careers within specific areas of technology.
 - d. Explore careers within specific areas of interest.
9. The student will identify kinds and levels of work common to technology by identifying kinds of work related to technology. (I)

III. The student will apply basic skills in communications appropriate to technological content and learning activities.

- 10. The student will use the features of computer based and on-line instruction, manuals, instructional guides, books and reference materials, such as Internet, CD-ROM, video table of contents, tutorials, index, glossary, appendix, bibliography. (E)**
- 11. The student will use the control features of computers to access appropriate software stored on the computer hard drive, print worksheets and software stored on the computer hard drive, print worksheets and instructional material, send and record e-mail messages and assignments, and maintain a personal digital notebook using a standard 3.5 inch floppy disc. (E)**
12. The student will read and follow complex written directions. (R)
13. The student will find, understand, and apply information from a variety of sources (internet, CD-ROM, books, and manuals, newspapers. (I)
14. The student will use and expand general and specialized vocabulary (including abbreviations, acronyms, and concepts) as appropriate to subject areas studied at the grade level. (I)
15. The student will write Standard English entries with correct: (R)
 - a. Sentence structure
 - b. Verb forms
 - c. Punctuation, capitalization, possessive, plural forms, and other matters of mechanics
 - d. Word choice and spelling
16. The student will answer and ask questions coherently and concisely, and follow spoken instructions. (R)
17. The student will identify and comprehend the main and subordinate ideas in lectures and discussions, ask questions to clarify information heard, and report accurately what others have said. (R)

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IV. The student will apply basic skills in mathematics appropriate to technological content and learning activities.

18. The student will perform with accuracy the computations of addition, subtraction, multiplication, and division using whole numbers, fractions, decimals and integers. (R)
19. The student will make and use measurements in both traditional and metric units. (R)
20. The student will formulate and solve problems in mathematical terms, selecting appropriate approaches and tools (mental computation, trial and error, paper-and-pencil techniques, calculator, and computer). (R)
21. The student will solve work-related problems involving the basic arithmetic operations using whole numbers, fractions, decimals, and percents. (R)

V. The student will apply basic skills in science appropriate to technological content and learning activities.

22. The student will describe the role of observation and experimentation in the development of scientific theories. (R)
23. The student will gather scientific information through skills in laboratory, field and library work. (R)
24. The student will draw conclusions or make inferences from data. (R)
25. The student will apply basic scientific/technical solutions to the appropriate problems. (R)

VI. The student will apply technological applications and workplace skills in career/occupational strands of learning.

26. The student will define and apply elements of alternative energy sources. (I)
 - a. Define and describe the differences between nonrenewable and renewable sources of energy.
 - b. Define and describe current programs and explorations in nuclear, geothermal and ocean tide based alternative energy programs.
 - c. Identify the various forms of alternative energy and their applications for residential and commercial buildings by investigating through hands-on use wind power and solar photovoltaics.
 - d. Describe the environmental effects of an external combustion engine through experimentation and testing.
 - e. Define through hands-on experimentation the role of biomass technology in long range energy forecasting and explore long-range private and government programs for sustainable energy resources.
27. The student will define and apply elements of architectural design. (I)
 - a. Define the nature of architecture and how architecture influenced society.
 - b. Classify historical architecture events from cave drawing to CAD systems, as a development of graphic language.
 - c. Define the importance of technical and computer aided drawing technologies that are essential to the language of industry and use sketching techniques and computer aided drawing systems to produce illustrations and drawings both 2-D (Auto Cad LT) and 3-D.

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Learner Objectives

VI. The student will apply technological applications and workplace skills in career/occupational strands of learning. (cont.)

27. The student will define and apply elements of architectural design. (I)
 - d. Interpret and creating drawings using universal drawing standards and define the reasons for applying various types of drawings such as oblique and perspective drawings. (I)
 - e. Describe the impact of environmental and ecological awareness of architectural design and define the relationship of planning, socioeconomics and urban growth to current architectural practices.
 - f. Define geographic and topographic mapping techniques and applying them to drawings.
28. The student will define and apply elements of communications technology. (I)
 - a. Identify the evolution of communications technology and identifying list periods of major technological growth and expansions.
 - b. Identify major components of a telecommunications system and compare and contrast the way computer systems are networked together to talk to each other. (Networks, LAN, WAN, ISP, www)
 - c. Demonstrate the operation of video-conferencing software and hardware through an Intranet within a classroom.
 - d. Identifying the components of a fiber optics transmission system and demonstrating the transmission of sound and video via laser.
 - e. Demonstrate the use of bar coding and panoramic image processing.
29. The student will define and apply elements of construction technology. (I)
 - a. Identify the historical developments of digital electronics that have led to the current technology and explain the impact of those developments and discoveries within the digital electronics industry.
 - b. Describe the importance of energy saving applications within home construction and perform experiments on four window glass designs. (I)
 - c. Apply through hands-on application the skills and procedures for land surveying using transits, lasers and mapping tools to develop plot plans and geological considerations for residential home design and town planning.
 - d. Define typical construction processes of masonry. Framing, plumbing, HVAC, electrical, security and entertainment systems and their integration into a system for construction of the modern home and office.
 - e. Apply the various mathematical operations, techniques and theorems that are used within construction technology.
 - f. Discuss the ramifications of alternative energy, conservation and environmental considerations in residential and commercial construction and design systems.

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VI. The student will apply technological applications and workplace skills in career/occupational strands of learning. (cont.)

30. The student will define and apply elements of digital electronics. (I)
 - a. Identify the historical developments of digital electronics that have led to the current technology and explain the impact of those developments and discoveries within the digital electronic industry.
 - b. Identify and define the hardware components of a modern desktop computer and explain the operation of each component.
 - c. Demonstrate through hands-on exploration the manufacture of printed circuit boards and digital circuits.
 - d. Define through hands-on experimentation basic semiconductor physics and characteristics, applications of diodes, transistors, and basic digital circuit configurations and their practical applications.
 - e. Compare and contrast logic functions, memory circuits, and clock and timing circuits and their applications to electronic systems.
 - f. Demonstrate through hands-on application the use of circuit design software and virtual circuit testing.
31. The student will define and apply elements technology. (I)
 - a. Discuss the history of the Environmental Protection Agency and how it affects goods and services that are produced today.
 - b. Define the difference between exhaustible, renewable, and inexhaustible resources and define and describe alternate ways of heating homes and fueling vehicles.
 - c. Assess the affects of design and technological activity on the environment and take into account both positive and negative impacts on the earth and its resources.
 - d. Analyze the effects of ground water pollution through the hands-on use of a water table and earth strata simulation device.
 - e. Describe the effects through hands-on experimentation of biological pollution remediation using microbes.
 - f. Analyze water and air samples and define air pollution and pollen index criteria to evaluate environmental conditions.
32. The student will define and apply elements of manufacturing technology. (I)
 - a. Contrast historical manufacturing processes and comparing them to current (“just in time”) manufacturing processes.
 - b. Practice elements of production management to synthesize planning, engineering, resource allotment and manufacturing processes by establishing a student management team.
 - c. Classify through hands-on use of the purposes and processes of inspection and SPC (statistical process control) in manufacturing environment to assure uniformity and adherence to design specifications.

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VI. The student will apply technological applications and workplace skills in career/occupational strands of learning. (cont.)

32. The student will define and apply elements of manufacturing technology. (I)
 - d. Analyze and demonstrate in application the relationship of CAD/CAM, Rapid Prototyping and 3-D CNC machining in industry and manufacturing production.
 - e. Define and interpret the components of the industrial design process and producing drawings and renderings for new products.
 - f. Identify environmental and ecological aspects of manufacturing systems.
33. The student will define and apply elements of multimedia production. (I)
 - a. Compare and contrast the use of multimedia technology for educational and commercial uses.
 - b. Demonstrate through hands-on use the operation of digital video equipment and editing software.
 - c. Compare and contrast through application the uses of the Internet for commercial and educational purposes and define the use of enhancement products. (Java, Shockwave, etc.) for the Internet site design.
 - d. Compare and contrast the file formats and imaging operations used within multimedia technology.
 - e. Define the management structure of a multimedia development team and prepare a timeline for a multimedia development project. (I)
 - f. Compile and produce the graphic, video, script, sound and storyboard elements of a screen sequence for a multimedia CD-ROM used in commercial application.