

## ***Industrial Arts, Havre Middle School***

Grade Level: 6<sup>th</sup> 7<sup>th</sup> and 8<sup>th</sup> grade  
Length: 1 quarter  
Time/Period(s) Per Day: 2 periods a day for each grade level

***ESSENTIAL UNDERSTANDING*** Students will learn the basics of measuring, vocabulary, mechanical drawing, tool identification and usage, computer aided design and project construction. Projects progress throughout the grade levels, building on the student's knowledge, usage and skill level of the various tools and techniques used.

### ***Course Objectives and Expectations***

1. To apply math and technical skills to effectively communicate ideas to others.
2. To create awareness of safety in our everyday routines.
3. To work productively in small groups to re-teach concepts and ideas.
4. To understand and appreciate the skills needed to create objects out of wood that enrich our society.

### ***Student Objectives***

Students will:

1. Demonstrate mastery of tools and equipment relative to their project/task.
2. Apply common math skills to complete worksheets on fractions used on the ruler and in the construction of their projects.
3. Demonstrate knowledge of terminology used in Mechanical and CAD drawings.
4. Learn and apply skills used in Mechanical and CAD drawings.
5. Practice safe and appropriate use of tools and technology.
6. Demonstrate knowledge of hand and power tools.
7. Use algebra to determine spacing on mechanical drawings.
8. Identify information on plans and transfer that information to their project pieces.
9. Gain appreciation of skill used to manufacture projects in the shop.
10. Acquire good habits of properly putting tools and equipment away as well as cleaning the work area.

### ***Montana Common Core Standard***

The grades 6–12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them. The Standards set requirements not only for English language arts (ELA) but also for literacy in history/social studies, science, and technical subjects. The following core standards are addressed in this course:

**RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

**RST.6-8.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

## ***MONTANA STANDARDS FOR CAREER AND VOCATIONAL TECHNICAL EDUCATION***

Content Standards indicate what all students should know, understand and be able to do in a specific content area. Benchmarks define our expectations for students' knowledge, skills and abilities along a developmental continuum in each content area. That continuum is focused at three points—at the end of grade 8, the end of one high school course, and the completion of six units of vocational coursework.

**MCS CTE 2 1.2 and 1.3**

**MCS CTE 3 1.2**

**MCS CTE 4 1.2, 1.3, 1.4 and 1.5**

### ***Pacing***

### ***Standards***

Each Quarter

Unit 1 Measuring, addition and subtraction of fractions found on a ruler	RST 6-8.3 MCS CTE 2.1.2
Unit 2 Hand and Power tool Identification	RST 6-8.4 MCS CTE 2.1.2
Unit 3 Shop and Power tool safety	RST 6-8.3 MCS CTE 2.1.2 MCS CTE 4.1.2
Unit 4 Project Construction	RST 6-8.3 MCS CTE 4.1.2 MCS CTE 4.1.3 MCS CTE 4.1.4 MCS CTE 4.1.5 MCS CTE 3.1.2
Unit 5 Mechanical drawing	RST 6-8.4 MCS CTE 2.1.2 MCS CTE 2.1.3 MCS CTE 4.1.5
Unit 6 Computer Aided Design	RST 6-8.4 MCS CTE 2.1.2 MCS CTE 4.1.5

## *Content*

- I. Measuring
  - a. Divisions of an inch down to 1/16's
  - b. Adding and subtracting fractions found on a ruler
  - c. Decimal equivalents
- II. Hand and power tool identification
  - a. Saws
  - b. Planes
  - c. Clamps
  - d. Sanders
  - e. Hand held drills
  - f. Other hand tools
  - g. Stationary Power tools
- III. Shop and power tool safety
  - a. General safety rules
  - b. Table Saw
  - c. Jointer
  - d. Band saw
  - e. Planer
  - f. Power miter
  - g. Disc sander
- IV. Project construction
  - a. Wood prep and sizing
  - b. Shape cutting
  - c. Hole drilling
  - d. Sanding
  - e. Assembling
  - f. Staining
  - g. Extra finishing
- V. Mechanical drawing
  - a. Terminology
  - b. Line types
  - c. Border layout
  - d. Object spacing for orthographic drawings
  - e. Isometric spacing
  - f. Equipment cleaning
- VI. Computer aided design
  - a. Introduction to SketchUp
  - b. Basic tools used
  - c. Basic shape design
  - d. Basic assemblies

### ***Timeline***

Unit 1 Measuring	(~1 week to cover)
Unit 2 Hand and Power tool Identification	(~2 weeks to cover)
Unit 3 Shop and Power tool safety	(1 week to cover)
Unit 4 Project Construction	(3 to 4 weeks to cover)
Unit 5 Mechanical drawing	(1 week to cover)
Unit 6 Computer Aided Design	(1 to 1 ½ weeks to cover)

### ***Montana Content Standards***

**Content Standard 2:** Students demonstrate an understanding and apply principles of resource management.

Benchmarks:

1. Follow detailed instructions and complete assignment (e.g., project/time management).
2. Recognize time constraints (e.g., personal time).

**Content Standard 3:** Students acquire and utilize personal and leadership skills to become successful, productive citizens.

Benchmark:

1. Identify personal and work ethics.

**Content Standard 4:** Students acquire and demonstrate current technical skills leading to an occupation.

Benchmarks:

1. Practice safe and appropriate use of technology.
2. Identify and use appropriate tools and equipment for the task.
3. Identify and demonstrate appropriate care of technological tools.
4. Follow basic technical instruction.

### ***Resources***

Montana Standards for Career and Vocational Technical Education:

<http://opi.mt.gov/pdf/Standards/ContStds-CareerTech.pdf>

Montana Common Core Standards (MCCS): Literacy History/Social Studies, Science & Technology 6-12:

[http://opi.mt.gov/pdf/CCSSO/MCCS-ELA/Strands/MCCS-Literacy-Hist\\_SS\\_Sci\\_Tech-Grades-6\\_12.pdf](http://opi.mt.gov/pdf/CCSSO/MCCS-ELA/Strands/MCCS-Literacy-Hist_SS_Sci_Tech-Grades-6_12.pdf)