



Course Outcome Summary

Course Information: **Metals I**

Description: This class introduces students to basic welding practices, and the use of hand and power tools, measurement, and layout practices. Skills will then be used in the construction of larger projects; basic math skills will also be stressed. In this class, we will place value on those things a potential employer would consider important in maintaining and keeping a job. We will be covering blueprint reading, Oxy-Fuel Cutting, Oxy Fuel Welding, and Shielded Metal Arc Welding.

Instruction Level: Grades 9-12

Total Credits: 1

Prerequisites: Intro technology Education

Textbook: Title: Modern Welding, Author: Althouse, Turnquist, Bowditch
Publisher: The Goodheart-Willcox Company, Inc. ISBN: 1-56637-987-3

Course Standards:

Common Career and Technical Core:

- Communicate and collaborate with others to accomplish tasks and develop solutions to problems and opportunities.
- Identify and apply employability skills.
- Assess benefits and challenges of working in diverse settings and on diverse teams.
- Apply leadership skills in real-world, family, community and business and industry applications.

Content Standards:

- Analyze and use GMAW, GTAW, SMAW and ox-acetylene welding.
- Demonstrate the ability to choose proper welding supplies given the process.
- Identify different types of welding machines.
- Demonstrate appropriate use of welding blueprint symbols and codes used in industry.
- Demonstrate safety and chose the proper safety equipment given the process being used (i.e. oxy-acetylene, GMAW, SMAW, GTAW, etc.)
- Identify different types of welding joints and be able to demonstrate the ability to perform the welds, (i.e. butt, corner, edge, lap, tee).
- Identify the different type of welding positions and be able to demonstrate the ability to perform the welds (i.e. flat, horizontal, vertical, and overhead).

ACT Reading and Writing Standards:

- Show a basic understanding of the persuasive purpose of the task by taking a position on the issue in the prompt.
- Generate reasons for a position
- Maintain a focus on the general topic in the prompt throughout the essay
- Provide a simple organizational structure by logically grouping some ideas
- Present an introduction and conclusion
- Locate and interpret minor or subtly stated details in somewhat challenging passages
- Draw logical conclusions in more challenging passages
- Paraphrase virtually any statement as it is used in somewhat challenging passages
- Order simple sequences of events in somewhat challenging literary narratives
- Understand point of view in somewhat challenging passages

Unit

1. **Blueprint reading and Drafting**
2. **Safety**
3. **Oxy-Fuel Cutting**
4. **Oxy-Fuel Welding**
5. **Shielded Metal Arc Welding**

Unit Outlines

1. Unit 1: Drafting and Blueprint reading

Standards:

- Demonstrate appropriate use of welding blueprint symbols and codes used in industry

Essential Question:

Students will be able to answer the question:

- How does a blueprint guide the construction of a project?

Essential Knowledge:

Students, using previously learned knowledge, will be able to read a blueprint and draw some difficult drafting exercises.

- Drawing Exercise # 1 3/16" Square Hole
- Drawing Exercise # 2 3/16" Pattern
- Drawing Exercise # 3 1/4" Pattern with hole through it then made to a square.
- Drawing Exercise # 4 3/8" 3" circle
- Drafting Exercise # 5 3/8" Oval
- Drafting exercise # 6 3/8" initials and bevel
- Drafting Exercise # 7 Final with oval, square hole, initials, and Bevel.

2. Unit 2: Safety

Standards:

- Communicate and collaborate with others to accomplish tasks and develop solutions to problems and opportunities.
- Identify and apply employability skills.
- Assess benefits and challenges of working in diverse settings and on diverse teams.
- Demonstrate safety and chose the proper safety equipment given the process being used.

Essential Question:

Students will be able to answer the question:

- Why is safety in the workplace important in society?

Essential Knowledge:

Students will pass all safety tests so they can work safely and efficiently in the shop.

- General Safety PowerPoint
- Oxy-Fuel Welding PowerPoint
- Oxy-Fuel Cutting PowerPoint
- General Safety Test
- Oxy-Fuel Cutting Test
- Oxy-Fuel Welding Test
- SMAW PowerPoint
- SMAW Test
- Demonstrations of exercises

3. Unit 3: Oxy-Fuel Cutting

Standards:

- Analyze and use GMAW, GTAW, SMAW and ox-acetylene welding.
- Demonstrate the ability to choose proper welding supplies given the process.
- Identify different types of welding machines.
- Demonstrate appropriate use of welding blueprint symbols and codes used in industry.
- Demonstrate safety and chose the proper safety equipment given the process being used (i.e. oxy-acetylene, GMAW, SMAW, GTAW, etc.)

Essential Question:

Students will be able to answer the question:

- How does the thickness of metal affect the cut quality and appearance of a material?

Essential Knowledge:

Students will be able to cut metal varying in thicknesses from 3/16" to 1/2" to safely handle different metal thicknesses using the Oxy-fuel cutting process

- Exercise # 1 3/16" Square Hole
- Exercise # 2 3/16" Pattern
- Exercise # 3 1/4" Pattern with hole through it then made to a square.
- Exercise # 4 3/8" 3" circle
- Exercise # 5 3/8" Oval
- Exercise # 6 3/8" initials and bevel
- Exercise # 7 Final with oval, square hole, initials, and Bevel.

4. Unit 4: Oxy-Fuel Welding**Standards:**

- Analyze and use GMAW, GTAW, SMAW and ox-acetylene welding.
- Demonstrate the ability to choose proper welding supplies given the process.
- Demonstrate appropriate use of welding blueprint symbols and codes used in industry.
- Demonstrate safety and chose the proper safety equipment given the process being used (i.e. oxy-acetylene, GMAW, SMAW, GTAW, etc.)
- Identify different types of welding joints and be able to demonstrate the ability to perform the welds, (i.e. butt, corner, edge, lap, tee).
- Identify the different type of welding positions and be able to demonstrate the ability to perform the welds (i.e. flat, horizontal, vertical, and overhead).

Essential Question:

Students will be able to answer the questions:

- How is welding with the oxy-fuel system related to oxy-fuel cutting?
- How is welding with the oxy-fuel system different than oxy-fuel cutting?

Essential Knowledge:

Students will be able to weld using the Oxy-fuel welding process to produce a pad of beads, butt joint, lap joint, Flat Corner, Flat Edge, and tee joint while staying safe in the shop.

- Pad of beads with and without filler
- Flat Butt with and without filler
- Flat Lap
- Flat Tee
- Flat Corner
- Flat Edge

5. Unit 5: Shielded Metal Arc Welding**Standards:**

- Analyze and use GMAW, GTAW, SMAW and ox-acetylene welding.
- Demonstrate the ability to choose proper welding supplies given the process.
- Identify different types of welding machines.

- Demonstrate appropriate use of welding blueprint symbols and codes used in industry.
- Demonstrate safety and chose the proper safety equipment given the process being used (i.e. oxy-acetylene, GMAW, SMAW, GTAW, etc.)
- Identify different types of welding joints and be able to demonstrate the ability to perform the welds, (i.e. butt, corner, edge, lap, tee).
- Identify the different type of welding positions and be able to demonstrate the ability to perform the welds (i.e. flat, horizontal, vertical, and overhead).

Essential Question:

Students will be able to answer the question:

- How does setting up the parameters affect what the weld is going to look like when using the SMAW process?

Essential Knowledge:

Students will be able to use the correct parameters in order to weld using the SMAW welding process to produce a pad of beads, butt joint, lap joint, Flat Corner, Flat Edge, and tee joint using different electrodes while staying safe in the shop.

- Flat Pad 6013
- Flat Butt 6013
- Flat Lap 6013
- Flat Tee 6013
- Outside Corner 6013
- Flat pad 6011
- Flat lap 6011
- Flat Butt 6011
- Flat Tee 6011
- Outside Corner 6011