



Sparta Area School District

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Course Outcome Summary

Course Information: Welding II

Description:	A course of instruction to include the knowledge, skills, and safety required to perform welding operations using the Oxy-fuel, Shielded Metal Arc, Gas Metal Arc, and Gas Tungsten Arc Welding process. Students will be graded on written work as well as lab competencies. The exercises are more challenging requiring attention to detail and additional time.
Instruction Level:	Grades 10 - 12
Total Credits:	1
Prerequisites:	Introduction to Technology Education Metals I

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:

- Provide a simple organizational structure by logically grouping some ideas
- Draw logical conclusions in more challenging passages
- Paraphrase virtually any statement as it is used in somewhat challenging passages

Unit

- 1. Blueprint reading**
- 2. Oxy-Fuel and Plasma Cutting**
- 3. Arc Welding**
- 4. Gas Metal Arc Welding**
- 5. Gas Tungsten Arc Welding**
- 6. Braze and Oxy-Welding**

Unit Outlines

1. Blueprint Reading

Standards:

- Identify and apply employability skills.
- Demonstrate appropriate use of welding blueprint symbols and codes used in industry.
- 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.

Essential Question:

- Why is it important to be able to read and understand a blueprint when trying to use cutting equipment in the shop?

Essential Knowledge:

Students will be able to read a blueprint and use those skills and previously learned knowledge to draw a part to be cut in the shop.

- Orthographic Projection Exercise
- Understanding Different Views Exercises
- Exercise 1: Drawing Square Hole Exercise
- Exercise 2: Reading A Blueprint
- Exercise 3: Welding Positions-Flat, Horizontal, Vertical, Overhead
- Exercise 4: Bead types-Groove, fillet, slot, or stringer

2. Oxy-Fuel and Plasma Cutting

Standards:

- 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.)

Essential Question:

- Why is it important to be safe when cutting a variety of thicknesses using the oxy-fuel and plasma equipment?

Essential Knowledge:

Students will be able to cut $\frac{1}{2}$ " thick mild steel to safely handle different metal thicknesses using the Oxy-fuel and plasma cutting process

- Square hole 3/8" material oxy-fuel cutting
- Beveled cut with circular hole 3/8" material oxy-fuel cutting
- Square hole 3/8" material plasma cutting
- Beveled cut with circular hole 3/8" material plasma cutting

3. 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:

- 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 8sing different electrodes while staying safe in the shop.

- Buttons 6013
- Flat Butt 6013
- Flat Lap 6013
- Flat Tee 6013
- Flat pad 6011
- Flat lap 6011
- Flat Butt 6011

- Flat Tee 6011
- Flat Butt 7018
- Flat Lap 7018
- Flat Tee 7018
- Weave Bead 7018
- 2F 7018 Lap Joint
- Final using different exercises and different electrodes

4. Gas 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.
- 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:

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

Essential Knowledge:

Students will be able to use the correct parameters in order to weld using the GMAW welding process to produce quality welds while staying safe in the shop.

- Pad of beads overlapping
- Pad of beads Starts/Stops
- Butt
- Lap
- Tee
- Outside Corner
- 16 Ga
- Pipe to plate
- 3f Down exercise
- Final

5. Gas Tungsten 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:

How is the gas tungsten arc welding process different than other processes that we have used in the past?

Essential Knowledge:

Students will be able to weld using the Gas Tungsten Arc welding process to produce a pad of beads, butt joint, lap joint, and tee joint while staying safe in the shop.

- Exercise 1: GTAW Pad
- Exercise 2: GTAW Butt
- Exercise 3: GTAW Lap
- Exercise 4: GTAW Tee

6. Braze 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:

- Why is it important to be able to weld different materials other than just mild steel using the oxy-fuel welding process?

Essential Knowledge:

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

- Exercise 1: Brazing Pad
- Exercise 2: Brazing Butt
- Exercise 3: Brazing Lap
- Exercise 4: Brazing Tee
- Exercise 5: Silver solder nut to Plate

