Students are to increase their skill level and knowledge of Shielded Metallic Arc Welding (SMAW) process in flat position.

<table>
<thead>
<tr>
<th>Specific Skill Focus</th>
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<th>Objectives</th>
<th>Action Plan</th>
<th>Resources</th>
<th>Marzano Vocabulary</th>
<th>GLOBAL Content</th>
</tr>
</thead>
</table>
| Safety & Class Procedures | 13 A.5a. Design procedures and policies to eliminate or reduce risk in potentially hazardous activities  4A4a. Apply listening skills as individuals and members of a group in a variety of settings | The student will be able to:  
  - State procedures for ensuring general shop safety for all welding lab procedures.  
  - Demonstrate awareness of the unique safety hazards of SMAW processes.  
  - Demonstrate how to set up an Oxy-Ace torch for a cutting procedure.  
  - Perform a braze weld using an oxy-ace torch and brazing rod.  
  - Set-up a plasma cutter for a cutting operation.  
  - Perform a cut using a Plasma Cutter and mild steel. | Demonstrate safety procedures daily.  
Pass safety test with at least an 80%.  
Practice Oxy-Ace cutting and welding in flat position.  
Cut a piece of mild steel using an Oxy-Ace torch.  
Set–up an Oxy-Ace torch for a brazing or welding procedure.  
Cut designs of own choosing to practice Plasma cutting.  
Practice proper technique for each weld joint | Modern Welding  
Video-“Welding’  
Practical Problems in Mathematics for Welders | Accident  
Combustibles  
Cylinders  
Housekeeping  
Toxic Fumes  
Ventilation  
Brazing  
Brazing rod  
Welding rod  
Cutting torch  
Welding torch  
Arc gap  
Travel speed  
Amperage setting  
Pressure settings  
Electrode  
Electrode coating  
Electrode holder  
Ground clamp  
Steel tape  
Flat position  
Plasma arc cutting  
Oxy–Ace cutting and Welding  
Striker  
Chipping hammer  
<table>
<thead>
<tr>
<th>Shielded Metallic Arc Welding (Stick Welding)</th>
<th>Technical Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>7A4a. Apply units and scales to describe and compare numerical data and physical objects.</td>
<td><strong>•</strong> Set up a welding unit for a SMAW process.</td>
</tr>
<tr>
<td></td>
<td><strong>•</strong> Increase skill level by performing SMAW of various joints in flat position to be graded according to American Welding Society (AWS) standards.</td>
</tr>
<tr>
<td></td>
<td><strong>•</strong> Explain the differences in welding rods and their uses according to their numbering system.</td>
</tr>
<tr>
<td></td>
<td><strong>•</strong> Investigate the various careers available in the welding industry.</td>
</tr>
<tr>
<td></td>
<td><strong>•</strong> Solve problems using addition, subtraction, multiplication, and division of whole numbers, fractions and decimals as they apply to the welding industry.</td>
</tr>
<tr>
<td></td>
<td><strong>Demonstrate proper welding of a butt joint, T-joint, corner joint, edge joint, and a lap joint in flat position</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Select correct welding rod for a procedure</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Invite guest speakers or visitors from the welding industry</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Measure accurately to the nearest 1/16” using various measuring instruments (i.e. steel tape measure.)</strong></td>
</tr>
</tbody>
</table>
**Industrial Technology – Intermediate Welding**  
**Curriculum and Scope and Sequence**  
**2nd Quarter**

**Students will gain skill in SMAW process in horizontal position.**

<table>
<thead>
<tr>
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</thead>
</table>
| Shielded Metallic Arc Welding | 4A4a. Apply listening skills as individuals and members of a group in a variety of settings | **The student will be able to:**  
- Identify the difference in welding machines.  
- Demonstrate the ability to set the welding current at the proper level for the operation.  
- Explain the differences of AC and DC current in a welding process.  
- Understand the effect of rod angle on a weld.  
- Increase skill level by constructing welds in horizontal position to be graded according to the AWS standards. |  
Operate the various types of welders  
Utilize the different processes by constructing basic weld joints  
Set welding machines to the proper amperage needed for a specific operation. Students will be assessed on proper amp settings.  
Describe the welding electrode numbering system.  
Demonstrate the effect of changing arc length, travel speed and amperage setting on a weld.  
Practice welds using appropriate rod angle according to the weld and position required. |  
Modern Welding  
Video-“Welding”  
*Practical Problems in Mathematics for Welders* |  
Horizontal welding  
Groove weld  
Keyhole  
Porosity  
Slag  
Spatter  
Tack weld  
Undercut  
Weld bead  
Weld pool |  
“Power Systems”  
Exploring Energy |
<table>
<thead>
<tr>
<th>Technical Math</th>
<th>7A4a. Apply units and scales to describe and compare numerical data and physical objects.</th>
<th>- Use knowledge of basic math to answer practical problems as they relate to the welding profession.</th>
<th>Demonstrate proper welding of a butt joint, T-joint, corner joint, lap joint and edge joint.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Use addition, subtraction, multiplication, and division to solve practical real life math problems in the welding profession.</td>
<td></td>
</tr>
</tbody>
</table>
**Industrial Technology – Intermediate Welding**  
**Curriculum and Scope and Sequence**  
**Third Quarter**  

Students will increase their skill level in SMAW in vertical position

<table>
<thead>
<tr>
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</thead>
</table>
| Shielded Metallic Arc Welding (Stick Welding) | 4A4a Apply listening skills as individuals and members of a group in a variety of settings. | The student will be able to:  
- Demonstrate ability to perform welds in vertical position  
- Demonstrate the ability to control undercut, overlap, porosity and slag inclusions when welding.  
- Contour weld bead during welding by using the proper weave pattern  
- Prepare a groove weld using an angle grinder.  
- Construct a product that shows application of various welding skills throughout the course of instruction | Use proper technique when welding each of the five basic weld joints in vertical position.  
Construct a butt joint, T joint, corner, lap, and edge joint in vertical position.  
Welds will be performed by welding uphill.  
State the proper bead width and height according to metal thickness.  
Identify the parts of a groove weld and their proper size according to metal thickness.  
Projects may include: tabletop grill, Texas style barrel grill, metal sculpture, etc. | Modern Welding  
Video-“Welding  
Practical Problems in Mathematics for Welders | Vertical welding  
Uphill  
Arc gap  
Travel speed  
Groove weld  
Double groove weld  
Angle grinder | Exploring Energy – Energy Converters Ch. 4 |
| Technical math | 7A4a. Apply units and scales to describe and compare numerical data and physical objects. | • Solve practical mathematics problems as they apply to the welding profession. | Students will be given written work and assessments displaying their ability to solve problems such as measurement, decimals and fractions. |   |   |   |
**Industrial Technology – Intermediate Welding**  
**Curriculum and Scope and Sequence**  
**Fourth Quarter**

Students will use skills learned to construct projects related to course work and learn basic skills in Metallic Inert Gas Welding (MIG).

<table>
<thead>
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</thead>
</table>
| Shielded Metallic Arc welding. | 4A4a Apply listening skills as individuals and members of a group in a variety of settings. | The student will be able to:  
• Increase skill level by constructing projects related to course work.  
• Demonstrate the ability to set up a metallic inert gas (MIG) welding unit.  
• List the advantages and disadvantage of MIG welding process.  
• Understand the unique techniques involved in MIG welding process.  
• Demonstrate skill level in the MIG process by performing the five basic weld joints in flat position. to be graded according to the American Welding Society standards. | Students may select projects and plans from a variety of resources available in the shop and online. Projects may include, but are not limited to a working windmill and a variety of barbecue grills. Practice MIG welding before constructing weld joints for a grade. | Modern Welding  
Video-“Welding”  
Practical Problems in Mathematics for Welders  
Welding for Arts and Crafts  
Welding Projects  
www.millerwelds.com/projects | MIG welding  
Shielding Gas  
Welding wire  
Contact tip  
Stick out  
Pressure rollers | Exploring Energy, “Kinetic Energy” Ch. 9 |
| Technical Math                      | 7A4a. Apply units and scales to describe and compare numerical data and physical objects. | • Solve mathematical problems as they apply to the welding profession. | Make accurate measurements to the nearest 1/16”. Students will be assessed with a written exam for this skill. |   |   |   |