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# Arc Welding Assignment

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Description:**

This final project will test students on their arc welding ability. Students will be proficient in reading plans and figuring out how you would layout the project. Students will demonstrate that they can perform arc welding proficiently. Students will demonstrate good workmanship by assembling this project correctly, neatly, and accurately.

**Materials:**

¼" x 4" Mild Steel Bar  
¼" x 2" Mild Steel Bar  
1 ¼" Black Pipe  
7018 x 1/8" welding rod

**Tools:**

SMAW Welder  
Oxy- Acetylene Torch  
Bench Grinder  
Angle Grinder  
Hydraulic Shear  
Chop Saw  
Chipping Hammer  
Wire Brush  
Square  
Soapstone

**Procedure:**

1. Pay attention to layout, neatness and workmanship
2. Dress in appropriate welding safety gear, leather gloves, welding helmet, welding jacket
3. Cut 1 ¼" pipe 1" long using the chop saw.
4. Cut 3 pieces of ¼" x 2" bar 5" long with the shear.
5. Cut 1 piece of ¼" x 4" bar 5" long with the shear.
6. With an oxy- acetylene torch cut the 4" x 5 plate into 2 pieces (1 ½" and 2 ½").
7. Grind the edges as need to prepare for welding.
8. By using the attached drawing determine the order of how you want to weld the plates together
9. Perform all welds on your diagram
10. Once finished with construction, clean the welds.
11. Make sure to label with your project and turn in your paper for grading.

**Notes:**

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**Photo/Drawing:**

**HILMAR HIGH SCHOOL**

ARC Welding Assignment

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_ ID #: \_\_\_\_\_

**Materials:**  
 1- 1/4" plate, 4" x 5"  
 3- 1/4" plate, 2" x 5"  
 1- Pipe, 1-1/4" x 1" Long

ARC Welder  
 7018 Electrodes (3/8" diameter)

**Instructions:**

1. Make sure you have on hand the appropriate safety gear and to wear it at all times.
2. Use the O/A torch to cut the 4"x5" plate into 2 pieces using the measurements indicated in the diagram.
3. Perform the welds indicated on the diagram.
4. All welds will be graded on correctness, uniformity, smoothness, and placement.
5. General Consideration is given to layout, neatness, and overall workmanship.

O/A Cuts	(15)	
3-Pass Fillet	(25)	
Single Pass Fillet	(15)	
Single Pass Lap (2 Beads)	(20)	
Single Pass Butt	(15)	
Pipe to Plate	(25)	
Open Corner	(15)	
General Consideration	(20)	
<b>TOTAL SCORE = (150)</b>		

(See handout for design layout)

# Arc Welding Worksheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Complete before you start:

1. What materials will you be using?

\_\_\_\_\_

2. What tool is used to cut the pipe?

\_\_\_\_\_

3. Determine the weld order. Number the welds on the drawing.

4. \_\_\_\_\_

5. Why is it important to tack the project before welding?

\_\_\_\_\_

6. How will you ensure the vertical pieces are square?

\_\_\_\_\_

## Grading Rubric:

<u>CRITERIA</u>	<u>POSSIBLE</u>	<u>SCORE</u>
Oxy- acetylene cuts	15	
3 Pass fillet	25	
Single pass fillet	15	
Single pass lap	20	
Single pass butt	15	
Pipe to Plate	125	
Workmanship	20	
Total:	150	

## Arc Welding Teachers Notes:

This is designed to be a summative exercise to demonstrate welding ability.

### Agricultural Standards Met:

- B7.0 Students understand oxy-fuel cutting and welding:
- B7.1 Understand the role of heat and oxidation in the cutting process.
  - B7.2 Know how to properly set up, adjust, shut down, and maintain an oxy-fuel system.
  - B7.3 Know how to flame-cut metal with an oxy-fuel cutting torch
- B8.0 Students understand electric arc welding processes:
- B8.1 Know how to select, properly adjust, safely employ, and maintain appropriate welding equipment (e.g., gas metal arc welding, shielded metal arc welding, gas tungsten arc welding).
  - B8.2 Apply gas metal arc welding, shielded metal arc welding, or flux core arc welding processes to fusion-weld mild steel with appropriate welding electrodes and related equipment.
  - B8.3 Weld a variety of joints in various positions.
  - B8.4 Know how to read welding symbols and plans, select electrodes, fit-up joints, and control heat and distortion.
- B1.0 Students understand personal and group safety:
- B1.1 Practice the rules for personal and group safety while working in an agricultural mechanics environment.
  - B1.2 Know the relationship between accepted shop management procedures and a safe working environment.

### Objectives:

By properly completing this project, students will be able to:

- Read a plan and layout dimensions
- Be proficient in arc welding
- Constructing a sound, neat and correct project

### Alternative Tools/Methods/Materials:

- All steel could be cut with a Chop Saw or a torch used for more pieces.
- Oxy Cutting could be omitted (use 2" pieces).

### Safety Review:

- Welding attire
- Oxy- Acetylene torch use
- Arc Welding
- Hydraulic Shear
- Chop Saw

**Project Time:**

Demonstration:	10 minutes
Build:	2 hours

**Demonstration Notes**

1. Set shear stop to 5".
2. Show a finished project.
3. Discuss the possible order of the welds.

**Bill of Materials:**

Projects:		20					
Size	Description	Units	Qty/Project	Cost/Unit	Order	Amount	
1/4" x 4"	Mild Steel Bar	20'	0.03	\$68.00	1	\$	68.00
1/4" x 2"	Mild Steel Bar	20'	0.06	\$35.00	2	\$	70.00
1-1/4"	Black Pipe	21'	0.005	\$ 50.00	1	\$	50.00
1/8"	E7018 Electrode	10#	0.04	\$ 35.00	1	\$	35.00
					TOTAL	\$	223.00

Project from: (Original project from Hilmar High School ). Plan by: Madison Weigel. Edits M.Spieß