

Pencil Holder

Name: _____

Date: _____

Description:

A simple but useful holder for pencils. Student will practice, layout, cutting, and welded assembly skills.

Materials:

$\frac{1}{4}$ " x 4" Flat Mild Steel

$\frac{1}{4}$ " x 2 $\frac{1}{2}$ " Angle Mild Steel

Electrode (see welding directions)

Tools:

Hydraulic Shear

Chipping Hammer

Wire Brush

Bench grinder

Square

Steel Tape

Soapstone

4" angle grinder.

Locking Pliers

Chop Saw

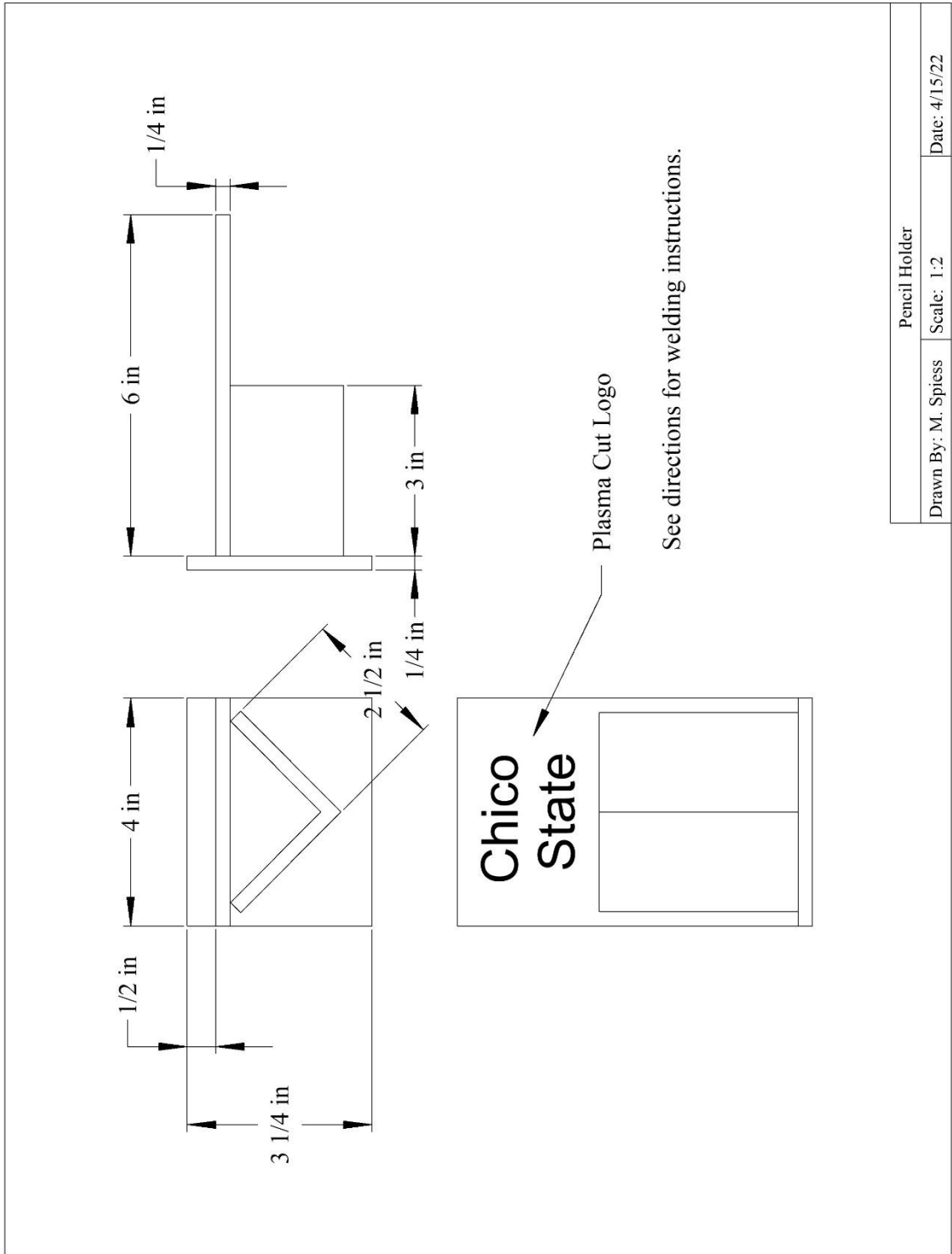
Procedure:

1. Review the plan.
2. Write the welding instructions on the on the drawing.
3. Cut a one piece of 4" bar to 3 $\frac{1}{4}$ " and one to 6" using the shear.
4. Cut a 1 piece of 2 $\frac{1}{2}$ " angle to 3" using the chop saw.
5. Clean up the sheared edges with the bench grinder.
6. Assemble the pieces and tack.
7. Check for square. Do not proceed unless the project is square and assembled correctly.
8. Weld as indicated OR as instructed.
9. Clean welds with a wire brush.
10. Use a bench grinder or small angle grinder to remove any sharp edges.
11. Optionally, paint. (Hammered Black looks good)
12. Optionally, apply felt pads to the base (works better on a desk)

Cutting List

Quantity	Size	Material
1	$\frac{1}{4}$ " x 4" x 6"	mild steel flat bar
1	$\frac{1}{4}$ " x 4" x 3 $\frac{1}{4}$ "	mild steel flat bar
1	$\frac{1}{4}$ " x 2 $\frac{1}{2}$ " x 3"	mild steel angle

Drawing:



Pencil Holder Worksheet

Name: _____

Date: _____

Complete this worksheet before starting the project.

1. What welding processes will you use to complete this project? _____

2. What tool(s) will you use to cut the metal? _____

3. Why is it important to use locking pliers when grinding small pieces of metal?

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

5. What technique did you use to minimize distortion of the project?

Grading Rubric:

<u>CRITERIA</u>	<u>POSSIBLE</u>	<u>SCORE</u>
Proper Assembly (As shown in drawing)	5	
Fillet Welds	10	
Edge Welds	5	
Neatness of Assembly (square, fit of parts)	5	
Neatness of Cuts/Dimensions	5	
Questions from worksheet	5	
Total Score	35	

Welding Rod Holder Teachers Notes:

Agricultural Standards Met:

- 6.0 Health and Safety. Students understand health and safety policies, procedures, regulations, and practices, including the use of equipment and handling of hazardous materials:
- 6.1 Know policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities.
 - 6.2 Understand critical elements of health and safety practices related to storing, cleaning, and maintaining tools, equipment, and supplies.
 - 6.4 Maintain safe and healthful working conditions.
 - 6.5 Use tools and machines safely and appropriately.
 - 6.6 Know how to both prevent and respond to accidents in the agricultural industry.
- 7.0 Responsibility and Flexibility: Students know the behaviors associated with the demonstration of responsibility and flexibility in personal, workplace, and community settings:
- 7.1 Understand the qualities and behaviors that constitute a positive and professional work demeanor.
 - 7.2 Understand the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.
 - 7.3 Understand the need to adapt to varied roles and responsibilities.
 - 7.4 Understand that individual actions can affect the larger community.
 - 7.5 Understand the importance of time management to fulfill responsibilities.
 - 7.6 Know how to apply high-quality craftsmanship to a product or presentation and continually refine and perfect it.
- 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.
- B5.0 Students understand agricultural cold metal processes:
- B5.2 Know basic tool-fitting skills.
 - B5.3 Know layout skills.
 - B5.4 Know basic cold metal processes (e.g., shearing, cutting, drilling, threading, bending.).
- B8.0 Students understand electric arc welding process.
- 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.

Objectives:

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

- Read a plan to and layout dimensions.
- Cut mild steel with the hydraulic shear.
- Properly set an arc welding machine.
- Choose the correct electrode for the job.
- Properly assemble the project.

Alternative Tools/Methods/Materials:

Lots of variations are possible.

- Plasma Cut Logo: This can be omitted. Plasma cutting can be part of the lesson or pieces can be pre-cut.
- Consider using different electrode and processes.
- Project makes a good unit test for a specific process.
- Introduce welding symbols

Safety Review:

- Hydraulic Shear
- Arc Welder (PPE)
- Hot metal
- Bench grinder (Especially when working with small pieces)
- Angle Grinder
- Chop Saw (hearing protection too.)

Project Time:

Demonstration:	30 minutes
Build:	2 hours

Demonstration Notes

1. Review plan.
2. Provide welding directions.
3. Demonstrate use of the shear. Note: Setting a stop can speed up cutting and demonstrate the use of the stop.
4. Demonstrate cutting the angle on the chop saw. Note: use a stand for the bar of angle and students can mark and cut. CAUTION: hot and sharp edges.
5. Demonstrate use of locking pliers when bench grinding small pieces.
6. Demonstrate the tack up and checking before welding.
7. Demonstrate the welding. IMPORTANT: To avoid distortion weld on opposite sides and allow to cool between welds.
8. Show how to clean up the project and your expectations for clean welds. If using an angle grinder then clamp project in a vise.

Bill of Materials:

Size	Description	Units	Qty/Project	Cost/Unit	Order	Amount
1/4" x 1"	Mild Steel flat bar	20' bars	0.05	\$6.00	2	\$ 12.00
1/4" x 1 1/2"	Mild Steel flat bar	20' bars	0.0125	\$6.00	1	\$ 6.00
					TOTAL	\$ 6.00