
Note Pad Holder

Name: _____

Date: _____

Description:

The note pad holder is a cold metal project that involves layout skills and sheet metal fabrication skills

Materials:

3-1/8"x 1/4" Aluminum Pop Rivet
18 ga. Galvanized Sheet Metal
1-1/8"x1" Flat Hot Rolled Mild Steel
1-1/8"x1"x1" HR Angle Iron
2-1"x 1/4"-20 (NC) Pan Head Screw
2- 1/4" Split Lock Washer
2- 1/4"-20 (NC) Wing Nut

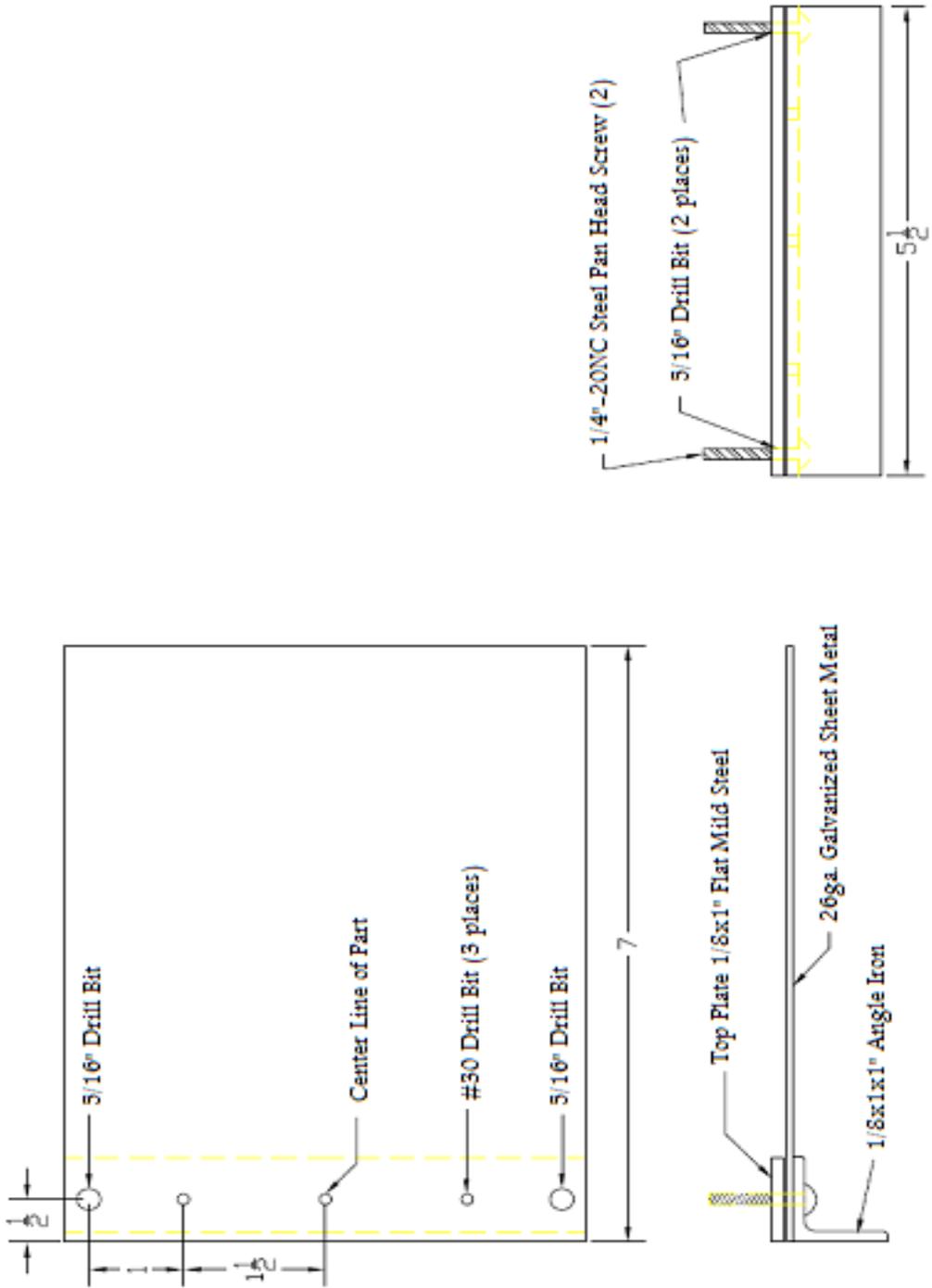
Tools:

Steel Tape Measure
Combination Square
Scratch Awl/Sharpie
Sheet Metal Shear
Mill Files (Bastard & Smooth)
Abrasive Cut-off Saw
Center Punch
Ball Peen Hammer
Pop Rivet Tool
Drill Press
#30 Drill Bit
1/4" Twist Drill
Locking Pliers

Procedure:

1. Layout the 5 1/2"x7" main base on 26ga galvanized sheet metal. Cut using a sheet metal shear.
2. Measure a 5 1/2" long piece of 1/8"x1" flat steel for the top plate strip. Measure a 5 1/2" long piece of 1/8"x1"x1" angle iron for the bottom support. Cut both pieces using an abrasive cut off saw.
2. File rough or uneven edges smooth or even with mill file.
3. Layout two locations for drilling outside screw-holes on the top plate strip front using a center punch. Line-up and securely clamp together all three pieces of material with locking pliers.
4. Drill two outside holes using a 1/4" drill and drill press. Remove any burs with a file.
5. Layout three locations for drilling inside pop rivet-holes on the main base plate front using a center punch. Line-up and securely fasten together the main base and support for drilling.
6. Drill three inside holes using a #30 drill bit and drill press. Remove any burs with a file.
7. Attach the main base plate and supporting angle iron using three 1/8"x 1/4" pop rivets and a pop rivet tool. Drive down the metal tight against rivet head with a ball peen hammer, if necessary.
8. Assemble note pad holder inserting a 1"x 1/4"-20NC pan head screw through each outside hole along with a 1/4" split lock washer. Thread on a 1/4"-20NC wing nut to each.

Photo/Drawing:





Note Pad Worksheet

Name: _____

Date: _____

- The main base plate of the notepad holder is _____ by _____. (1 pt)
- Calculate the distance of each of the two outside 5/16" drilled holes from the project edges, and note on given plan. The center of each hole is measured at 1/2" from the top of the note pad holder, and _____ from the side, both right and left, project edges. (1 pt)
- Name the three larger machine tools used to complete this project. (3 pts)

- The tool used to smooth rough edges of metal is called a _____. (1 pt)
- List the following steps in order of the recommended method used to layout and drill a hole with a drill press. (2 points)
 - ___ At a 90°-angle to material surface, drill hole completely through applying light, constant pressure on hand feed lever
 - ___ Place and firmly secure materials for drilling to the drill platform
 - ___ According to plan, measure and mark locations of holes to drill with a center punch
 - ___ Select desired drill bit to put in drill press chuck and a piece of wood for protective backing
- The difference in the diameter of the 1/8" pop rivets (_____) and the #30 drill bit (_____) is _____. This difference helps to eliminate a(n) _____. (2 pts)

Grading Rubric:

<u>CRITERIA</u>	<u>POSSIBLE</u>	<u>SCORE</u>
Worksheet Questions	10	
Assembly (properly assembled, ordered lay of pieces)	5	
Measurement – height & width	5	
Rivets (placement, cleanliness, tight)	5	
Screws (placement, cleanliness)	5	
Workmanship (straight cuts, not sharp edges, flat/level)	5	
TOTAL POINTS :	35	

DECIMAL EQUIVALENTS OF DRILLS

Drills	Diameter Inches																
80	.0135	57	.0430	37	.1040	11/64	.1719	C	.2420	T	.3580	5/8	.6250				
79	.0145	56	.0465	36	.1065	17	.1730	D	.2460	23/64	.3594	41/64	.6406				
1/64	.0156	3/64	.0469	7/64	.1094	16	.1770	E	.2500	U	.3680	21/32	.6562				
78	.0160	55	.0520	35	.1100	15	.1800	1/4	.2500	3/8	.3750	43/64	.6719				
77	.0180	54	.0550	34	.1110	14	.1820	F	.2570	V	.3770	11/16	.6875				
76	.0200	53	.0595	33	.1130	13	.1850	G	.2610	W	.3860	45/64	.7031				
75	.0210	1/16	.0625	32	.1160	3/16	.1875	17/64	.2656	25/64	.3906	23/32	.7188				
74	.0225	52	.0635	31	.1200	12	.1890	H	.2660	X	.3970	47/64	.7344				
73	.0240	51	.0670	1/8	.1250	11	.1910	I	.2720	Y	.4040	3/4	.7500				
72	.0250	50	.0700	30	.1285	10	.1935	J	.2770	13/32	.4062	49/64	.7656				
71	.0260	49	.0730	29	.1360	9	.1960	K	.2810	Z	.4130	25/32	.7812				
70	.0280	48	.0760	28	.1405	8	.1990	9/32	.2812	27/64	.4219	51/64	.7969				
69	.0292	5/64	.0781	9/64	.1406	7	.2010	L	.2900	7/16	.4375	13/16	.8125				
68	.0310	47	.0785	27	.1440	13/64	.2031	M	.2950	29/64	.4531	53/64	.8281				
1/32	.0312	46	.0810	26	.1470	6	.2040	19/64	.2969	15/32	.4688	27/32	.8438				
67	.0320	45	.0820	25	.1495	5	.2055	N	.3020	31/64	.4844	55/64	.8594				
66	.0330	44	.0860	24	.1520	4	.2090	5/16	.3125	1/2	.5000	7/8	.8750				
65	.0350	43	.0890	23	.1540	3	.2130	O	.3160	33/64	.5156	57/64	.8906				
64	.0360	42	.0935	5/32	.1562	7/32	.2188	P	.3230	17/32	.5312	29/32	.9062				
63	.0370	3/32	.0938	22	.1570	2	.2210	21/64	.3281	35/64	.5469	59/64	.9219				
62	.0380	41	.0960	21	.1590	1	.2280	Q	.3320	9/16	.5625	15/16	.9375				
61	.0390	40	.0980	20	.1610	A	.2340	R	.3390	37/64	.5781	61/64	.9531				
60	.0400	39	.0995	19	.1660	15/64	.2344	11/32	.3438	19/32	.5938	31/32	.9688				
59	.0410	38	.1015	18	.1695	B	.2380	S	.3480	39/64	.6094	63/64	.9844				
58	.0420											1	1.0000				

Note Pad Holder -- Teachers Notes:

Agricultural Standards Met:

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:

B5.1 Know how to identify common metals, sizes, and shapes.

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).

B5.5 Complete a cold metal project, including interpreting a plan, developing a bill of materials, selecting materials, shaping, fastening, and finishing.

Objectives:

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

- Read a plan and to layout dimensions.
- Safely and properly use a power machine tool, such as a drill press, sheet metal shear and abrasive cut off saw.
- Perform basic sheet metal fabrication.

Alternative Tools/Methods/Materials:

- Make larger in size (for 8½"x11" paper)
- Use various tools for cutting: hydraulic shear, chop saw, hacksaw, iron worker, Beverly shear, tin snips, etc.
- Use lighter/heavier, thinner/thicker angle iron or flat steel
- Use different kinds or sizes of bolts, screws or nuts (bigger drill bits = less likely to be broken)
- Tap holes for screws
- Replace flat cold rolled mild steel top holding strip with sheet metal
- Replace angle iron and top flat strip with wood and/or use wood for base material
- Fold edges of sheet metal
- Add metal strip to bottom of front face (design)
- Replace angle iron with a hanger or hook
- Make entire project out of aluminum
- Drill more holes (makes project adjustable for various sizes of paper)
- Replace pop rivets with spot welding or with countersunk screws

Safety Review:

- Abrasive cut off saw/cutting metal
- Sheet metal shear/shearing metal
- Drill press (floor)/drilling holes in metal

Project Time:

Demonstration:	40 minutes
Build:	3 hours

Demonstration Notes

1. Measure twice before you cut.
2. Remember to file or smooth rough and sharp edges.
3. Layout/measure material at machines and/or drilling to minimize back and forth traveling. Demo the use of the combination square for layout.
4. Emphasize correct drill speed for drilling metal.
5. Clamp material pieces together locking pliers facing upwards, minimizing interference in accurately securing and leveling project on drill press platform before drilling. By drilling the clamped pieces you insure the holes will align.
6. Remember: metal will be hot after cutting with an abrasive cut off saw and after drilling.
7. Using a #30 drill bit (.1285" diameter) to make holes for 1/8" pop rivets (.125" diameter) eliminates an interference fit. Since the hole is slightly larger (difference of .0035"), inserting the pop rivet is more efficient, requires less time to try and push it in, and allows for more productivity.
8. Push pop rivet and tool firmly against material before squeezing to ensure rivets are flush against metal.
9. Unclamp pieces after drilling outside ¼" holes, and attach main base plate to supporting angle iron with screws for drilling inside pop rivet holes.
10. Pound down the rivet heads to make them as flush as possible against the metal.
11. Lock washer is placed near end of screw next to wing nut.
12. Workmanship should be emphasized.

Bill of Materials:

Projects:		24					
Size	Description	Units	Qty/Project	Cost/Unit	Order	Amount	
18 ga	Galvanized Sheet Metal	3'x8' sheets	0.013	\$48.00	1	\$	48.00
1/8"x1/4"	Aluminum Pop rivet	100-pack	0.03	\$5.50	1	\$	5.50
1/8"x1"	Flat HR mild steel	20' bar	0.025	\$10.00	1	\$	10.00
1/8"x1"x1"	Angle iron	20' bar	0.025	\$ 12.00	1	\$	12.00
1"x1/4"	20 NC steel pan head screw	100-pack	0.02	\$ 5.50	1	\$	5.50
1/4"	Split Lock washer	100-pack	0.02	\$ 12.00	1	\$	12.00
1/4"	20 NC wing nut	50-pack	0.04	\$ 7.00	1	\$	7.00
						TOTAL	\$ 100.00

Project from: Mr. Patterson, Ripon High School

Plan by: Lindsey Pahl