NAME: __________________________

INDUSTRIAL TECHNOLOGY & DESIGN

Shop B

DESIGN FOLIO

UNIT 1                           Year 9

DUST PAN AND CARRY ALL

Centenary Heights State High School
Safety - Respect - Learning

NAME: __________________________
Dustpan

Knowledge and Understanding
Technologies and Society
Explain some factors that could influence the design of your dustpan

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Technology contexts
Explain how the technology we are using to produce the dustpan (folded metal) impacts on the design of the dustpan.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Process and production skills
Investigating
Evaluate the need for a dustpan in today’s society, who would use it and why?

_________________________________________________________________

Evaluating
Develop 3 criteria for success including sustainability considerations.
1.___________________________________________________________
2.___________________________________________________________
3.___________________________________________________________

When the project is complete use your 3 criteria from above to judge the suitability of
Your ideas
1.___________________________________________________________
2.___________________________________________________________
3.___________________________________________________________

Your design
1.___________________________________________________________
2.___________________________________________________________
3.___________________________________________________________

The processes used
1.___________________________________________________________
2.___________________________________________________________
3.___________________________________________________________
MATERIAL
Body 330 x 240
Handle 175 x 40
PLAN OF ACTION

Starting at the beginning, write each of the MAJOR STEPS needed to make your solution. You may wish to sketch some of these steps. Remember that some steps may have several actions,

1. Fitting a wood screw
   a) Drill clearance holes
   b) Drill root diameter hole for screw
   c) Drill countersink
   d) Fit wood screw

My plan of action / work order will be:-

Major Sequences

1. ..............................................................................................................
2. ..............................................................................................................
3. ..............................................................................................................
4. ..............................................................................................................
5. ..............................................................................................................
6. ..............................................................................................................
7. ..............................................................................................................
8. ..............................................................................................................
9. ..............................................................................................................
10. ............................................................................................................
11. ............................................................................................................
12. ............................................................................................................
13. ............................................................................................................
14. ............................................................................................................
15. ............................................................................................................
16. ............................................................................................................
17. ............................................................................................................
18. ............................................................................................................
19. ............................................................................................................
TIP - Make sure your teacher checks your sequence

Material List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>No.</th>
<th>MATERIAL</th>
<th>SIZE</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
METALWORK TOOLS AND EQUIPMENT

1. Name the sheetmetalworking stakes shown in the diagrams below.

   a. .........................................................
   b. .........................................................
   c. .........................................................

   d. .........................................................
   e. .........................................................
   f. .........................................................

2. Name two stakes you could use when turning a folded edge on a piece of tinplate or galvanoid.

   a. ................................................................
   b. ................................................................

3. Give two reasons why a hammer should not be used to turn a folded edge on a piece of tinplate.

   a. ................................................................
   b. ................................................................

4. Name the sheetmetalworking tools shown in the diagrams below.

   a. .........................................................
   b. .........................................................
   c. .........................................................
5. Name the sheetmetalworking tools shown in the diagrams below.

![Diagram of tools]

a. ___________________________  b. ___________________________  c. ___________________________

6. Which of the following tools would you use to cut a piece of wire for a wired edge?
   a. Jewellers' snips  
   b. Combination pliers  
   c. Tin snips  
   d. Vice-grip pliers

7. Briefly explain your choice in question 6 above. Also give reasons why the other three tools would not be used to cut wire.

8. Neatly draw a rivet set in the space provided on the right, clearly showing the holes in the face of the tool.
   Your sketch could be a pictorial drawing such as an oblique view or it could consist of two orthographic views.

9. Briefly describe the uses of the two holes in the face of the rivet set.
   Also describe the purpose of the hole in the side of the rivet set.
10. Name the metalwork tools shown in the diagrams below.

a. ........................................ b. ........................................ c. ........................................

11. Which of the tools shown above would be used to punch holes in thin sheetmetal which is to be joined with tinman's rivets?

12. The diagrams below show a tinplate box positioned on a wooden block ready to punch rivet holes through the seams. Which diagram illustrates the procedure that would give the best result?

a. Diagram A  b. Diagram B

13. Briefly explain your answer to question 12 above.

14. Tinman's rivets are usually galvanised. What is the meaning of the term 'galvanised'?

15. Why are tinman's rivets usually galvanised?
SEAMS AND EDGES

1. List three reasons why sheetmetal projects often require edge treatment.
   a. ..............................................................................................................................
   b. ..............................................................................................................................
   c. ..............................................................................................................................

2. Name the edge treatments shown in the diagrams below.
   a. ..............................................................................................................................
   b. ..............................................................................................................................

3. The allowance for a wired edge is:
   a. 3mm.  b. 4mm.  c. 5mm.  d. 6mm.

4. Which of the following seams requires one allowance only?
   a. Lapped  b. Grooved  c. Folded  d. Peined

5. Complete the development of one corner of the sheetmetal box with 4mm double folded edges illustrated in the diagram below. Seams are not required.

6. Complete the development of one corner of the sheetmetal box with wired edges illustrated in the diagram below. Seams are not required.
N.B. Notching in the following diagrams is either 90° or 45° as illustrated.

7. Complete the development of one corner of the sheetmetal box with 8mm lap seams illustrated in the diagram below. Edge treatment is not required.

8. Complete the development of one corner of the sheetmetal box with 5mm folded seams illustrated in the diagram below. Edge treatment is not required.

9. Complete the developments of one corner of the sheetmetal boxes shown below. Both boxes have 5mm folded edges and 5mm lap seams which are to be soldered.
N.B. Notching in the following diagrams is either 90° or 45° as illustrated.

7. Complete the development of one corner of the sheetmetal box with 8mm lap seams illustrated in the diagram below. Edge treatment is not required.

8. Complete the development of one corner of the sheetmetal box with 5mm folded seams illustrated in the diagram below. Edge treatment is not required.

9. Complete the developments of one corner of the sheetmetal boxes shown below. Both boxes have 5mm folded edges and 5mm lap seams which are to be soldered.
3. TOOLS USED WHEN WORKING WITH METALS

These activities will help you to:

- know the names and uses of tools
- know some different families of tools
- be able to put different tools into their correct families.

Q1: Look at the tools shown in this drawing. In the circles provided, place numbers from the word bank to identify the tools. (Not to scale)

WORD BANK

1. Ball-pein hammer
2. Bench drill
3. Centre punch
4. Cold chisel
5. Combination pliers
6. Cross-pein hammer
7. Dividers
8. Dresser
9. Engineer’s square
10. Engineer’s vice
11. Files
12. Groover
13. Hacksaw
14. Hand vice
15. Machine vice
16. Pin punch
17. Rivet set
18. Scratch gauge
19. Scribe
20. Soldering bit
21. Steel rule
22. Tin snips
23. Tinman’s mallet
24. Tinman’s square
25. Twist drill
26. Vice grips
27. Wad punch

Q2: Now put the name of each tool from the word bank in the correct column of the table of tool families on page 8. (Three examples have been given.)
Carry All

Knowledge and Understanding
Technologies and Society
Explain some factors that could influence the design of your toolbox
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Technology contexts
Explain how the technology we are using to produce the toolbox (folded metal) impacts on the design of the toolbox.
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Process and production skills
Investigating
Evaluate the need for a toolbox in today’s society, who would use it and why?
_________________________________________________________________

Evaluating
Develop 3 criteria for success including sustainability considerations.
1. _____________________________________________________________
2. _____________________________________________________________
3. _____________________________________________________________

When the project is complete use your 3 criteria from above to judge the suitability of
Your ideas
1. _____________________________________________________________
2. _____________________________________________________________
3. _____________________________________________________________

Your design
1. _____________________________________________________________
2. _____________________________________________________________
3. _____________________________________________________________

The processes used
1. _____________________________________________________________
2. _____________________________________________________________
3. _____________________________________________________________
RIVETS

Rivets are metal pins used to hold two or more pieces of metal together.

COMMON RIVETS

- **blind rivet**
- **standard open blind rivet**
- **tinman's rivet**
- **closed blind rivet**

STEPS IN FASTENING BLIND RIVETS

1. Select a rivet to suit the model.
2. Drill a hole to suit the rivet.
3. Place the rivet through the hole.
4. Use blind rivet pliers to draw the mandrel through the rivet.
Major Sequences

1. _______________________________________________________________
2. _______________________________________________________________
3. _______________________________________________________________
4. _______________________________________________________________
5. _______________________________________________________________
6. _______________________________________________________________
7. _______________________________________________________________
8. _______________________________________________________________
9. _______________________________________________________________
10. _______________________________________________________________
11. _______________________________________________________________
12. _______________________________________________________________
13. _______________________________________________________________
14. _______________________________________________________________
15. _______________________________________________________________
16. _______________________________________________________________
17. _______________________________________________________________
18. _______________________________________________________________
19. _______________________________________________________________
20. _______________________________________________________________
21. _______________________________________________________________
22. _______________________________________________________________
23. _______________________________________________________________
24. _______________________________________________________________
25. _______________________________________________________________

Material List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>No.</th>
<th>MATERIAL</th>
<th>SIZE</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MY IDEAS

There’s nothing more dangerous than an idea if it’s the only one I’ve got.

Here is workspace for your ideas, although, you may have many more.
SHEETMETAL WORK

The adjacent drawing shows a sheetmetal box joined on one corner with a folded seam. The box has a wired edge and a separate base joined with a peined down seam as illustrated in the sectional detail.

1. Which of the following (drawn to a smaller scale) would be the correct development of the base?

   a.  
   b.  
   c.  
   d.  

2. Which of the following (drawn to a smaller scale) would be the correct development of the sides of the box?

   a.  
   b.  
   c.  
   d.  

3. Name a suitable material for the construction of the box given that it would be exposed to excessive moisture.

4. Briefly explain why the sheetmetal you have chosen as your answer to question 3 would not be affected by moisture.
5. The sketch on the right shows a sheetmetal container with sloping ends. It has wired edges and the corners are joined with 6mm lapped and soldered seams. Complete the full size development below by adding the ends and all allowances for the wired edges and lap seams.

N.B. The ends only are sloping; the other two sides are perpendicular to the base.

6. Name all the sheetmetal working tools and equipment you would use to mark out, cut and fold up the container shown above.
7. The sketch on the right shows a sheetmetal container with a wired edge and separate ends joined by 5mm folded seams. Complete the full size development below by showing all allowances for seams and edges including notching.

The incomplete development below represents the actual pieces of sheetmetal to be marked out.

8. The diagram on the right represents one corner of the development of a sheetmetal box with 5mm folded edges and 8mm lap seams. The seams are notched mm as represented by dimension 'A' so that the folded edge does not overlap the

..........................................................
WORKING DRAWINGS

Now make a working drawing. This drawing should be complete so that anyone working from it could make the design.
PLAN OF ACTION

Starting at the beginning, write each of the MAJOR STEPS needed to make your solution. You may wish to sketch some of these steps. Remember that some steps may have several actions,

1. Fitting a wood screw
   e) Drill clearance holes
   f) Drill root diameter hole for screw
   g) Drill countersink
   h) Fit wood screw

My plan of action / work order will be:-

Major Sequences

1. _______________________________________________________________
2. _______________________________________________________________
3. _______________________________________________________________
4. _______________________________________________________________
5. _______________________________________________________________
6. _______________________________________________________________
7. _______________________________________________________________
8. _______________________________________________________________
9. _______________________________________________________________
10. _______________________________________________________________
11. _______________________________________________________________
12. _______________________________________________________________
13. _______________________________________________________________
14. _______________________________________________________________
15. _______________________________________________________________
16. _______________________________________________________________
17. _______________________________________________________________
18. _______________________________________________________________
19. _______________________________________________________________
TIP - Make sure your teacher checks your sequence

Material List

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>No.</th>
<th>MATERIAL</th>
<th>SIZE</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>