

# Alubind – informalist aluminium folder

## Focus: resistant materials

### About the project

Alubind is a design, make and appraise project, which provides the students an opportunity to utilise a strong design philosophy which, acts as a context and catalyst for creativity. Using a design process the student will complete a design folder which will demonstrate their capability in the identified outcomes of the design project.

All students will be ultimately familiar with the Informalist design philosophy, have developed and series of highly communicative graphic skills and have experienced the making processes associated with aluminium.

### Sequence of the unit

Alubind in one of four resistant material projects that use a design, make and appraise approach to problem solving. It continues with the development of design awareness and the development of a capability of activities of a more practical nature.

The project is aimed at taking between 28-34 hours, which represents five 50 minute lessons over an eight week period. The project timing is used as a best case example and often a project may take longer.

ICT has the opportunity to support this project through research, the production of the evaluation and in the extension work that has been identified.

### Outcomes

#### At the end of the project

##### Students will develop knowledge and understanding in:

- properties of aluminium
- the production of aluminium
- uses of aluminium
- ecological issue relating to the use of aluminium
- how sheet aluminium can be used to make products
- the informalist design style and its cultural importance
- processes used in making the alubind product
- safe working environments, habits and procedures

##### Students will develop skills in:

- designing the alubind according to to a given brief
- making the alubind and selecting the best methods for their idea
- evaluating their design according to set criteria
- communicating their ideas as design concepts and development drawings
- marketing by considering a target market for their product.
- Managing time and resources throughout the design process

##### Students will develop:

- an appreciation if the implications of the use and production of aluminium
- a sensitivity to the effects of electrolysis as a high energy process
- a sense of responsibility for the use of technology
- an appreciation of the contribution made by themselves and others in the process of design

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## Prior learning

### Useful experience could include:

- selecting materials & processes, tools & equipment
- measuring and marking out accurately
- modelling prototypes
- producing concept sketches
- identify appropriate joining techniques
- manage a design project

### Video:

Alubind – Informalist aluminium folder.  
Designability Group Pty Ltd.

### CD-ROM

Exploring Materials CD-ROM educational pack.  
ISBN 1900747 10 3

## Links with other subjects

**Science:** Electrolysis and the anodising of aluminium

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## Language used in the project

Throughout the project the comprehension and spelling of language will be addressed. Using strategies such as 'word of the day' and investigating its meaning/s and identifying its origin. Language of a technical nature will be discriminated.

brusque, utopian, unprecedented, avant-garde.  
mandrel, riveting, forming,

## Homework & Extension activities

### Homework

See Homework Schedule at the end of the programme

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## Resources

### Recommended text:

Design and Technology Foundation Course, Resistant materials, systems and control, Collins London, 1997.  
ISBN 00327352 0

### Recommended resource book:

Pentagon, Informal Design, Taschen, Cologne, 1990.  
ISBN 3 8228 0404 5

Mel Byars, 50 Tables, Innovations in Design and Materials, Rotovision, NY, 1997. ISBN 2 88046 311 4

J. de Noblet, Ed., Industrial Design, Reflections of a Century, Flammarion, Paris, 1993. ISBN 2 08013 539 2

### Extension activities could include:

- A study on the design group Pentagon which was responsible for the style of Informalism.
- Identify more contemporary products that seem to have been influenced by Informalism.
- An extended study on Ron Arad.

These books are available through Designability

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C	Sheet	Text	Teaching material	Teaching Content	Student Activity	Homework
1	2 3	34 35	<ul style="list-style-type: none"> <li>Samples of aluminium</li> </ul>	<ul style="list-style-type: none"> <li>Show video (25 mins). This will give a broad overview of the project.</li> <li>Show samples of aluminium – identify extrusion and discuss its uses e.g. window frames.</li> <li>Discuss mechanical and physical properties soft, malleable, ductile, shiny, good thermal conductor, radiant heat reflector, reacts quickly with oxygen, and does not rust.</li> </ul>	<ul style="list-style-type: none"> <li>View video and take notes</li> <li>Read through aluminium information</li> </ul>	<ul style="list-style-type: none"> <li>Answer questions 1-4 on the homework worksheet. (sheet 7)</li> </ul>
2	5 7 11		<ul style="list-style-type: none"> <li>Video: <a href="#">Alubind</a></li> </ul>	<ul style="list-style-type: none"> <li>Show video cued to section on informalism</li> <li>Explain the main tenets of the design style – Informalism.</li> <li>Discuss the questions raised by Informalism.</li> <li>Introduce the design brief. Show an example of the final product.</li> <li>Discuss ways to be creative.</li> </ul>	<ul style="list-style-type: none"> <li>Write a list of adjectives, which describe the objects shown of the slide – whole class activity.</li> <li>Read sheet no. 5</li> <li>Read through the design brief</li> </ul>	<ul style="list-style-type: none"> <li>Answer questions 5-7 on the homework worksheet. (sheet 7)</li> </ul>

C	Sheet	Text	Teaching material	Teaching Content	Student Activity	Homework
3	11 12 13		<ul style="list-style-type: none"> <li>• Samples of possible finishes</li> <li>• Overhead of concept sketching example</li> </ul>	<ul style="list-style-type: none"> <li>• Show samples of possible finishes</li> <li>• Discuss design opportunities</li> <li>• Demonstrate concept sketching</li> <li>• Check student's sketches</li> </ul>	<ul style="list-style-type: none"> <li>• Concept sketching</li> </ul>	<ul style="list-style-type: none"> <li>• Complete concept sketches</li> <li>• Study for class test</li> </ul>
4	13 14 15 17 18	61	<ul style="list-style-type: none"> <li>• Demo area</li> <li>• Tools and equipment required to make an Alubind.</li> </ul>	<ul style="list-style-type: none"> <li>• Students to sit class test. (5-10 mins)</li> <li>• Mark and go through the answers.</li> <li>• Demonstration of working with aluminium. Use all tools and equipment the students will need when making their folder. Discuss tools, techniques and safety issues. (Students are often amazed at the process of riveting and how it works.)</li> <li>• Review making process from video if necessary</li> </ul>	<ul style="list-style-type: none"> <li>• Class test</li> <li>• View demonstration of working with aluminium and take notes.</li> <li>• Students should have the opportunity to experience the making process with sample pieces of material.</li> <li>• Attempt to create the design paths that have been identified and designed by the students.</li> </ul>	<ul style="list-style-type: none"> <li>• Complete a scale 1:1 front view of your chosen idea.</li> <li>• Indicate all finishes and apply the most crucial dimensions.</li> </ul>
5	19 17	40 41	<ul style="list-style-type: none"> <li>• All marking out tools ready for use.</li> <li>• Class set of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Explain how to do a flow diagram –use OHT as an example. The flow diagram is suitable for homework.</li> <li>• Revise marking out and ensure to emphasise accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>• Mark out aluminium</li> <li>• Commence making</li> </ul>	<ul style="list-style-type: none"> <li>• Complete a flow diagram of how you intend to make your folder.</li> </ul>
6	20	42- 65	<ul style="list-style-type: none"> <li>• All making tools ready for use.</li> <li>• Class set of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Check all designs and offer advice on possible modifications – keep designs simple.</li> <li>• Ensure students explain their ideas using graphical methods.</li> <li>• Supervise making.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue making</li> </ul>	<ul style="list-style-type: none"> <li>• Product reference.</li> <li>• Collect 5 pictures of objects designed in aluminium. Cut and paste photocopies to the sheet provided.</li> <li>• Explain what each object is and name the designer.</li> </ul>

C	Sheet	Text	Teaching material	Teaching Content	Student Activity	Homework
7	21	42-65	<ul style="list-style-type: none"> <li>All making tools ready for use.</li> </ul>	<ul style="list-style-type: none"> <li>Supervise making and reinforce safety issues.</li> <li>Allow students to change their design ideas. Making is part of design, which is about decision making. They will document their decisions in their evaluation.</li> </ul>	<ul style="list-style-type: none"> <li>Continue making</li> </ul>	<ul style="list-style-type: none"> <li>Consider other products that could be redesigned using sheet aluminium. Complete one page of concept sketches.</li> </ul>
8	22	42-65	<ul style="list-style-type: none"> <li>All making tools ready for use.</li> </ul>	<ul style="list-style-type: none"> <li>Supervise making</li> <li>Revise any making techniques and</li> <li>Reinforce safety issues</li> </ul>	<ul style="list-style-type: none"> <li>Continue making</li> </ul>	<ul style="list-style-type: none"> <li>Research the work of Ron Arad. Describe his style – include images.</li> </ul>
9	23	42-65	<ul style="list-style-type: none"> <li>All making tools ready for use.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss the importance of evaluation</li> <li>Supervise making</li> <li>Revise any making techniques required.</li> </ul>	<ul style="list-style-type: none"> <li>Complete making processes.</li> <li>Commence evaluation questions.</li> <li>Bind or staple all work together with contents sheet ready for submission.</li> </ul>	<ul style="list-style-type: none"> <li>Complete any unfinished work for late submission.</li> </ul>

**Contents.**

This is simply a list of the worksheets, homework sheet and information sheets. Each sheet should be identified as such in the content listing and as a subtitle on the actual page. The content should identify the sheet with a page number. The contents page is the most helpful way for students to collate all their sheets at the end of a project. It helps them become familiar to the idea of presenting a folio.

**Design Brief & Project Overview.**

The merits of a well defined brief cannot be under estimated. The 'brief' statement itself maybe very simple but its supporting information is vital to tie the project together. Introduction statement related to design catalyst, materials, and design focus  
Brief (Statement)

Parameters (restriction or guidelines)

Submission (what the students need to complete for assessment)

The Project Overview is directly related to the Design Brief. It will visually explain the project using graphics such as perspective view, mini orthographic views, or exploded views. A parts list will be included.

**Video notes.**

The video notes help students focus on important parts of the video by providing space for notes to be taken. Sometimes there are discussion questions to help the teachers and the students reinforce what they have seen. This also prevents that silence at the end of a video allowing a flow to the next activity.

**Design Catalyst.**

Most Designability projects use a design catalyst as a way of inspiring the teachers and students. A design catalyst such as Functionalism or Biomorphism provide a reason for designing a chosen form or overall aesthetic. This information is crucial. It is always difficult to start designing without some kind of stimulation. A design catalyst ensures that students aren't left staring at a blank sheet when the time to draw some concepts comes.

**Product Reference.**

The collection of images is the process where students will become familiar with a design style or a material. It will also develop research skills. It is often best to insist that students label all images with the name of the object and the name of the designer and when it was designed, and even the primary material it is made of. Books in the library should be the main source of imagery but with careful selection there many good websites with excellent images which naturally makes this aspect of the project very easy – it can be accomplished as in school work or as homework. Some care must be taken with websites so that students aren't lured to sites which merely advertise products as these sites will not have the extra required information.

**Materials.**

Designability projects use resistant materials, metal, plastics, wood, electronics and will eventually use textiles, food, and new and interesting materials yet to be considered. This information is vital early on in the project as this can be considered whilst designing. Design possibilities can be considered with a good understanding of physical and mechanical properties.

**Concepts.**

A worked example of concept sketches is provided for each project. It encourages good practice by providing a role model. This page should be used as an OHT whilst student are in the concept stage of their project. Encourage students to follow instructions on the use of the fineliner.

**Design Sheets**

These are formatted sheets with a title block for drawing. Encourage students to fill in the title block as this will help their overall presentation.

**Working with.**

One the features of Designability projects is the Working with sheet. This information is related to the materials and processes aspect of the project. Each project will be introducing new skills and techniques and this sheet enables students to listen to a practical demonstration and write down the notes that are provided. The Working with sheet is most often a table identifying the stages of making as rows and identifying equipment, how to use and safety as columns. Students can fill this sheet in during demonstrations or as revision after demonstrations.

**Main Process.**

An information sheet is provided on the main making process.

**Flow Diagram.** The flow diagram is a standard template that enables students to predict or record their making activities. The sequence for this is provided by the Working with sheet.

**Designer Focus.**

There are opportunities in Designability projects to have a designer focus so students not only learn about a design styles or philosophy but is familiar with one designer and his/her work. The Design Focus could be used as part of any extension work.

**Drawing Focus.**

Drawing as way of communicating ideas is considered to be a vital part of any Designability project. Each project will focus on one or two important drawing skills which will then be built upon in future projects.

**Homework Questions.**

These relate to the content of design catalyst, materials, and making processes. These questions can also form the basis of Class Tests.

**Class Tests.**

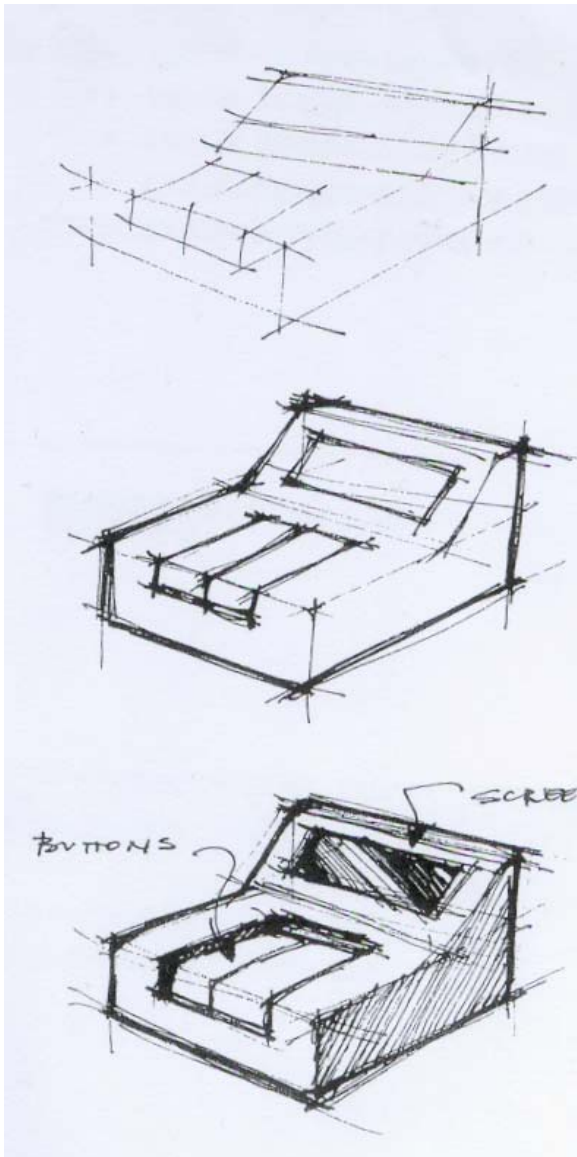
One or two class tests per project is normal and these are formulated from homework questions and notes made during the project. These questions can form the basis of examinations. There is plenty of scope for teachers to provide additional class test from the supplied material.

**Evaluation.**

It is important for student sto reflect not only on how they have gone about the project, but also to evaluate their design according to the design parameters. A series of questions is provided to do this.

Concept sketches are done in the *ideas stage* of the design process.

- Concept sketches are always freehand and drawn quickly.
- Use a fineliner (not pencil).
- Never scribble or cross out what you think are bad ideas.
- Show various views (perspective, orthogonal, sectional and detail views)
- Use colour
- Use your fineliner in the following way



**1. Construct** your overall shape,

- Light lines are drawn quickly
- Start with a box and then modify it
- Lines are long
- Some lines will be incorrect

**2. Firm** in the correct lines

- Go over them more slowly
- Lines are long
- Make an outline extra dark

**3. Shade** in a chosen vertical face

- Use light, fast diagonal lines

**4. Annotate** by adding notes on various aspects of your design

- Words help people understand your ideas



	<b>Equipment</b>	<b>Use</b>	<b>Safety</b>
<b>Marking out</b>	<ul style="list-style-type: none"> <li>• Steel rule</li> <li>• Engineer’s square</li> <li>• Centre punch</li> <li>• Scriber</li> </ul>	<ul style="list-style-type: none"> <li>• Check for squareness of work piece.</li> <li>• Mark out all drill holes using the hinge and binder clip as templates.</li> <li>• Mark out fold line.</li> </ul>	<ul style="list-style-type: none"> <li>• Be careful of sharp edges of work piece.</li> <li>• Smooth down sharp edges with ‘wet or dry’.</li> <li>• Rounding corners with a file may be necessary.</li> </ul>
<b>Cutting</b>  (only be needed if you are adding another piece of Aluminium to the folder)	<ul style="list-style-type: none"> <li>• Tin snips or bench knife</li> <li>• abrafile</li> <li>• hacksaw</li> <li>• reciprocating saw (up to 1.6 Aluminium – the blade gets blunt quickly)</li> </ul>	<ul style="list-style-type: none"> <li>• Tin snips can be used in a vise for ease of use.</li> <li>• Cut right on the marked out line with snips or bench knife.</li> <li>• Cut on the waste side of the line if using a blade.</li> </ul>	<ul style="list-style-type: none"> <li>• Keep fingers clear of any cutting tool.</li> <li>• eye protection for reciprocating saw.</li> </ul>
<b>Filing</b>	<ul style="list-style-type: none"> <li>• Metal working files</li> <li>• Needle files for intricate areas</li> </ul>	<ul style="list-style-type: none"> <li>• Cross filing and draw filing</li> <li>• place work low in the vice so that it doesn’t wobble and make a loud noise</li> </ul>	<ul style="list-style-type: none"> <li>• Be careful of any sharp edges.</li> <li>• Let students know how the file fits into the handle. The spike can be dangerous if the file comes apart from foolish use.</li> </ul>
<b>Drilling</b>	<ul style="list-style-type: none"> <li>• Pedestal drill or mini drill or hand drill or power drill</li> <li>• Use 4mm or 4.2mm drill bits for rivet holes.</li> <li>• De-burring tool</li> </ul>	<ul style="list-style-type: none"> <li>• Make sure a piece of scrap wood is placed under work piece and it is secured well.</li> <li>• De-burr all holes ready for riveting</li> <li>• Drill and rivet first two holes of hinge and then complete the rest. This will provide automatic alignment.</li> </ul>	<ul style="list-style-type: none"> <li>• use eye protection and wear an apron</li> <li>• Anyone else near the operator should also wear safety protection.</li> <li>• Know how to stop the machine quickly. Don’t use anything larger than 4.5mm dia bit for a mini drill.</li> </ul>
<b>Joining</b>	<ul style="list-style-type: none"> <li>• Rivets (4mm)</li> <li>• Rivet pliers</li> </ul>	<ul style="list-style-type: none"> <li>• Be sure to rivet from the correct side. (one side of the rivet is better to look at than the other.)</li> <li>• To remove rivets drill a hole through the rivet from the good side.</li> </ul>	<ul style="list-style-type: none"> <li>• Release stem from rivet pliers before loading the next rivet.</li> <li>• Safety glasses</li> </ul>
<b>Finishing</b>	<ul style="list-style-type: none"> <li>• Many possibilities-</li> <li>• Brasso and rag;</li> <li>• Wire brush in power drill;</li> <li>• Contact adhesive for masking;</li> <li>• Wet or dry for a satin finish (use water)</li> </ul>	<ul style="list-style-type: none"> <li>• Aluminium will not keep a perfect shine. It is soft and tends to scratch</li> <li>• Use only small amounts of brasso at a time. When it goes black use a fresh part of rag to wipe off.</li> </ul>	<ul style="list-style-type: none"> <li>• Use Brasso in a well ventilated area.</li> </ul>

Week	Sheet	Task
1	7	<ul style="list-style-type: none"><li>• Answer questions 1,2,3,4 on the homework question sheet.</li></ul>
2	7	<ul style="list-style-type: none"><li>• Answer questions 5,6,7 on the homework question sheet.</li></ul>
3	13	<ul style="list-style-type: none"><li>• Study for a class test on Informalism and the production and uses of Aluminium.</li><li>• Complete more concept sketches and choose the best idea.</li></ul>
4	14	<ul style="list-style-type: none"><li>• Complete a scale 1:1 front view of your chosen idea on the design development sheet (the outline of has already been drawn to scale). Indicate all finishes, use a ruler if needed, and indicate important dimensions.</li></ul>
5	19	<ul style="list-style-type: none"><li>• Complete a flow diagram of how you will make your folder.</li></ul>
6	20	<ul style="list-style-type: none"><li>• Product reference. Find 5 pictures of objects designed in aluminium. Cut and paste photocopies to the sheet provided. Explain what each object is and name the designer.</li></ul>
7	21	<ul style="list-style-type: none"><li>• Consider other items which could be redesigned using sheet aluminium. Complete one page of concept sketches.</li></ul>
8	22	<ul style="list-style-type: none"><li>• Research the work of Ron Arad. Answer the questions on sheet 15.</li></ul>
9	23	<ul style="list-style-type: none"><li>• Complete evaluation questions.</li></ul>

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

Answer the following questions in the spaces provided.

1. Write three words which describe the properties of Aluminium. (3 marks)

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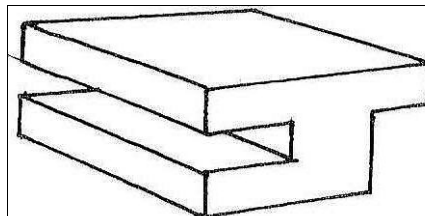
2. Name three finishes you may be able to apply to Aluminium. (3 marks)

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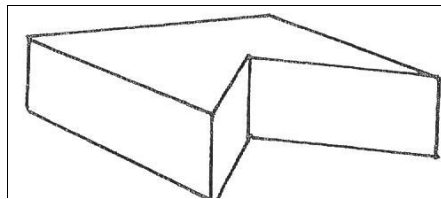
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3. Can the following shape be extruded? (1mark) \_\_\_\_\_



4. Can the following shape be extruded? (1mark) \_\_\_\_\_



5. Name the process by which Aluminium is extracted from its ore. (1 mark)

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6. Circle the two objects most likely be made from Aluminium. (2 marks)

helicopter blades  
window frames  
stadium seating  
steel trusses

a bridge  
fishing rods  
shopping trolleys  
scissors

7. Which tool is used to make a fine scratch line on Aluminium when marking out? (1 mark)

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8. Which tool is used with a hammer to make an indentation in Aluminium to indicate where a hole is to be drilled? (1 mark)

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9. The sheet metal bender provides a very even and straight fold in sheet Aluminium. Why is it such a problem to have made a mistake when folding sheet Aluminium? (1 mark)

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10. Name one effective mechanical fastening system for joining sheets of Aluminium together (1 mark)

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11. Name two pieces of equipment required to make a burnished finish on aluminium. (2 marks)

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12. How is a pop rivet best removed? (1 mark)

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13. Informalism has been a moderately successful design style which seems to carry many messages. State one of these messages. (2 marks)

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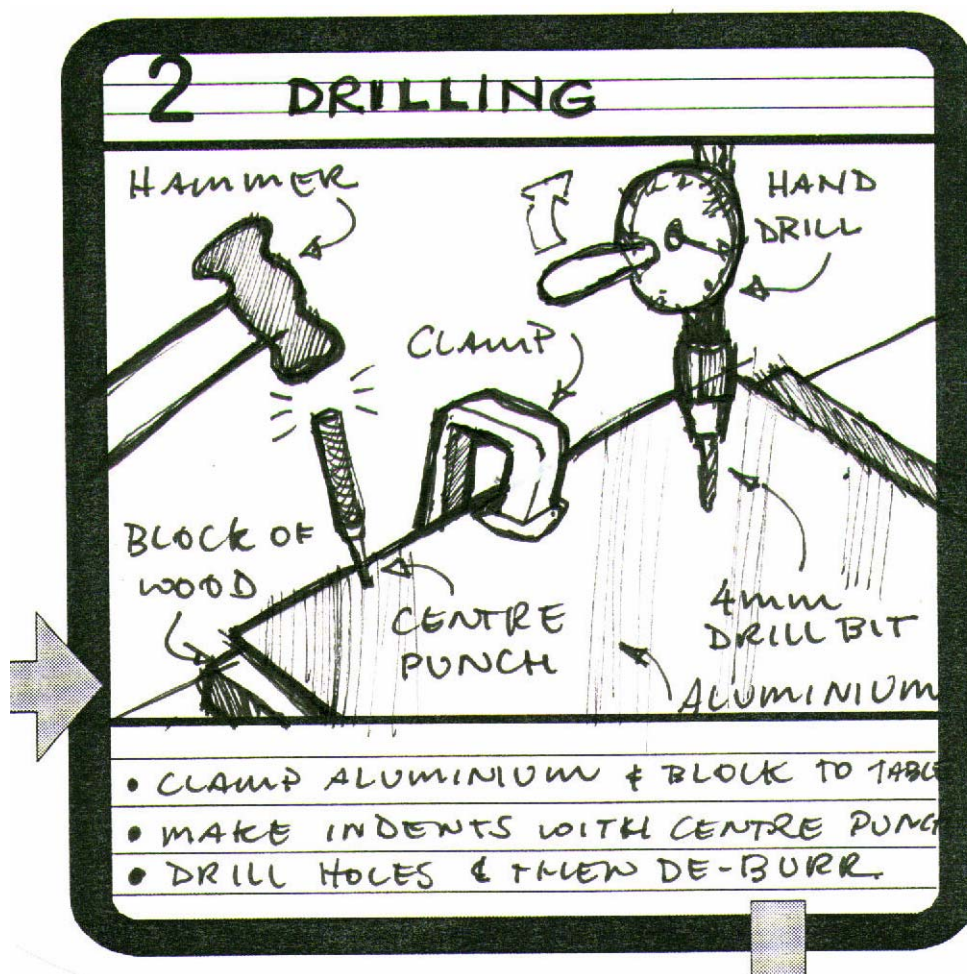
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Name : \_\_\_\_\_ Answers \_\_\_\_\_

1. Write three words which describe the properties of Aluminium. (3 marks)  
**soft, malleable, ductile, electrically and heat conductive, non-ferrous**
2. Name three finishes you may be able to apply to Aluminium. (3 marks)  
**Polished, masked, burnished, indented, scratched**
3. Can the following shape be extruded? (1mark) **Yes** \_\_\_\_\_
4. Can the following shape be extruded? (1mark) **Yes** \_\_\_\_\_
5. Name the process by which Aluminium is extracted from its ore. (1 mark)  
**Electrolysis**
6. Circle the two objects most likely be made from Aluminium. (2 marks)
 

helicopter blades	a bridge
<b>window frames</b>	fishing rods
<b>stadium seating</b>	shopping trolleys
steel trusses	scissors
7. Which tool is used to make a fine scratch line on Aluminium when marking out?  
(1 mark) **scriber**
8. Which tool is used with a hammer to make an indentation in Aluminium to indicate where a hole is to be drilled? (1 mark) **Centre punch**
9. The sheet metal bender provides a very even and straight fold in sheet Aluminium. Why is it such a problem to have made a mistake when folding sheet Aluminium? (1 mark)  
**A fold cannot be moved or removed. Even when flattened it is still evident.**
10. Name one effective mechanical fastening system for joining sheets of Aluminium together (1 mark)  
**Pop rivet**
11. Name two pieces of equipment required to make a burnished finish on aluminium. (2 marks)  
**Power drill and wire wheel brush**
12. How is a pop rivet best removed? (1 mark) **by drilling it out from the same side it was put in**
13. Informalism has been a moderately successful design style which seems to carry many messages. State one of these messages. (2 marks)
  - **Do objects have to be made from traditionally beautiful materials in order to be considered beautiful?**
  - **Has mass production caused us to overlook some materials and fabrication techniques?**
  - **Do we have the tendency to over-process materials, or is there value in the 'found object'?**



1. Number section and complete a title, eg. "2. DRILLING".
2. Draw the process and label tools and equipment
3. In point form describe the process – include any safety issues.