# THE DESIGN PROCESS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROBLEM</td>
<td>3</td>
</tr>
<tr>
<td>DESIGN BRIEF</td>
<td>5</td>
</tr>
<tr>
<td>ANALYSIS - MIND MAP</td>
<td>6</td>
</tr>
<tr>
<td>RESEARCH</td>
<td>10</td>
</tr>
<tr>
<td>SPECIFICATION</td>
<td>12</td>
</tr>
<tr>
<td>IDEAS</td>
<td>13</td>
</tr>
<tr>
<td>SOLUTION - WORKING DRAWING</td>
<td>14</td>
</tr>
<tr>
<td>MANUFACTURE</td>
<td>15</td>
</tr>
<tr>
<td>EVALUATION</td>
<td>15</td>
</tr>
</tbody>
</table>
PROBLEM

The process of designing begins when there is a need. Wherever there are people there are problems needing solutions. In some cases the designer may have to invent a product. An example might be a game for blind people.

At other times the designer may change an existing design. (If the handle of a pot becomes too hot to touch, it must be redesigned.)

Designers also improve existing products. They make the product work even better. Could the chair in the waiting room of a bus or train station be altered so that waiting seems shorter?

Below are some problem situations, what is the problem and how could it be resolved?

________________________
________________________
________________________
________________________
________________________
________________________
THE DESIGN BRIEF

A design brief should describe simply and clearly what is to be designed. The design brief cannot be vague. Some examples of problems and design briefs are listed below, complete the design briefs that are missing:

PROBLEM: Blind people cannot play many of the board games available to sighted people.
DESIGN BRIEF: Design a game of dominoes that can be played by blind people.

PROBLEM: The handle of a pot becomes too hot to hold when the pot is heated.
DESIGN BRIEF: Design a handle that remains cool when the pot is heated.

PROBLEM: Waiting time in a bus or train station seems too long. There is nothing to do.
DESIGN BRIEF: ________________________________________
______________________________________________________

PROBLEM: My CD's are lying about my room and I stand on them and break them.
DESIGN BRIEF: ________________________________________
______________________________________________________

PROBLEM: My next door neighbour is hard of hearing and they cannot hear the doorbell.
DESIGN BRIEF: ________________________________________
______________________________________________________

PROBLEM: Parents with young babies do not shop at my supermarket because there is nowhere to change nappies.
DESIGN BRIEF: ________________________________________
______________________________________________________
ANALYSIS

The ANALYSIS is one of the early sections in the design process. It involves listing as many questions as you can think of regarding your project. The questions will vary from project to project but usually the majority of these questions are the same, whatever the project you are attempting.

1. Will the design be safe?
2. What materials are available? What materials will be the most suitable? What will be the overall size?
3. How long will the product take to manufacture?
4. How will the product be mass produced? On a production line? What will the cost of 'labour' be?
5. What is the best shape for the solution?
6. What colour scheme will be most appropriate?
7. What are the functions of the product?
8. What special features need to be built into the designs?
9. What 'ergonomic' factors need to be taken into account?
10. What designs already exist? What do you think of them? Could they be improved?
11. Where can I collect research material to help me design?
12. Who is going to buy my product? What is the age group?
13. Is my solution likely to solve the design problem?
14. What equipment and machinery will I need for manufacture?

Something that can help you analyse the problem is a MIND MAP. Mind mapping is a great way to brainstorm, to capture ideas or to find out what you think about a particular topic.
A MIND MAP is simply a visual way to arrange ideas. Here’s how to do it:

- First, choose a subject for the whole map.
- Then take a piece of paper and some coloured pencils.
- Turn the paper sideways (landscape) to give plenty of room for branches. That’s also how our eyes prefer to see things.
- Draw a powerful picture in the centre to stimulate ideas.
- For each main idea (topic), draw a branch coming out from the centre.
- For ideas that belong with a main idea (subtopics), draw a branch coming out from the main idea.
- Write the ideas on the lines.
- Always write the right way up so that the map is easy to read.
- Leave one branch (or more) open to stimulate new ideas.
- Add pictures and colour.
- Use symbols and codes such as ticks, crosses and clocks to reinforce your main points.
- If two ideas are linked, draw an arrow between them.

Now pick one of the design problems on page 5 and construct a MIND MAP.
Traditionally, product design has been considered to comprise three main elements:

- **ergonomics**
- **aesthetics**
- **technology**

Product Designers need knowledge of all these elements. In the case of the design of a small or simple product, the designer’s responsibility may be for all of these elements. In the case of larger products, such as cars, the designer’s responsibility may be for aesthetics only; ergonomists and engineers providing the expertise needed for the other elements.

The best design occurs when all three components are considered together from the start of the design process.

**What is aesthetics?**

The term ‘aesthetics’ concerns our senses and our responses to an object. If something is aesthetically pleasing to you, it is ‘pleasurable’ and you like it. If it is aesthetically displeasing to you, it is ‘displeasurable’ and you don’t like it.

Look at the two versions of the Playstation below. One is more aesthetically pleasing than the other, which one and why?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
What is ergonomics?

Ergonomics is about 'fit': the fit between people, the things they do, the objects they use and the environments they work, travel and play in. If good fit is achieved, the stresses on people are reduced. They are more comfortable, they can do things more quickly and easily, and they make fewer mistakes.

The picture below shows the interior of a car. What parts of the interior of a car have been ergonomically designed?

The diagram below is an office work area. How could you redesign the work area to make it better ergonomically?
**SPECIFICATION**

Once you have completed your design you should specify what you are going to do to solve the problem. Always refer to your research. Below is an example of a specification for a design for a children’s toy.

- It must have no sharp edges.
- It must have smooth edges.
- It must be colourful.
- It must have a non-toxic finish.
- It must have a style that appeals to boys and girls.
- It must be constructed strongly.
- It must be easily cleaned.
- It must be durable.

In a new sheltered housing complex for the elderly, each home owner will be issued with a remote control that will operate the main electrical appliances in their home. Write a specification for the remote control.

It must ___________________________________________________

It must ___________________________________________________

It must ___________________________________________________

It must ___________________________________________________

It must ___________________________________________________

It must ___________________________________________________

On page 8 you constructed a MIND MAP for a design problem. Write a SPECIFICATION for this design problem using the MIND MAP to help you.

_________________________________________________________

_________________________________________________________

_________________________________________________________

_________________________________________________________

_________________________________________________________

_________________________________________________________
IDEAS

You should produce a number of solutions. It is very important that you write or draw every idea on paper as it occurs to you. This will help you remember and describe them more clearly. It is also easier to discuss them with other people if you have a drawing. Write comments next to each design referring to your SPECIFICATION.

These first sketches do not have to be very detailed or accurate. They should be made quickly. The important thing is to record all your ideas. Do not be critical. Try to think of lots of ideas, even some wild ones. The more ideas you have, the more likely you are to end up with a good solution.

On the previous page you wrote a SPECIFICATION for a remote control for the elderly. Sketch some ideas and make notes referring to your SPECIFICATION.
A working drawing is the final ‘constructed’ drawing, produced as part of the design process.

Dimensions are added so that any person using the working drawing can manufacture the design. Usually there are at least six dimensions but you can add as many as you feel are required in order for the manufacturer to make your solution.

The working drawing should be precise and drawn to a scale. If the drawing is half the size of the solution then the scale is 1:2. If the drawing is a 3rd the size of the solution then the scale is 1:3.
MANUFACTURE

Produce planning sheets to show each stage of production.

An example of one is below.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>TOOLS USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mark out wood</td>
<td>Pencil, rule, try square</td>
</tr>
<tr>
<td>2. Saw waste wood away</td>
<td>Tenon saw</td>
</tr>
<tr>
<td>3. Shape wood on sanding machine</td>
<td>Disc sander</td>
</tr>
<tr>
<td>4. Sand wood smooth</td>
<td>Glass paper</td>
</tr>
<tr>
<td>5. Wax wood for smooth finish</td>
<td></td>
</tr>
</tbody>
</table>

EVALUATION

Designers evaluate their finished products or prototypes in order to test whether they work well and if the design can be corrected or improved. Whatever you have designed it is important to evaluate your work constantly during the project.

CONSIDER THE FOLLOWING POINTS WHEN WRITING YOUR FINAL EVALUATION:

1. What do you think of the overall design? What changes would you make?
2. Are you happy with the materials you chose? Would you make adjustments next time?
3. Is the colour scheme exactly what you expected? What alterations would you make?
4. Did the project take too long to make? Would this alter the cost of manufacture?
5. Would it be easy to set up a production line for the manufacture of your solution?
6. Is your solution safe? Could it be made safer?
7. Are the techniques you used to make your solution adequate or would you use a different range of manufacturing techniques?
8. Is the solution the right size/shape?
9. What are the views of other people regarding your design?
10. Does it work? What changes are required?