CRAFT & DESIGN

PROBLEM

RESTRICTIONS

INVESTIGATION

SOLUTION

MANUFACTURE

EVALUATION

THE DESIGN PROCESS

To get from the point where a need has been identified then it has been fulfilled takes a lot of designing skill. It is not a case though of sitting around waiting for a flash of brilliance from the Designer. The Designer follows a pretty well laid out series of steps to get from the beginning to the end of the process.

There are lots of different ways to get from the start to the finish of the design process but the one we have used during your Standard Grade is described on the left.

Try to remind yourself what each section was about. You might have used slightly differently worded headings from time to time but the basic idea was always the same ;

Identify a problem which needs solving   then

Work out the limitations of time and materials and tools   then

Investigate a range of possible answers to the various problems   then

Decide on the best of all the identified solutions   then

Think carefully how you are going to make your solution   then

Ask yourself how good the finished article was to learn from any mistakes

EASY

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ERGONOMICS

Ergonomics is about ensuring a good fit between people, the things they do, the objects they use and the environments in which they work, travel and play.

Ergonomics needs to be considered in the design of virtually any product. Failure to do so may lead to designs which do not fit the needs of the users, leading to ineffective, inefficient or unsafe designs, which are unlikely to be commercially successful.

The human sciences of psychology, anatomy and physiology provide information about the abilities and limitations of people, and the wide differences that exist between individuals. People vary in many ways: body size and shape, strength, mobility, sensory acuity, cognition, experience, training, culture, emotions, etc.

Look at the two craft knives shown here. The plain handle shown in the first picture has been improved upon in the second picture. The second knife fits the users hand better – it is a more ERGONOMIC knife. This will make it more comfortable and safer to use.

What other everyday items can you think of that are obviously ERGONOMIC ?

ANTHROPOMETRICS
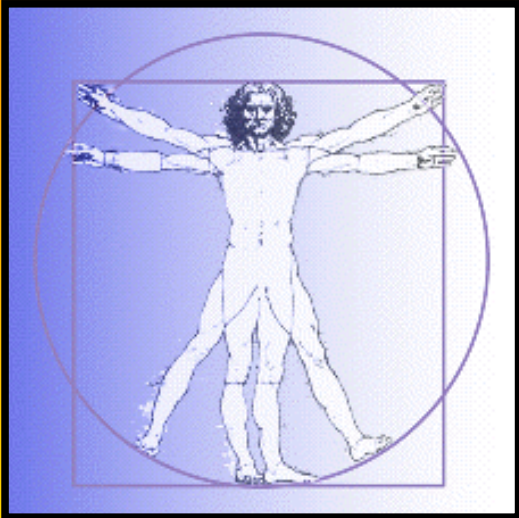
Anthropometrics means - man (anthrop) measurements (metric). It is the measurement of the size and proportions of the human body, as well as other stuff such as how far you can reach and so on. Accurate data on height, weight, limb, and body sizes are needed to design items ranging from clothing, furniture, cars tools and so on. Anthropometrics enables us to make sure that the objects we design take into account about 90% of the population.

Men and women are different. Women are usually smaller with finer body proportions

People of different ages are often different sizes

People from different parts of the world need to be considered when designing.

Anthropometric Data comes in the form of **charts and tables**. They may provide specific sizes such as **finger lengths** and **hand spans** but they also offer **average group sizes** for people of different age ranges. Other sizes to consider are **heights, reach, grip and sight lines.**

Game and toy designers need to use this information in order to design their products. They do understand that these sizes are constantly changing, as the **population grows bigger.**

5th & 95th PERCENTILE

Measurement - cm	PERCENTILE			
	Male		Female	
	95%	5%	95%	5%
1. Forward Reach	68.3	60.96	63.75	56.39
2. Elbow Height	113.3	100.33	105.41	91.7
3. Knuckle Height	78.74	69.1	72.64	62.99
4. Shoulder Height	152.7	135.13	141.73	123.95
5. Eye Height	173.73	154.69	161.8	142.24
6. Stature	185.9	163.58	171.96	137.16
7. Overhead Reach	215.4	191	177.8	170.18
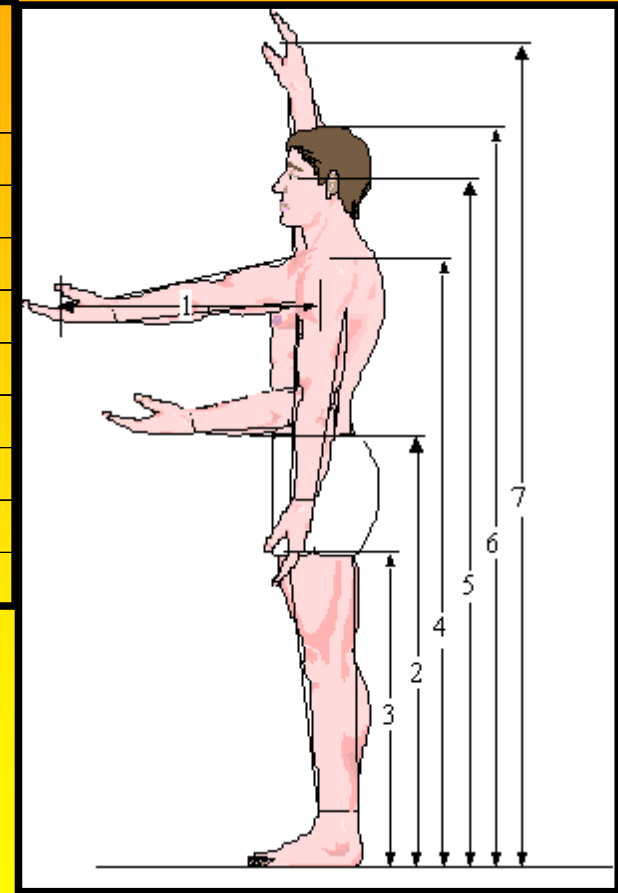
WHAT IS IT ?

When any average size (male height, female reach etc.) is worked out, there are always some sizes at the extremes (max and min) which have a significant impact on the final value. To reduce this effect, the first and last 5% of any group are often ignored to give a more true average size. The first 5% and last 5% are called the 5th and 95th percentile.
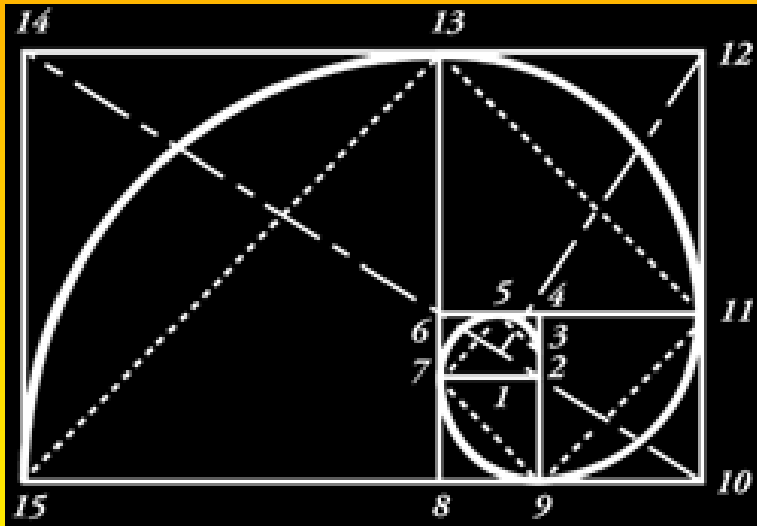
AESTHETICS

Aesthetics is more concerned with appearance. Trying to design something which will not only be comfortable to use (ergonomic) but also pleasant to look at (aesthetic). Often an in-between result is settled for since something which may be very good looking might be very uncomfortable to use.

When a design looks good and is said to be 'aesthetically pleasing', the designer has achieved just the right combination of . . .

SHAPE   **FORM**   **STYLE**   **COLOUR**

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THE GOLDEN SECTION

There are some general rules for creating correct relationships and therefore aesthetically pleasing items of furniture. The Golden Section involves mathematically proportioning space in a work of art. This way of dividing space dates all the way back to the ancient Greeks designing the Parthenon. The Golden Section requires a particular ratio between height and width, which is about 13:8. A rectangle constructed according to the Golden Section can be divided into a square and a smaller rectangle. The smaller rectangle has the same proportion as the original rectangle. Then the smaller rectangle can be divided into a square and even smaller rectangle. This method of divisions of the page can continue to infinity. The pattern obtained by joining corresponding points on the rectangles is the same spiral found in seashells. Herein lies the reason for the Golden Section being aesthetically pleasing. It is a pattern found in nature; psychologically speaking, it makes sense that a figure of beauty in nature would be emulated in the world of design.

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FAULTY DESIGN
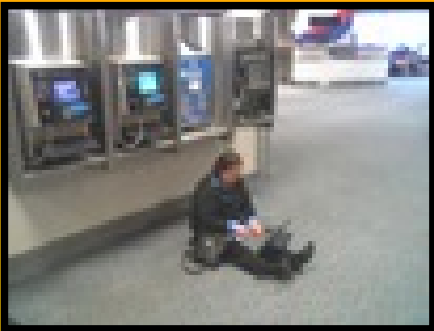
Attached is a picture of a laptop data port at LaGuardia Airport, NYC. Picture was taken in the Northwest terminal. Someone decided to replace one of the pay phones with some sort of laptop data port. However, they didn't install any sort of desk or ledge. In the hour I was waiting at the airport, I observed three people forced to sit on the floor while using this data port.

On the left is the elevator keypad from a luxury apartment. Can you see what's wrong? The numbers are listed right to left, instead of left to right.

All of the designs on this page have one thing in common – they all failed to properly consider their users when they were being created.

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MARKETING

Most designers are designing for profit. That is, they intend to sell the items they design in the market place somehow. At some point in the design process, the designer will have to consider how the product is going to be marketed. It would normally be sensible to think of this early on in the design process. Marketing is a complex business but some of the important things to consider would be . . .

ECONOMICS

what will it cost to make ?

how much can you sell it for ?

how much profit ?

ADVERTISING

how will you publicise it ?

how much to spend on advertising ?

MARKET RESEARCH

who is likely to buy it ?

what are competitors doing ?

how many could you sell per year ?

CONSUMER ISSUES

any legal requirements ?

is a helpline required ?

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DESIGN OBSOLESCENCE

Manufacturers design products to only have a certain 'lifespan' to encourage you to replace products you already own.

- **A phones' battery may only last 100 charges**

- **Computer software might need updating**

- **Bodywork on a car may rust even though the engine is OK**

- **A product may go out of fashion**

There are four types of obsolescence:

Functional Obsolescence
New technology replaces old (example: video tape replaced by DVD) Obsolete products do not have the same functions or capabilities as new ones

Style Obsolescence
Marketers change the styling of products so as to make owners of the old model feel 'out of date' (example: cars, clothing)

Intentional Physical Obsolescence
A product is designed to last for a specific lifetime (example: home entertainment electronics)
If a product will be technically or stylistically obsolete in five years, many marketers will design the product so it will only last for that time (this is done through a technical process called 'value' engineering)

Doing this will reduce the cost of making the product, and lower the price to consumers (unless there is a lack of competition in the industry, in which case the cost reduction will probably not be passed on to the consumer in the form of lower price)

Postponement Obsolescence
Technological improvements are not introduced even though they could be (example: a large software manufacturer that specialises in operating system - name withheld for legal reasons) . The marketer feels either that consumers don't need the innovation or they are concerned that the new model will cannibalise the sales of their old model.