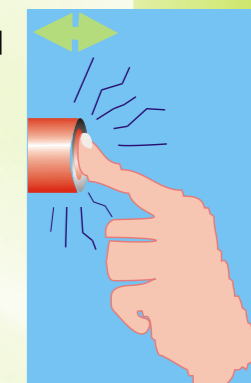


HOMework design 1&2

Homework 1

1. Shown opposite is a picture of a finger pressing a button. What anthropometric data would be required when designing such a button.(1)
2. What is the best method of tackling a design brief?(2)
3. In your own words, briefly explain four stages of the DESIGN PROCESS. (8)
4. Explain the advantage of including an exploded view as part of a design folio.(2)
5. When designing a door way what percentile of people do we design for and why is this so?(2)
6. State three reasons why a manufacturer would choose to use a flat pack rather than having his/her product fully assembled before delivery. (3)

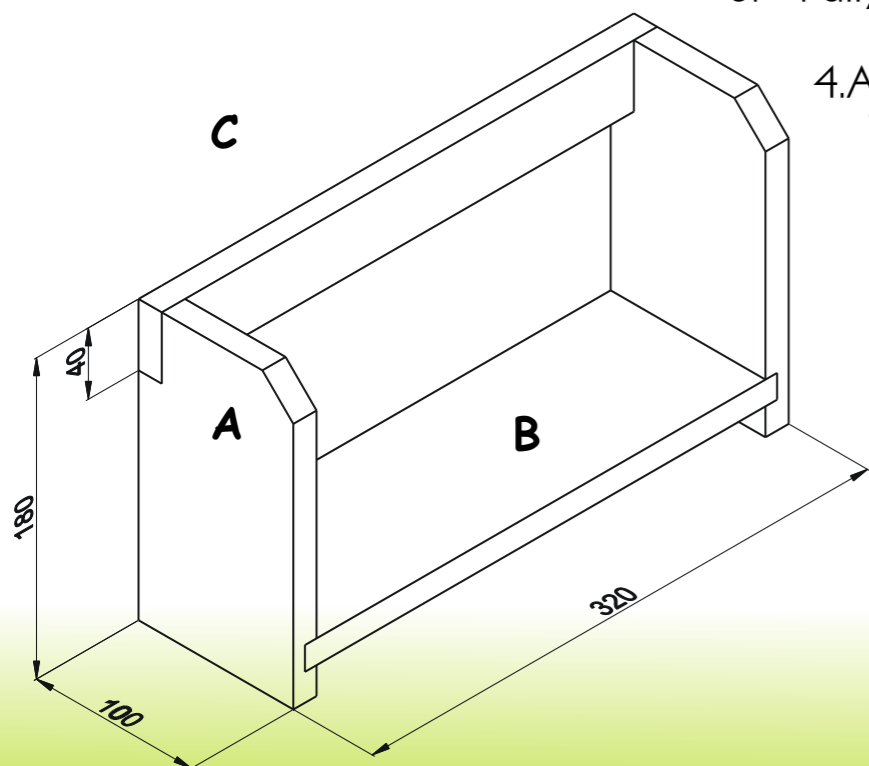


Homework 2

1. Shown opposite is a picture of an office chair. If you had to design a new range of office chairs what three Ergonomic factors would you have to consider when designing it. (3)
2. Explain the purpose of carrying out an Analysis when carrying out the design process. (2)
3. Fully explain the purpose of a Design Specification. (3)



4. A drawing of a CD rack is shown below. Assuming the material is pine and the thickness is 15mm, in the table provided construct a cutting list of all the component parts. (9)

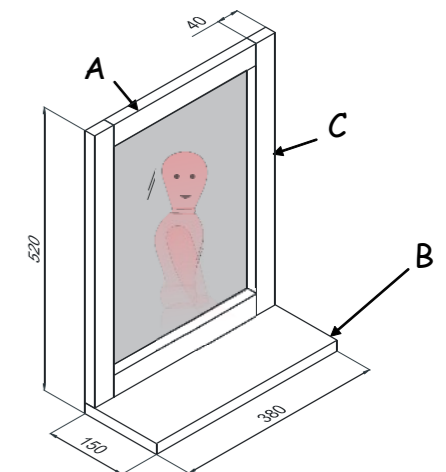


| Material | Part | Quantity | Width | Thick | Length |
|----------|------|----------|-------|-------|--------|
| | | | | | |
| | | | | | |
| | | | | | |

HOMWORK design 3&4

Homework 3

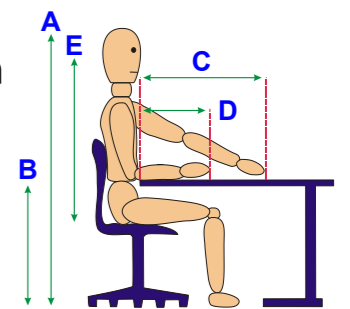
1. Shown opposite is a picture of a hand held power drill. What two ergonomic factors would be required before designing such a tool. (2)
2. Why would it be a good idea to make a miniature model of your final design idea with modelling clay or some other basic material before making the finished article? (2)
3. When designing everyday products we design for a certain percentage of people, what is this percentage and why is this so. (4)
4. A drawing of a mirror is shown. Assuming the material is 10mm thick pine, in the table provided construct a cutting list of all the component parts. (9)



| Material | Part | Quantity | Width | Thick | Length |
|----------|------|----------|-------|-------|--------|
| | | | | | |
| | | | | | |
| | | | | | |
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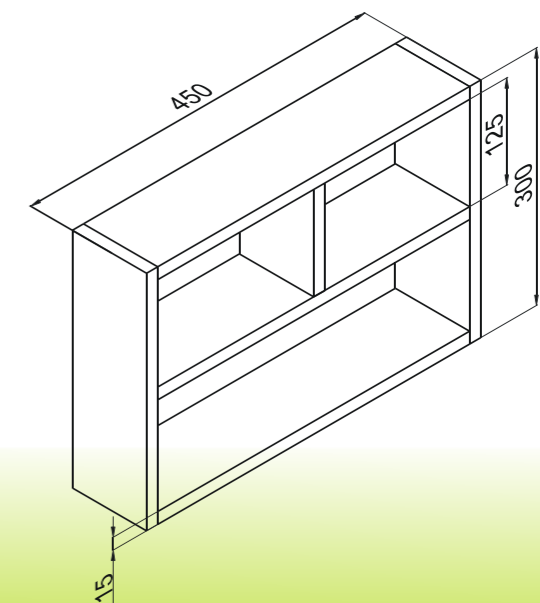
Homework 4

1. If you were asked to design a mobile phone, why would it be important to take the 50th percentile sizes of both men and women? (2)
2. In the drawing opposite, an ergonomist is shown sitting at a desk. If you were asked to design the desk, what two factors would have to be considered to ensure it's suitability? (2)
3. When evaluating and testing a finished designed product, why is it important to compare the final product with the specification. (3)



4. A picture of a shelving unit is shown, assuming the material is mahogany and the width is 100mm, in the table provided construct a cutting list of all the component parts. (9)

| Material | Part | Quantity | Width | Thick | Length |
|----------|------|----------|-------|-------|--------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



HOMework design 5&6

Homework 5

1. Why is the presentation drawing a very important aspect of the design process? (2)
2. Why is it important to write a sequence of operations? (2)
3. Briefly explain the purpose of the Initial Ideas stage of the design process. (2)
4. Name four important factors that need to be considered when carrying out detailed research. (4)
5. Briefly explain what is meant by the term ERGONOMICS. (2)
6. Briefly explain what is meant by the term ANTHROPOMETRICS. (2)
7. Shown opposite is a picture of an ergonome sitting on a bike. List five ergonomic factors which would require to be considered when designing a bike. (5)



Homework 6

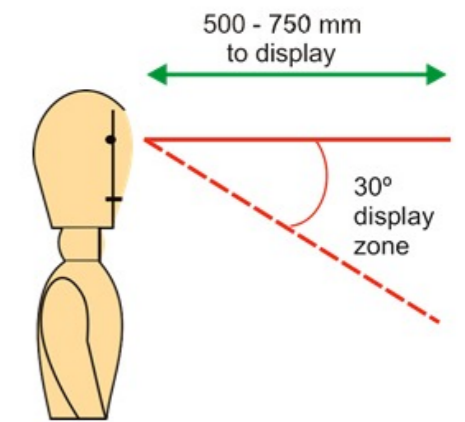
1. Aesthetics is a very important part of the design process, fully explain what the term aesthetics means. (3)
2. Explain why the use of an Ergonome is an ideal method for a designer to test his product. (2)
3. In your own words, give a full explanation for the purpose of carrying out Market Research prior to designing a new product. (3)
4. State three reasons why a manufacturer would choose to use a flat pack rather than having his/her product fully assembled before delivery. (3)
5. A designer is about to embark on the design of a mobile phone which will be used by both men and women. Why would he use the 50th percentile size of both their thumb lengths? (2)
6. Briefly describe the purpose of a Knock Down Fitting and where it may be used. (2)

HOMWORK design 7

Homework 7

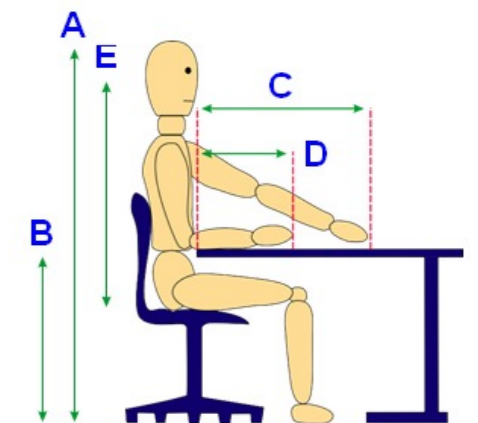
We all know supermarkets sell products, but why are the shelves not higher than they are. They could store a lot more food etc if they were higher. There are several reasons they are not: firstly, the average sized person could not reach them and secondly, they could not see what is on the shelf. Another important factor when designing shelving is to ensure the correct height is established for people looking at the products. If a customer has to reach for a product that is too high for them, they could over balance and cause the products to fall the ground.

1. Can you think of two other situations when the designer would need to consider how far the user can reach?



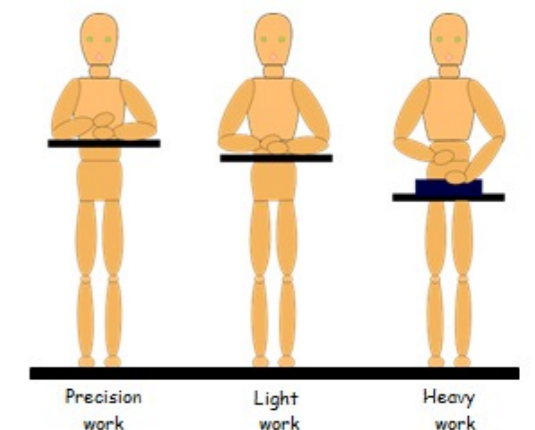
In the picture opposite, factors which would have to be considered when designing a table, would be to ensure the table was high enough to clear the person's legs but not too high to work at so as to make the working height uncomfortable. The reach of the person is also very important. If the desk was too wide the person would not be able to reach anything at the far edge.

2. Can you think of any other products that the designer would need to consider the height of the user?



This picture shows three different table heights for a person to work. If the object being worked upon was very heavy, the person at the higher work surface would tire very quickly. It would be more beneficial to work at the lower height. The higher work surfaces are more suited to light or precision work.

3. Can you think of any other products that the designer would need to consider how much force the user needs to apply to use it or to make it work?



HOMWORK design 8a

Writing a Specification

Specification – Homework 8

What is a specification?

The 'specification' is probably the easiest part of the design process although it is one that pupils tend to neglect or write incorrectly. It is usually a list of points, with each point referring to the research work. To gain the higher levels in the specification you need to show what you have learnt from the research that you collected and presented in the research section.

1. Can you think of as many things as you can that the designer thought of before designing the phone to the right? In your homework jotter write down Ten things.

2. You have been hired by a handheld torch manufacturer to design a new torch for younger people. The first job they want you to do is to create a specification for them that is realistic.

Things you may want to think about are:

- Who is the torch for?
- What will the torch be made from?
- How big will the torch be?

3. There are many important points you need to consider before designing a torch. Produce a list of things you think are important about the design of the torch - you should aim to write at least ten items.

This list is a very basic specification.

To write a full specification more information/thinking is involved. The main difference between a basic specification and a full specification is that all points must be appropriate to the task (appropriate to what you are designing) and some of the points must be measurable.

A measurable specification point is something that can be measured/tested against after you have designed your product.





HOMWORK design 8b

Example

Below I have written 3 simple specification points for a new handheld controller for a Playstation.

- Must be one colour.
- Must include buttons.
- Must include the 'Sony – Playstation' logo.

The above points are non-measurable. Below shows you the non-measurable and the measurable points side by side. Measurable points give you more information.

Non – measurable

1. The controller must be one colour.
2. Must include buttons.
3. Must include the 'Sony – Playstation' logo.

Measurable

1. The controller must be made from black plastic.
2. Must include 10 buttons including an on/off button.
3. Must include the 'Sony – Playstation' logo on the front face of the controller so people can identify it with Sony Playstation.

Below you can see a list of specification points for a mobile telephone. In the 'measurable' column write down the measurable version specification point. Number 1 is completed for you.

Non-Measurable

1. The phone must be a good size.
2. The phone must be colourful.
3. The phone must include buttons.
4. The phone must be aimed at younger people.
5. The holder should be colourful.
6. The phone must have a screen.
7. The phone must be durable.
8. The manufacturer's logo must be included.
9. The key size must not be too small.
10. The numbers must stand out on the keys

Measurable

1. The phone must be no bigger than 120mm tall, 75mm wide and 25mm thick.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

You should now have a good idea what a measurable specification point is.

HOMWORK design 8c

Specification –

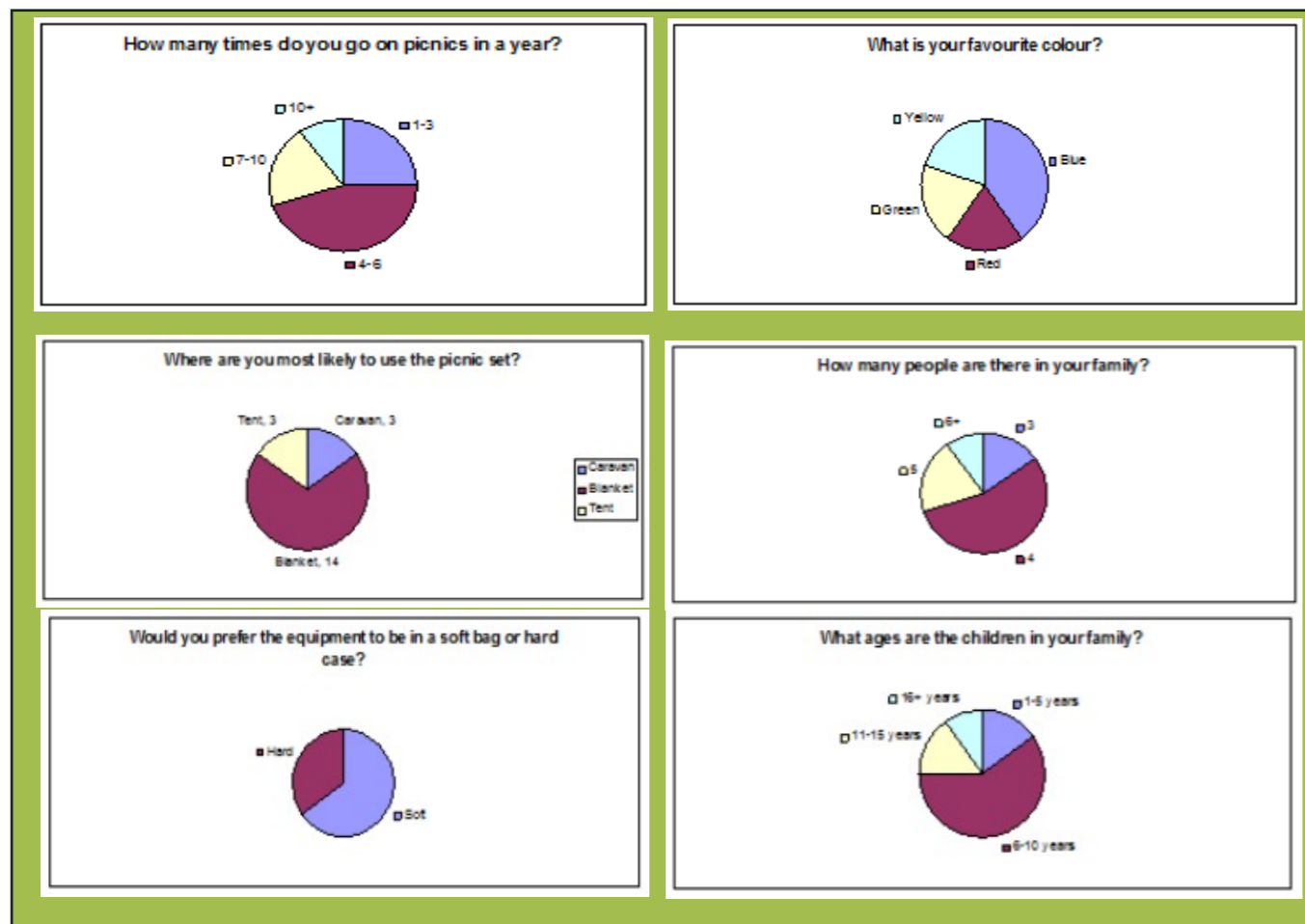
1. What are user's views and how would we gain them? Why are they important?

You need to take some users views into consideration before writing your specification. If we didn't then the product we are designing may not be liked by them.

Below you will see a small survey. From this survey we can take important information to include in our specification.

Customer/Users views

These results are taken from a survey of 20 families.



What can I use from this survey? What have I found out?

- Three quarters of families go picnicking no more than 6 times in a year.
- I know that from the people I surveyed the favourite colour was blue.
- At least half of the families have 4 people in their family.
- The most likely place they would use a picnic set is on a blanket.
- Most would prefer the picnic set to be in a soft case.
- 6-10 years was the most common ages of children in families asked.

This information is valuable to write a specification. I can use this information to generate a good specification with users views included in it.

1. Using the information gathered in the survey, write a specification for the 'picnic set'

Eg

1. The picnic set must be easy to store when not in use (I chose this because the set is only likely to be used 6 times a year)



HOMWORK design 8d

This information is valuable when writing a specification. I can use this information to generate a good specification with users views included in it. Write a specification taking into account what you have learned from the customer survey. The first two have been done for you.

Complete the specification for the 'picnic set'

1. The colour of the picnic set is going to be blue as this was the highest chosen colour in my survey.
2. My picnic set will be designed to fit in a soft case so it can be carried easily as more people in the survey wanted this.
- 3.
- 4.
- ...
- 15

Homework 9 Product Evaluation

Two kettles are shown below. We can clearly see that the Aesthetics of each are very different.

Alessi



Braun

Describe each kettle design in relation to their appearance and the materials used and try to give reasons why each has been designed in this way.

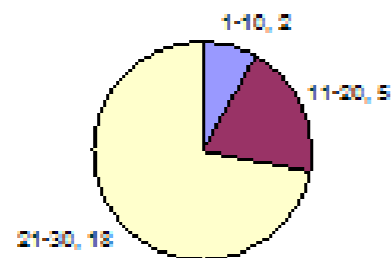
Which kettle do you think would be the easiest to use and why?

HOMWORK design 8e

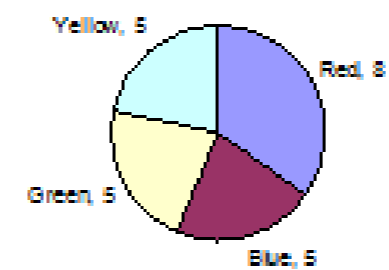
Specification –

You are to write a design specification for a CD holder using the information below from a small customer survey. 25 people were asked the following questions.

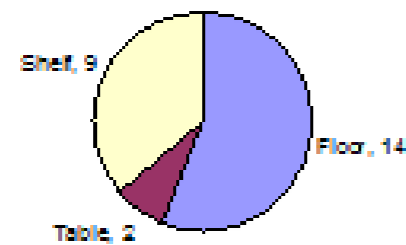
How many CD's do you have?



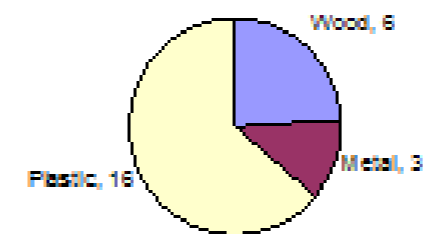
What is your favourite colour?



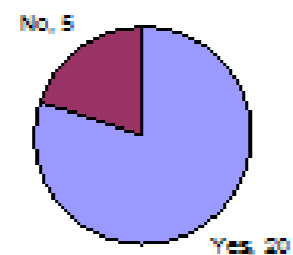
Where would you keep a CD holder?



What material would best fit into your bedroom environment?



Would the holder be used on a wooden surface?



Other things to think about: Sizes, height, target market, age of user, cost, safety etc

To gain a Nat 5 you need to have done the following.....

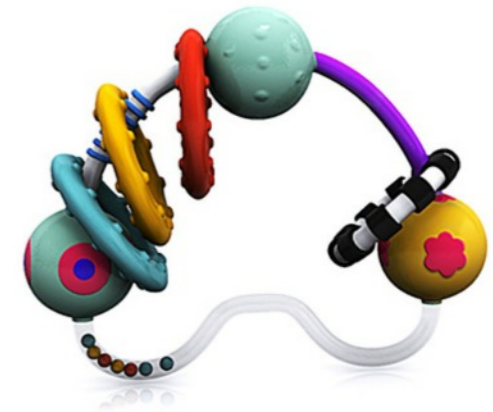
- My specification must include 3 appropriate measurable points within a
- 10 point spec
- My specification has some users' views included in it



HOMEWORK design 9

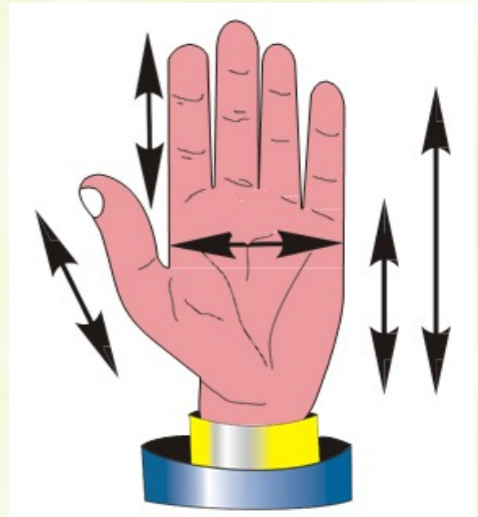
Annotating

In your homework jotter choose one of the products below, sketch it onto your page and annotate it using the system [AccessFm](#).



HOMWORK design 10

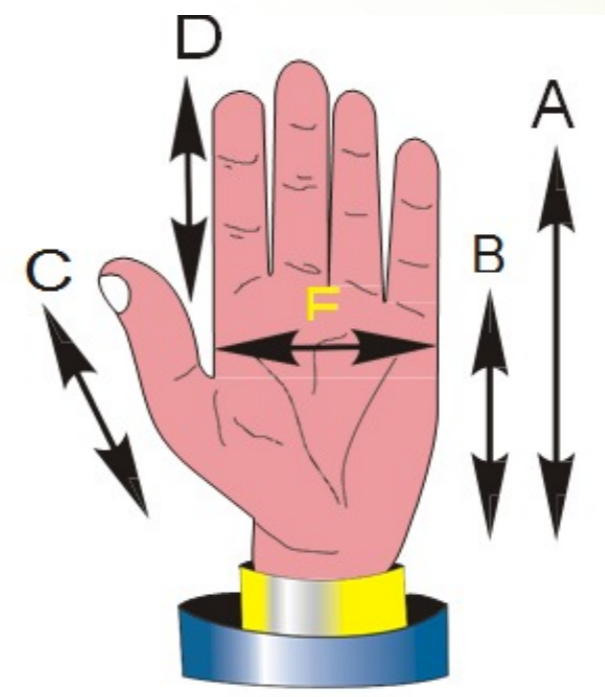
The table below lists each part of the hand and also shows a 5th, 50th and 95th percentile for both men and women. The reason for this, is that men's hands are generally larger than those of women and therefore if a telephone was being designed, it would be designed with both men and women in mind.



| Anthropometric estimates for British adults aged 19-65 years (in mm) | | | | |
|--|----------|-----------|-----------|--------|
| Dimension | 5th %ile | 50th %ile | 95th %ile | |
| A Hand length | 173 | 189 | 205 | MALE |
| | 159 | 174 | 189 | FEMALE |
| B Palm length | 98 | 107 | 116 | MALE |
| | 89 | 97 | 105 | FEMALE |
| C Thumb length | 44 | 51 | 58 | MALE |
| | 40 | 47 | 53 | FEMALE |
| D Index finger length | 64 | 72 | 79 | MALE |
| | 60 | 67 | 74 | FEMALE |
| E Hand breadth | 78 | 87 | 95 | MALE |
| | 69 | 76 | 83 | FEMALE |

Looking at the table the percentile that we are concerned with is the 50th %ile. Try adding together the 5th %ile and the 95th %ile for each category and then divide by two. What figure has this given you? Your result should be equal to the 50th %ile.

Using the information in the table work out which sizes a designer would use for the design of a mobile phone that would be suitable for males and females. Draw your sizes on the hand below.



HOMWORK design 11

Aesthetics & Function

1. State what is meant by the term function?
2. Products are designed to perform a primary function but in order for them to function and perform efficiently and safely, they must also have secondary functions.
 - (a) State what the primary function of a steam iron is.
 - (b) List three secondary functions of the iron.
 - (c) Describe two factors that would influence how well the iron performs



3. Two digital radios are shown below. Both perform the same function. However designers need to strike a balance between aesthetics and function.



Roberts DAB radio



Ruark Vita DAB radio

- (a) Explain which radio you think has been designed with an emphasis on aesthetics and which has an emphasis on function.

HOMEWORK design 12

Mass Production

1. State what is meant by the term mass production.
2. Rapid prototyping is commonly used in industry to test prototypes.



- (a) Describe what rapid prototyping is.
 - (b) What is a prototype?
 - (c) At what stage in the design process might a designer produce a rapid prototyped model?
3. Computers are used to control a wide range of mass production processes. Describe two advantages of this to the manufacturer.
 4. Mass production techniques have made it possible to manufacture high volumes of products very quickly to meet the growing demands of consumerism.
 - (a) What impact do you think this will have on the environment?
 - (b) What can designers do to limit the impact on the environment?

HOMWORK design 13 & 14

Design Folio/Factors

1. List the 8 stages of the Design Process.
 2. What detailed Design Factors should be considered when researching a new Product's Design?
 3. What is a Product Specification?
 4. When undertaking the Idea Generation Stage of the design process, what are ANNOTATIONS?
 5. What are some things that should be considered when developing some of the Initial Ideas further?
 6. What four pieces of information should be included when doing the "Planning for Manufacture" stage of the folio?
 7. What should be considered when writing an Evaluation?
-

Target Market

1. (a) State what is meant by target market?
 (b) In order for a designer to ensure that a product is as successful as possible they must carry out market research. Describe two ways this can be done.
 (c) What three things must the potential buyers of a particular product have in common?
2. Two cameras are shown below. They both perform similar functions but are intended for entirely different target markets.



Canon EOS 450D, £450



Fujifilm Finepix, £75

- (a) Suggest a suitable target market for each of the cameras. Consider age, gender, interest, lifestyle, income and usage when describing the target market.

HOMWORK design 15 & 16

Aesthetics

1. (a) State what is meant by the term Aesthetics. (b) Describe two reasons why aesthetics is so important in the design of products.

2. Two contrasting examples of car design are shown.



- (a) Explain which of these designs appeal to you most. The following terms can be used to help in your explanation: Shape, form, colour, line, proportion, contrast, texture.

3. There are many kettles to choose from on the market today. Two examples of these are shown here.

- (a) State what is meant by the term Style.

- (b) Describe how you think each of the designers have achieved the different style of kettles.



Breville 'high-tech' Kettle

Morphy Richards

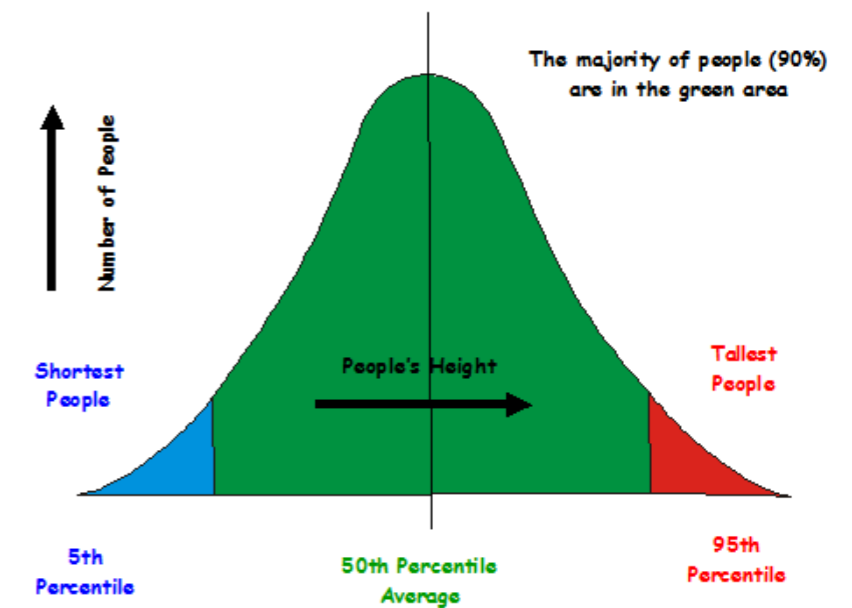
'retro' kettle Homework 19 The Market

1. Briefly describe what is meant by a "TARGET MARKET".
2. What 3 factors dictate the size of a potential market of a product?
3. What are the 4 "P's" when talking about marketing?
4. Now that you know what the 4 "P's" stand for what does each one mean?
5. What is meant by "Impact of decisions"?
6. What is the difference between product "needs" and product "wants"?
7. What would it be called when a product is targeted at a very small section of the market?

HOMWORK design 17 & 18

Ergonomics & Anthropometrics

1. What is meant by the term "Ergonomics"?
2. What is an "Ergonome"?
3. What size of person are most things designed for, and why are they designed for em?
4. What is Anthropometry?
5. Why must a large sample of people need to be measured to get accurate anthropometric data?
6. What does the 0-5th percentile show in the graph?
7. What does the 95-100th percentile show in the graph?
8. If you had a product and wanted to sell it to the most amounts of people, what percentile should you take your data from?
9. If designing a product why would you have to consider sizes of men and women separately?
10. Why do supermarkets not have their shelving go all the way up to the ceiling? Surely this way they could store a lot more items and save space...?



Aesthetics & The Design Team

1. What is Aesthetics and why is it an important thing to think about when designing a new product?
2. What colours do you think would be best for a children's toy and why?
3. What do we mean by "Harmony" when we are talking about design?
4. What could you do to help your design look "unified and organised"?
5. Why do you think designers use a lot of different shapes and sizes?
6. Why would a designer use contrast within a design?
7. What type of shapes would be classed as "geometric"?
8. What type of shapes would be classed as "organic"?
9. Draw a table and list each member of the design team in one column and what their role in another column.

HOMWORK design 19 & 20

Ergonomics

Car designers invest a lot of money in developing car interiors to ensure that they are comfortable and it is easy to operate the controls within them.

- State **two** human dimensions that would need to be considered when designing the driver's car seat.
- What can designers do to make such controls easier to understand what aspect of the car they control? Give examples to illustrate your answer.
- When designing products, how can designers help to create the best fit and comfort for the largest percent of the population as possible?
- When designing the dashboard controls give an example of how physiology should be considered.



A sheet of concepts for a new shelter is shown. When developing these ideas ergonomics will need to be considered.

- What percentile of standing height or stature will need to be considered to ensure that the majority of the population will be able to stand under the shelter?
- A scale model of a human was used during the design of the shelter. State the name of this type of model.

