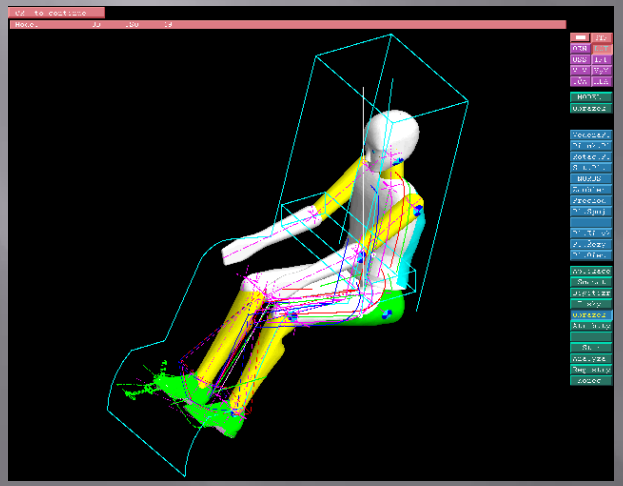
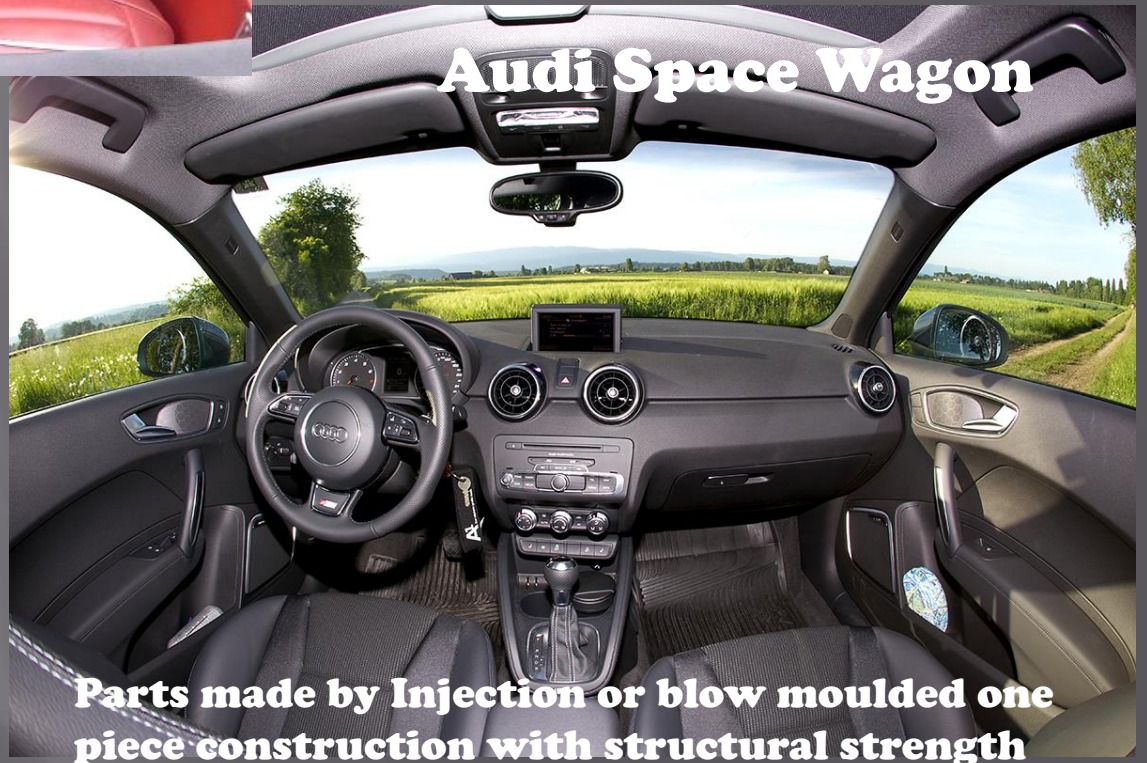
Starter task: Compare and contrast these two car interiors! Think about comfort, ease of use, safety, and materials.

1960's Triumph





Audi Space Wagon

Parts made by Injection or blow moulded one piece construction with structural strength 'moulded in'

Today we will learn about:

Why designers need to match their products to the human form or body.

Why designers need to consider how their designs affect our senses.

By the end of today most will be able to describe the basic meaning of ergonomics giving several examples of good design.

Some will be able to describe the relationship between anthropometric data and ergonomic design.

Superstars can describe how some materials and making methods make better ergonomic design easier and more effective.

Task: Briefly describe a product you are familiar with such as a chair or games console that is easy and comfortable to use. Can you describe why it is good or easy to use?

Describe three hazards that may occur if a designed product does not fit the human form properly

Task

Make a list of as many design features or components as you can think of that need to be ergonomically well designed.

Buttons and dials

Handles and grips

Seating heights and shapes

Table top heights

Clothing sizes and shapes.

Changes to colour or appearance to help those with a sight problem

Keyboard for visually impaired

What is Ergonomics???

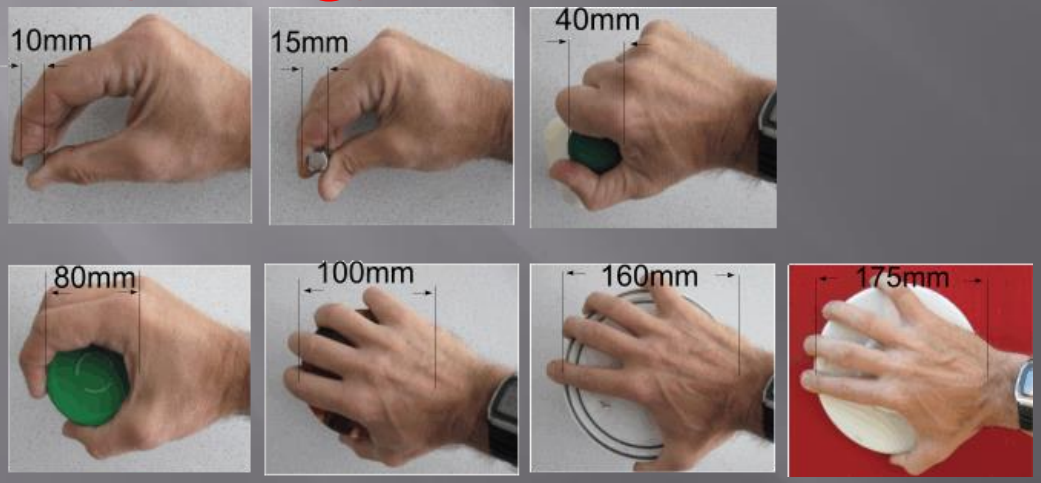
Ergonomics is the study of how a product comes into contact with the human body

This covers 3 aspects:

Anthropometrics

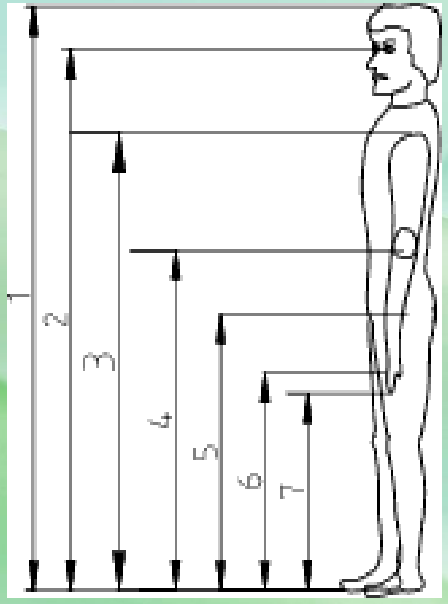
Psychology

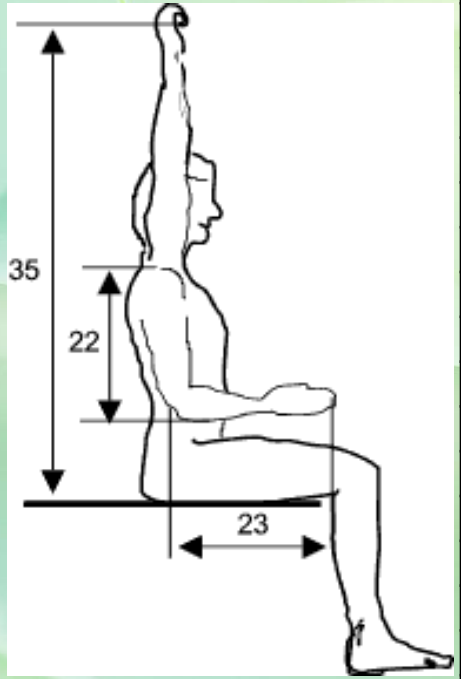
Physiology



Anthropometrics

- **The size and study of the Human Body**





Dimensions (mm)	Man (Percentiles)		Women (Percentiles)	
	5%	95%	5%	95%
1- Height	1641	1869	1514	1725
2-Eye	1525,4	1751,2	1409	1612,6
3-Shoulder Height	1351,1	1559,5	1230,2	1431,2
4-Elbow Height	1023,8	1189,8	951,8	1097,8
5-Hip Height	849,8	1013,1	750,6	902,4
6-Knuckle Height	690	825	660	780
7-Fingertip Height	605,5	725,2	564,5	671,1
22-Shoulder-Elbow Length	346,6	406,7	312,5	370,6
23-Elbow Fingertip Length	442,0	512,1	396,3	465,9
24-Upper Limb Length	735,4	852,5	652,0	779,4
25-Shoulder Grip Length	607,2	717,8	556,4	660,5
26-Head Length	187,7	212,8	172,0	196,7
27-Head Breadth	145,1	166,8	137,1	157,7
28-Hand Length	173,6	206,0	159,0	191,0
29-Hand Breadth	79,2	95,1	70,5	83,9
29A -Hand Breadth- over thumb	97,4	116,2	82,7	101,1
30-Foot Length	245,3	288,2	220,2	262,1
31-Foot Breadth	93,2	109,9	85,4	103,7
32-Span	1693,7	1963,6	1544,6	1804,9
33-Elbow Span	874,2	1018,5	783,1	929,0
34-Vertical Reach	1941,5	2244,9	1824,7	2064,0
35-Vertical Reach (sit)	1230,7	1404,4	1135,4	1295,5
36-Forward Grip Reach(sit)	670	804,8	617,9	745,3
37-Forward pinch Reach(stand)	731	878,4	669,1	803,5

Psychology

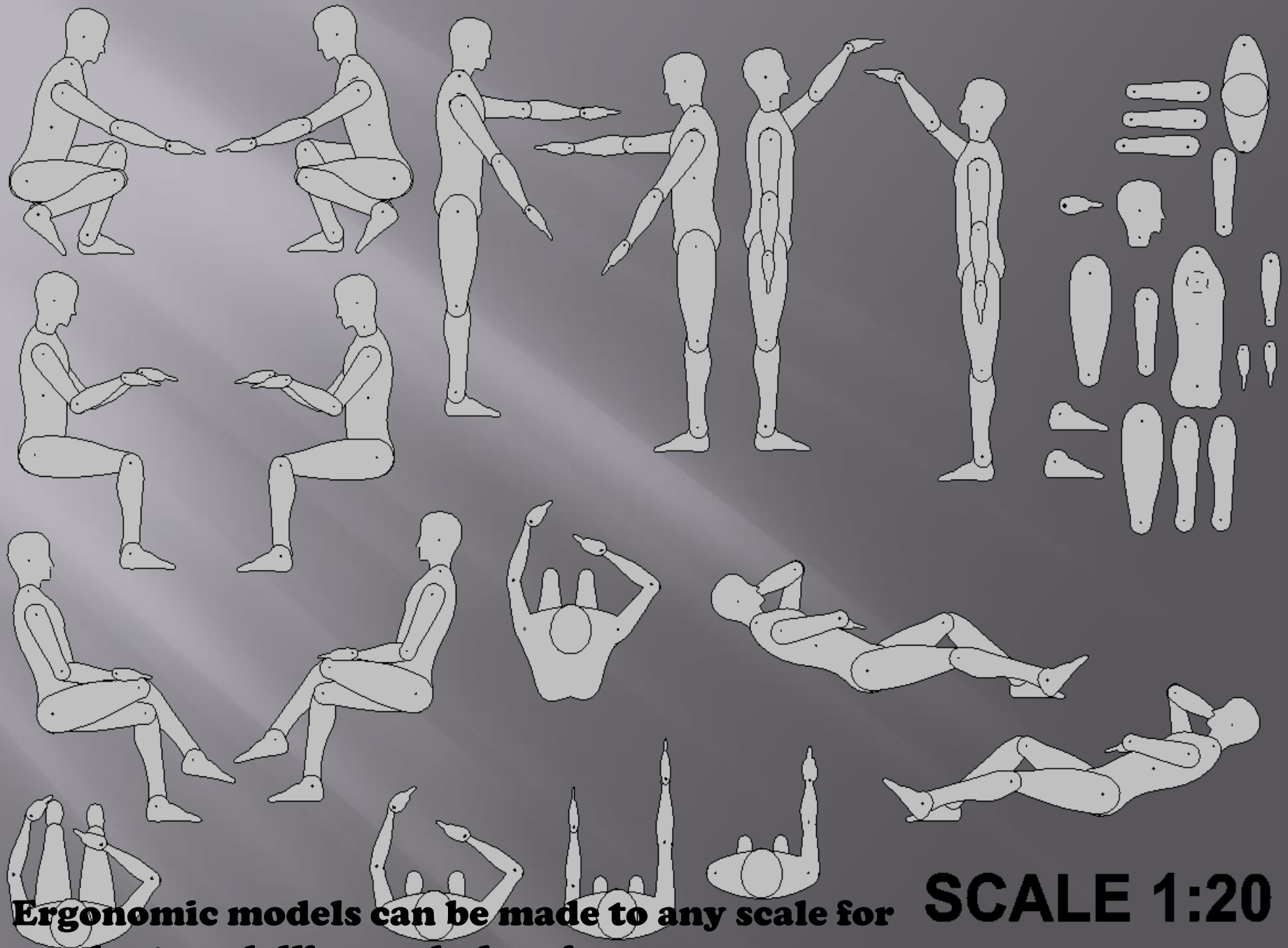
- How a product communicates to us.
- So we know exactly how to use, we know where the functions are by just looking at it
- Thinking about colours
- Textures, mood. How a product affects our senses (aesthetics).

Physiology

- Strength and limitations of the human body
- How long can you hold a product for

- When does it become too heavy?

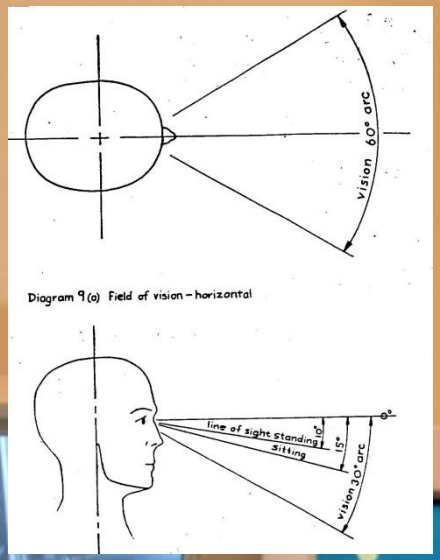
Is it designed help you Do your work/task Properly?



Ergonomic models can be made to any scale for product modelling and planning.

Table and chair unsuited to user and task. What injuries or problems may occur? Back strain and injury from bad seating or furniture costs the UK economy hundreds of millions of pounds of lost productivity.

An ergonomic seating design for comfort and stability. Comfortable employees tend to be more productive and happy in their workplaces. What do you think of your chairs, stools and tables?



Prototype for a military helicopter pilots head set to enable complete environment control.

Choose one of the following Design Tasks!

Design an ergonomically well designed games console, mobile phone or computer mouse.

Design a children's toothbrush or cutlery set with ergonomic features that could help develop their handling skills

You must produce at least five ideas on A3 paper.

Your ideas can be flat views of front, side and views from above. (Elevations).

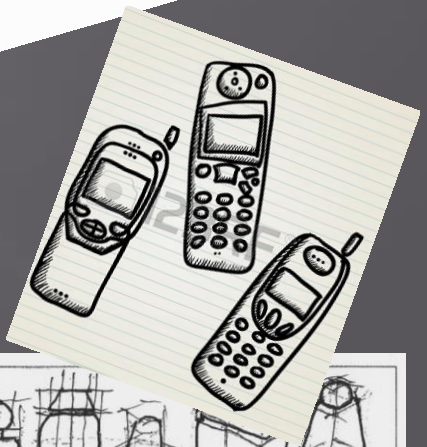
To reach higher levels for designing your ideas could have three dimensional views in free hand isometric projection or perspective.

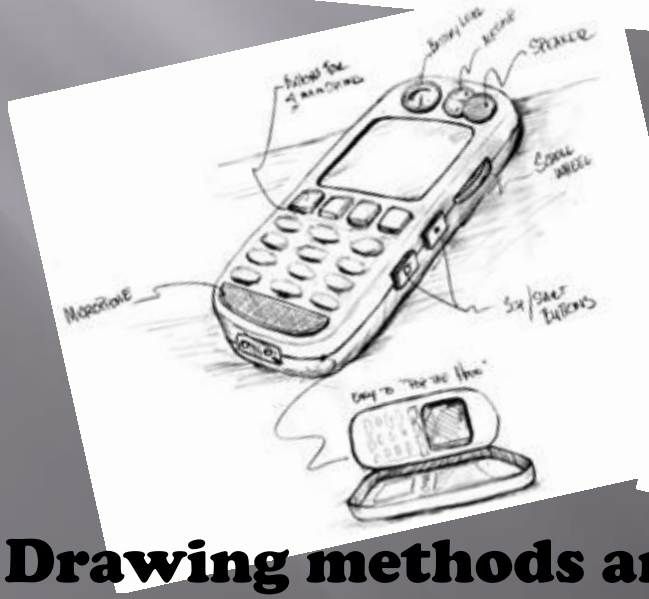
Your ideas must have pencil shading to show tone or colour showing tone

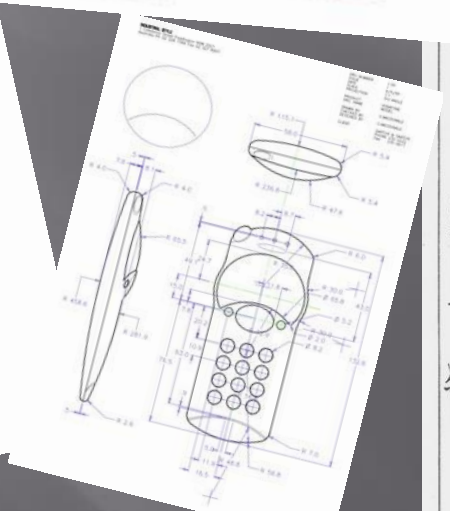
Your ideas must be labelled and annotated to describe what you like or dislike about each one.

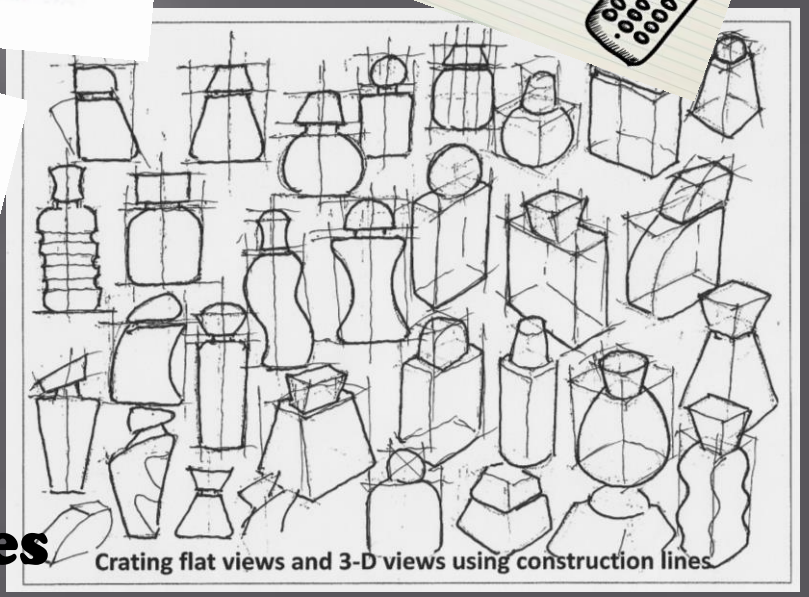
Swap your work with a partner and ask them to evaluate your work. Your partner can also add detail.

Can you suggest a suitable materials and making processes to produce your design? Which would you choose and why?



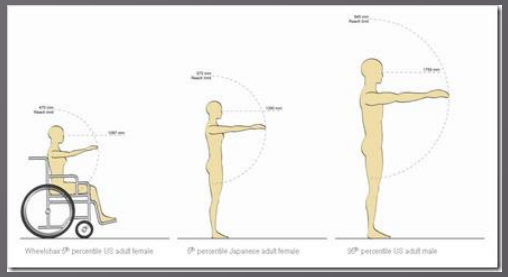






Drawing methods and techniques

Plenary Questions:



What is the difference between ergonomics and anthropometrics?

Describe two hazards of poor ergonomic design

What are the three aspects of ergonomics?

How might ergonomic requirements change for different age groups or those with a physical disability?

Ergonomic toy designs

Telephone key pad for sight impaired

Kitchen aids for the elderly