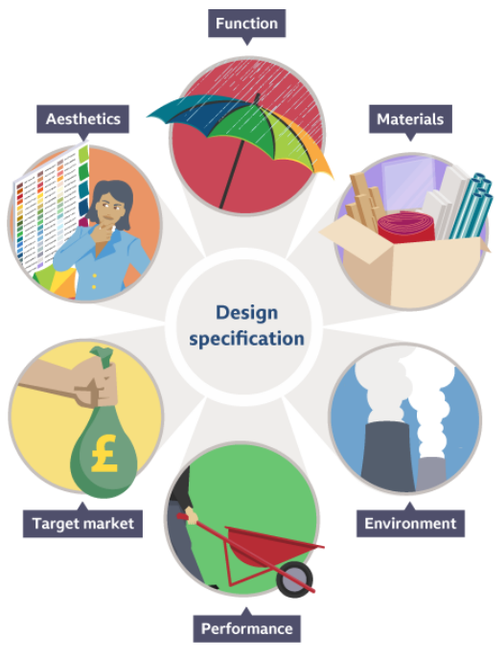
Year 11 Design & Technology Knowledge Organiser: Theory: Unit 6

Design brief and design specification

A design brief is the statement a client gives to a designer outlining what they want their product to be like, eg 'Design a drinks bottle holder for use while riding a bicycle'.

A design specification is a list of criteria a product needs to meet. Using the brief as a starting point for research, a specification can be written when more facts are known. Information needs to be found through research to help produce early design solutions and improvements.

It is important that the criteria the product must meet are measurable. This will make evaluating design ideas, progress and the final outcome much easier. Eg, how much will the product cost to produce?



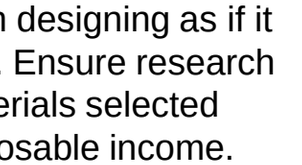
Design strategies

Collaboration- working with others to gather data, design ideas and solve problems. This can be a creative way to work as ideas develop from something simple.

User- centred design- this way of designing is based on understanding and fulfilling the requirements of the client or users of products. Research and feedback is ongoing with this strategy.

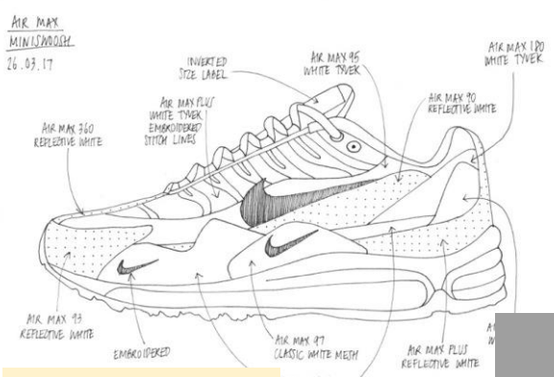
Iterative design- this is a cyclical approach where one idea is formulated then tested and analysed. It then gets modified or refined based on the outcome. Each iteration gets better as a result of the process however it is time consuming.

Avoiding design fixation- whilst this is not a design strategy in itself it is very important when designing. Don't fall into the trap where you are producing designs similar to those existing. Use your research, collaborate with others and find a new starting point. It may also be helpful to model instead of drawing.



Communicating design ideas: sketching and annotating

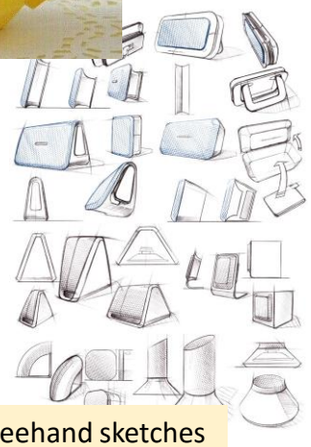
Communicating your design ideas can be done in a number of ways. It might be that you select a number of ways to display your ideas.



Annotated drawing

Model (handmade)

CAD model



Freehand sketches

Annotations should inform the viewer of planned choices such as colour, material choices and finishes

When annotating, it is important to consider the products impact on the environment, social issues and economics.

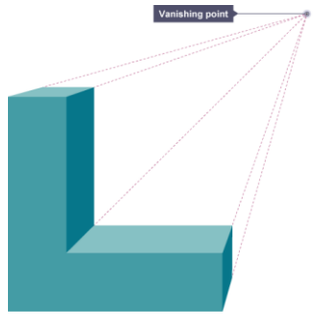
Designers must consider their carbon footprint when designing and that of the intended user. To lessen this, recycled materials may be used and parts made available for repairs if it breaks.

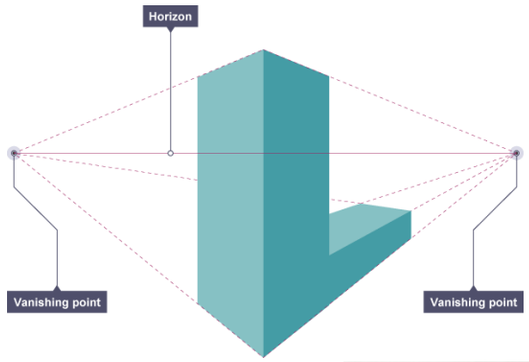
Ethical issues are important. Fairtrade products may be chosen where possible to ensure good living standards for the farmers or raw materials.

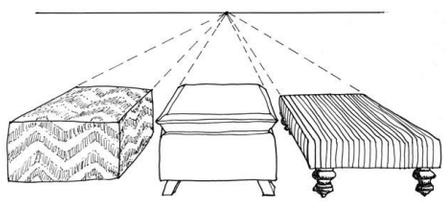
It is important to consider cultural beliefs when designing to ensure nobody is offended by your product.

Economic consideration should be taken when designing as if it is not a viable product, it will not be a success. Ensure research has been gathered to support pricing and materials selected match up with the target market and their disposable income.

Perspective drawing

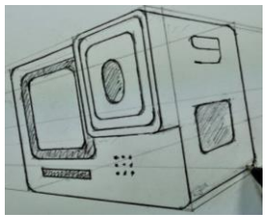






Single point perspective is used to show an object from the front. It looks more realistic as the lines, drawn to the vanishing point make it look as though it gets smaller as it gets further away. This technique is commonly used by interior designers.

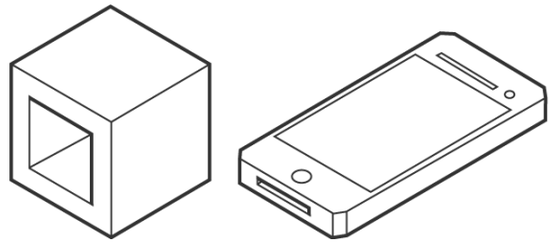
Two- point perspective is used to show an object from the edge. This is useful if you want to display a design feature or use multiple angles. This technique is commonly used by architects.

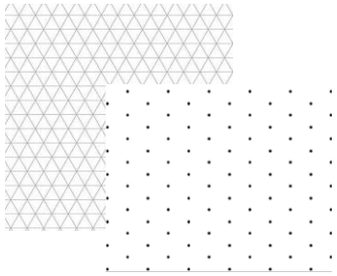


Isometric drawing

Isometric drawing or isometric projection are a better choice if you want to show dimensions and separate parts of a product. This type of drawing are used by engineers and architects.

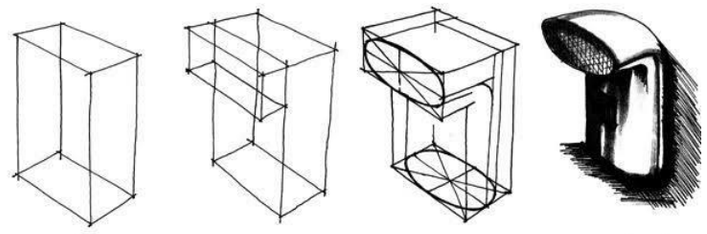
- **horizontal** edges are drawn at 30 degrees
- **vertical** edges are drawn as vertical lines
- **parallel** edges appear as parallel lines





Isometric papers are available to assist with these drawings, never draw across the grid!

Isometric drawing can also help us complete more difficult or rounded shapes by using a technique called crating. This uses isometric boxes and you then work the curves into those boxes/ crates.



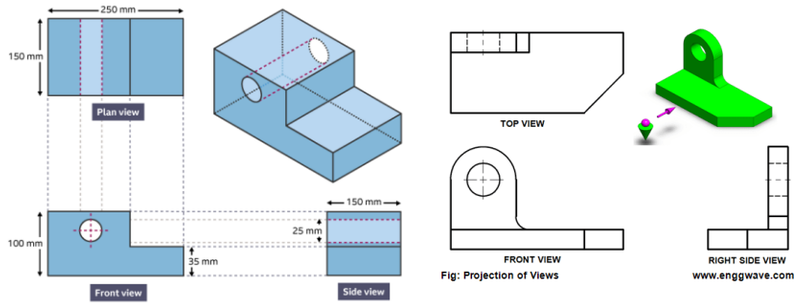
The work of others

Harry Beck was a technical draughtsman who redesigned the London Underground map. He used his knowledge to remove all unnecessary information, such as distance, roads and landmarks. It was a radically different map to anything produced before but was soon copied by many other cities.

Sir James Dyson reinvented the vacuum cleaner to no longer need a bag. He famously prototyped thousands of designs before refining his cyclone-suction, bag-free design. His designs keep the engineering visible to the user through a combination of transparent and bright-coloured plastic.

Third angle orthographic projection

Orthographic projections are working drawings. They show the sides of a product without perspective. Construction lines are seen to aid manufacture. They are drawn to scale and include dimensions.



Manufacturing specification

After the design is finalised and has all the information required to be manufactured, a manufacturing specification is created. A drawing, with dimensions is required, along with a parts list including materials that will be used to manufacture each part and how it will be finished.

Once completed, a flowchart can be produced describing the order of production, incorporating quality assurance, quality control and tolerance. This is the recipe for a successful product.