

Smart and modern materials:

Smart materials react with their surrounding environment such as changing colour in the sun. Modern materials have been produced to fit a need such as Kevlar in military body armour.

Understanding a client's needs

A client is the person the product is designed for. You need to 'know' your client and their 'needs' in a product to ensure your designs will be suitable. Carrying out a client profile is one way of fact finding as well as research such as product analysis to identify what is already available on the market.

Designers identify the opportunity to develop new products based on technology push or market pull.

Technology push

Technology push is when products are re-designed because of changes in materials or manufacturing methods. This might mean that new materials have become available, with improved properties; or that improvements in manufacturing processes mean a manufacturer can make the product cheaper or more effectively, which reduces manufacturing costs.

Market pull

Market pull is when product ideas are produced in response to market forces. Examples of market influences include:

- A demand from consumers for new or improved products.
- A competing product is launched by another manufacturer.
- A manufacturer wants to increase their share of the market.

Consumer choice

Once a designer has identified an opportunity for a product, the next step is to identify the detail of what consumers want. To do this they need to identify who the different customers are and what they are looking for, e.g. a choice of different styles, performances and process.

For example, car manufacturers design slightly different versions of the same car model to suit individual driver's different tastes. Market research is carried out to identify consumer wants and desires.

Design should consider its impact on:

Social/moral/ethical/environmental issues.

Context/brief/specification

These are all vital to establish at the start of the designing process. The context is the general situation where there is a problem such as 'encouraging people to live healthier lifestyles'. The brief is then written to identify the client, some of their needs and possible constraints such as 'design and make an app that monitors the user's health'. Constraints could include cost, materials, time, safety. A specification is a detailed document that clearly identifies what the client needs and wants from the product and should be detailed enough that a designer could read it and design a suitable product. ACCESSFM is often used to help identify all aspects of the

Materials

When choosing suitable materials for designs it is important to consider the properties and characteristics of the materials and how they perform as well as look, last over time and can be shaped and finished.

Timbers: wood comes from trees and can come from hard or soft woods.

Hard wood comes from deciduous trees which shed their leaves in autumn such as oak. They grow slowly so tend to be more expensive. **Soft woods** come from coniferous trees that have needles or leaves that are evergreen. These tend to grow much quicker making it cheaper to produce. Each ring in the tree trunk shows you the year's growth, count the rings and you can see how old the tree is. **Manufactured boards** are made by gluing wood pieces together. They are made from waste materials or recycled woods, an example of this is plywood and MDF.



Design Strategies & communication methods

Different approaches to designing a product are called design strategies.

Iterative design is widely used, it involves making a model of the design, which is then tested and evaluated. A new improved model is then made, and the process is repeated until you have a suitable idea that meets all the client's needs. There is also **user centered design** (where the user is integral to every step of the process and decision) and **inclusive design** (that considers all potential users including ages/gender/physical abilities).

Freehand sketching is great for quick initial ideas, they can be 2D or 3D and may have technical notes.

Working drawings are more formal and communicate the sizes and technical aspects of the design. **Orthographic** is a way of drawing 3D objects in 2D from different viewpoints. **Isometric** is a method of drawing an object in 3D with each side being drawn at 30° angle. **Perspective drawings** can have one or two-point perspective, where the image looks like it is vanishing away to a point or points. **Exploded views** show how all the parts of the product fit together, this can often be drawn on a computer. This is known as CAD-computer aided design.

Key words

Design context: the general situation where there are problems that need solutions.

Design possibilities: opportunities, related to the design context, from which the need for a specific solution is identified.

Client: also known as the user, the person or persons who will buy/use the product.

Client profile: a summary of the client's needs/likes/dislikes.

Primary research: first hand, gathered direct from the client.

Secondary research: comes from second hand sources such as the internet.

Manufacturing specification: a document containing all the information needed to make the product.

Iterative design: a design strategy that follows a cyclic make-test-evaluate approach.

Orthographic projection: a way of showing a 3D object in 2D by drawing it from the front, plan and side views.

Isometric projection: a method of drawing an object in 3D where each side is drawn at a 30° angle.