

## Properties 1



### Strength

The ability of a material to withstand force without breaking or permanently bending.

### Elasticity

The ability of a material to bend and flex when subjected to a force and then return to its original shape when the force is removed. Bridges and buildings require a degree of elasticity.

### Hardness

The ability to resist abrasive wear, indentation and deformation. An important property for cutting surfaces such as drill bits and saw blades

### Toughness

The ability to withstand sudden stress in the form of shocks or blows without fracturing and to resist cracking when subject to bending forces.

## Properties 2



### Brittleness

The opposite to toughness. A brittle material will not withstand sudden forces or blows. Glass is a brittle material.

### Durability

The ability to withstand wear, tear and deterioration over time. Durability refers to both the mechanical properties and the appearance of the material.

The term used to describe weathering and chemical attack of a surface, particularly metals is corrosion. Plastic materials degrade, rather than corrode, but generally take much longer to do so.

### Stability

The ability to resist changes in shape and size over time. Wood is particularly unstable and tends to warp and twist with changes in humidity. Metals and some plastics tend to gradually deform when subjected to stress over long periods.

## ACCESS FM.



This is a good way of producing a specification in an exam as it prompts you to address the important points.

**Aesthetics** What should it look like?

**Customer** Who will use the product?

**Cost** How much will it cost to make?

**Environment** How will the product affect the world?

**Size** How big in mm?

**Shape** Shaped for a particular purpose?

**Function** What it should do.

**Material** What it is made from and why

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## Woods



**Man-made** boards are the most economical method of using wood products. They allow much bigger sheets to be produced than could be cut from a tree, are stable and free of defects (knots, splits etc).

They can be covered in a **veneer** (thin sheet) of more expensive material to improve their aesthetic qualities.

Chipboard is often covered in a layer of thermosetting plastic to give the impression of a higher quality product. Kitchen worktops are a good example of this.

- Plywood
- Chipboard
- Medium Density Fibreboard (MDF)
- Block board
- Hardboard

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## CAD CAM



### CAD

Computer Aided Design. Drawing using a computer. 2D drafting and 3D modelling, like Solid works.

- Quicker and more accurate than by hand
- Can be emailed, copied and modify without redrawing
  - Expensive to set up
  - Need to train staff
- Virus, power cut or software problems could stop work

### CAM

Computer Aided Manufacture. Machines are used to cut components. Laser cutting, routing and vinyl cutting are examples.

- Quick and accurate
- Machines don't get bored like humans
  - Can break and are expensive
  - Require skilled operators.

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## SYMBOLS.



The Kitemark® is the world's premier symbol of trust, integrity and quality. Manufacturers having this associated with their product or service will reassure customers and specifies alike that they have satisfied the most rigorous of quality processes.



The Forest Stewardship Council ensure that wood is sourced from sustainable, managed forests.



Carried by products made from recycled material.

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## Finishes – Woods & Plastics.



### For woods:

**Staining** involves applying a water-based pigment (colour) to improve the look of the wood.

**Polyurethane Varnish** a tough, clear coating that seals the wood, but allows the grain to be seen. Used for outdoor furniture.

**Oil Based Paint** provides a waterproof seal for exterior woodwork – external doors, window frames etc.

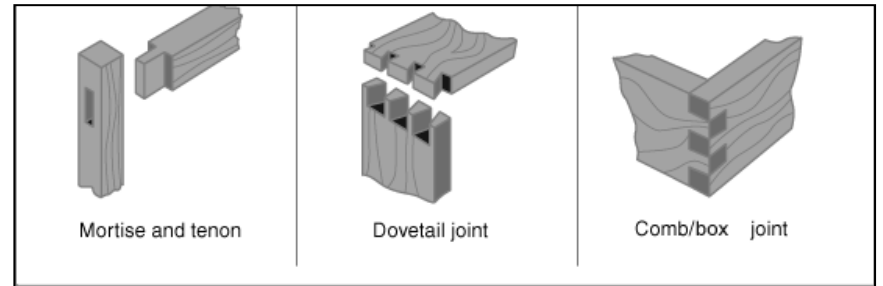
### For plastics:

Plastics are generally self-finishing, meaning that once molded into shape they require no further work.

Coloured pigments can be added when the plastic is made, before it is molded.

Screen-printing is used on vacuum forming.

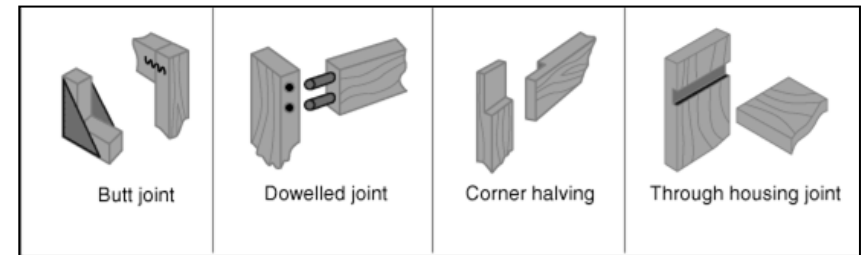
## Joining Wood



Mortise and tenon

Dovetail joint

Comb/box joint



Butt joint

Dowelled joint

Corner halving

Through housing joint

PVA is the glue used for most wood joints to join them together.