RESISTANT MATERIALS

WOODS
- HARDWOOD
  - ASH
  - MAHOGANY
  - OAK
  - BEECH
- SOFTWOODS
  - PINE
  - CHIPSBOARD

WALLS
- MAN-MADE WOODS
  - MDF
  - PLYWOOD
- HARDBOARD

RESISTANT MATERIALS

METALS
- FERROUS METALS
  - MILD STEEL
  - STAINLESS STEEL
- NON-FERROUS METALS
  - COPPER
  - ZINC
  - BRASS (ALLOY)

POLYMERS
- THERMOSET
  - POLYESTER RESIN
  - ACRYLONITRILE-BUTADIENE-STYRENE (ABS)
- THERMOPLASTICS
  - POLYVINYL CHLORIDE (PVC)
  - POLYETHENE
  - ACRYLIC
  - HIGH-IMPACT POLYSTYRENE (HIPS)
Hardwood

- Deciduous (leaf losing) trees.
- Slower growing.
- Expensive to buy.
- Colour varies enormously.
- Aesthetically pleasing grain patterns which vary depending on the wood.
- Denser.
- Greater strength and hardness than softwoods.
- Examples of Hardwoods—Oak, Mahogany, Beech and Ash.
## Oak

### Properties
- Hard
- Tough
- Durable
- High density

### Uses
- High quality furniture
- Garden benches
- Boat building
- Veneers

### Advantages
- Finishes well

### Disadvantages
- Contains an acid which corrodes steel
**Mahogany**

### Properties
- Durable
- Medium density

### Uses
- Indoor furniture
- Interior woodwork
- Window frames
- Veneers

### Advantages
- Finishes well
- Relatively easy to work

### Disadvantages
- Prone to warping
- Some tropical types can be a bit soft and fibrous
**Beech**

**Properties**
- Hard
- Tough

**Advantages**
- Finishes well
- Turns well

**Uses**
- Workshop benches
- Children’s toys
- Interior furniture
- Kitchen chopping boards and worktops

**Disadvantages**
- Prone to warping
### Ash

#### Properties
- Tough
- Flexible
- Good elasticity

#### Uses
- Sports equipment
- Ladders
- Laminated furniture
- Tool handles

#### Advantages
- Flexible

#### Disadvantages
- Can become a bit splintered
MATERIALS FACTSHEET

Softwood

- Coniferous (cone-bearing, evergreen) trees.
- Reach maturity in about 30 years.
- Cheaper than hardwoods.
- More sustainable than hardwoods.
- Resinous (they have lots of resin).
- Various in colour (although generally pale yellow with brown streaks).
- Less dense than hardwoods.
- Prone to water damage (absorbs water if not treated)
- Examples of softwood—Pine.
Pine

**Properties**
- Lightweight

**Uses**
- Constructional woodwork (joists, roof trusses)
- Floorboards
- Children’s toys
- Garden decking

**Advantages**
- Nice colour and grain pattern
- Grows relatively quickly in comparison to hardwoods

**Disadvantages**
- Prone to warping
- Knots can fall out and leave holes
MATERIALS FACTSHEET

Man-made wood

- Waste wood is used to make MDF and chipboard.
- Plywood is made from layers of veneers glued together.
- All are made in a factory.
- Used in mass produced furniture.
- Examples of man-made wood—plywood, chipboard, medium density fibreboard (MDF) and hardboard.

**Advantages**
- Available in large flat sheets (2440x1220mm) so can be used for large pieces of furniture without having to join together.
- Doesn’t warp as much as natural timber.
- Can be decorated in many ways
- Can be flexible
- Waste wood used in making MDF, chipboard and hardboard.

**Disadvantages**
- Need sharp tools to cut and tools are easily blunted
- Thin sheets do not stay flat unless supported
- Difficult to cut traditional joints.
- Can generate harmful dust particles.
- Edges need to be treated to hide unsightly parts and also to stop water getting in.
# Plywood

## Properties
- Very strong in all directions
- Resistant to splitting because layers are in alternate directions

## Uses
- Boat building (exterior quality plywood)
- Drawer and wardrobe bottoms
- Cheaper grades used in construction industry for hoarding and shuttering

## Advantages
- Available in large sheets
- Thicker sheets will not warp or twist
- Thin sections can be laminated to create 2D shapes

## Disadvantages
- Thin sheets very flexible and will warp if not correctly stacked or supported

## Aesthetics
- Made of layers (veneers) normally 1.5mm thick
- Grain of each layer is at right angles to the layer either side of it, and there is an odd number so the outside layers run in the same direction
- Birch veneers used on the outside layers resulting in attractive surface
### Chipboard

#### Properties
- Made from waste products bonded together using very strong resins
- Strong in all directions although not as strong as plywood
- Not very resistant to water but moisture resistant grades available

#### Uses
- Large floor boards and decking for loft spaces
- Shelving
- Kitchen worktops
- Flat-packed furniture

#### Advantages
- Makes good use of waste materials that are chipped up

#### Disadvantages
- Not very good around water because it will soak it up
- Will chip and flake on edges if not protected

#### Aesthetics
- No grain patterns
- Surface often veneered or covered with a plastic laminate
### Medium Density Fibreboard (MDF)

#### Properties
- Very dense
- Stable and not affected by changing humidity levels
- Will break down and absorb water if it gets very wet

#### Uses
- Flat packed furniture
- Drawer bottoms
- Kitchen units
- Heat and sound insulation

#### Advantages
- Thin sheets can be formed to make 2D shapes

#### Disadvantages
- Not very good with water because it will soak it up at the edges

#### Aesthetics
- Excellent surface finish which can be veneered or painted
Hardboard

**Properties**
- Made from compressed fibres that have been soaked in resin before being compressed

**Uses**
- Drawer bottoms
- Cabinet backs
- Smoothing out uneven floors
- Lightweight internal door cladding

**Advantages**
- Cheapest of all manufactured boards

**Disadvantages**
- Not very strong as it has no grain

**Aesthetics**
- Side very smooth and underside textured