

Materials and their properties Timbers and Manufactured Boards

A: Natural Timbers		Manufactured Boards
Hardwood	Softwood	Manufactured Boards
		
<p>Hardwoods are usually obtained from deciduous trees, which lose their leaves in autumn.</p> <ul style="list-style-type: none"> Usually grow in warmer more humid climates, mainly in South America and Asia Grow slowly (80+ years) Are more difficult to sustain than softwoods Are more expensive than softwoods Are strong and hard wearing 	<p>Softwoods are usually obtained from coniferous trees, which are also known as evergreen trees. They grow quickly which makes them sustainable as they are renewable. This also makes them cheaper when compared to hardwoods.</p> <ul style="list-style-type: none"> Usually grow in colder climates and are mainly grown in Scandinavia and Northern Europe Grow thin, needle-like leaves Grow relatively quickly (30 years) Are easier to sustain than hardwood trees Are easy to cut and shape Are usually cheaper than hardwoods 	<p>Manufactured boards are made from the waste sections of felled trees - the parts which are of little use as planks. The wood is reduced to pulp, particles or thin strips and bonded together using special adhesives or resins. Manufactured boards are made as an alternative to natural timber.</p> <ul style="list-style-type: none"> Come in sheet form (usually 1.2 x 2.4m) Are extremely stable and of uniform thickness Are less expensive than laminating planks of timber Can be covered with veneers Are available in a variety of thicknesses (3, 6, 9, 12, 15, 18, 22mm)

B: Sustainable Timber

Wood is considered to be a sustainable material as trees can be grown to replace those used for timber or fuel. A big issue is that in many parts of the world timber is being used faster than trees are being replanted. This causes deforestation which is seen as a key factor to global warming.

To regulate this, the **Forest Stewardship Council (FSC)** are dedicated to ensuring that timber supplies are regulated and sustainably harvested.



C: Timber	Characteristics and uses of hardwoods
Teak	Hard and fine grained. It has a high oil content which makes it water resistant. Used for indoor and outdoor furniture, boat building, window frames and worktops.
Ash	Dense, hard and strong, but more pliable than oak so more easily worked and can be bent to shape. Used for furniture, tool handles, musical instruments and ladders.
Mahogany	Strong and durable, reddish brown in colour, it can provide wide plank sizes. Used for high quality furniture, musical instruments and boat building.
Oak	Strong, hard and open-grained, light brown in colour. Used for timber framed buildings, high quality furniture, flooring and barrels. The tannin in oak can corrode steel screws and fittings. Also used for wine corks (bark) and smoking foods (burned shavings).
Balsa	Strong and durable, lightweight, easy to work. Used for model making, floats and rafts.
Beech	Hard and strong with a close grain. Used in furniture, woodturning, toys, plywood veneers and wooden tools and handles.

D: Timber	Characteristics and uses of softwoods
Pine	The timber is light in colour and easily worked, although can contain knots that limit the sizes that can be put to use. Fast growing and therefore planted and harvested in great quantities. Used for furniture, panelling, floors, window frames and roof trusses.
Cedar	A hard, durable wood, also known for its fragrance, so has been used for storage chests and boxes. Also used for musical instruments and as shingles for roofing and to cover the outside of buildings.
Spruce	Lightweight and strong, straight-grained with a regular texture. It can contain resin pools that limit its use in large sizes. Used for musical instruments and in building.
Larch	Durable and water resistant with few knots. Used for posts and fencing, boats and as cladding on buildings.

E: Timber	Characteristics and uses of manufactured boards
Plywood	Three or more layers of sheet timber glued to form strong, wide boards, sometimes decoratively veneered on the outermost layer. It is widely used for flooring, sheds, boat building and the decorative effect of the layers can be used in furniture.
Blockboard	A core of softwood strips placed edge to edge and glued under pressure between thinner veneers. Used for worktops, doors, shelves and panelling.
Chipboard	A rigid board with a smooth surface made from wood particles glued under heat and pressure. It comes in a range of densities. Used for flooring, laminated worktops and flat pack furniture.
MDF	Fine wood particles glued under heat and pressure. It is dense and has a smooth flat surface with no grain or knots. Easily machined, but the adhesive can cause irritation to the eyes and lungs.

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F: Keywords

- Primary source: where materials originate (polymers from oil, timber from trees etc) and the raw material that needs to be converted into a workable form
- Softwood: timbers that come from coniferous (evergreen) trees
- Hardwood: timbers that come from deciduous trees
- Manufactured Boards: timbers that are made from the waste sections of felled trees—the parts which are of little use as planks

G: Video and web-links

- FSC video: <https://youtu.be/G9tzNI-HFic>
- FSC website: <https://www.fsc-uk.org/en-uk/about-fsc/what-is-fsc>
- How MDF is made: <https://www.youtube.com/watch?v=qitenYvpSx4>
- How wood for building construction is made: <https://www.youtube.com/watch?v=9h28uT2XNOM>

H: Samples of grain and colour surfaces



Revision Checklist

I know the primary source of materials for producing natural and manufactured timbers

I can recognise and characterise different types of natural and manufactured timbers

I understand how the physical and working properties of a range of natural and manufactured timbers affect their performance

I understand how sustainably harvested timber can help to reduce deforestation which is seen as a key factor in global warming

Test yourself

1. Name a suitable timber to make a children's toy and explain why it is suitable.
2. Which timbers are more expensive, softwoods or hardwoods? Why?
3. Describe the role of the FSC.
4. What is the primary source of timbers and manufactured boards?
5. Name a suitable timber to make flat pack furniture and explain why it is suitable.