Ebbsfleet ACADEMY

Subject: Design Technology Year: 11 Term: 1 Topic: Materials
Exam board: AQA
Course information: Design & Technology 8552

Knowledge Area	What You Must Know
Hardwood	Dense grain expensive wood from deciduous trees which resists moisture and rotting well (oak, Mahogany, Beech).
Softwood	Fast growing wood from pine (evergreen) trees that is cheap, grows fast but is poor outdoors. (Spruce, Fir, Redwood).
Paper types	Cartridge Paper, Greaseproof Paper, Tracing Paper, Laser Copier Paper. Layout Paper, Bleed proof paper.
Cardboard Types	Corrugated Card, Solid White Board, Foam-board, Duplex Board, Foil Lined Board.

Working Properties		Physical properties	
Key Terms	**Explanation**	**Key Terms**	**Explanation**
Strength	The ability to withstand breaking	**Electrical conductivity**	A material that will allow electricity to pass through it, Example – insulators
Hardness	The ability to withstand scratching and wear	**Thermal conductivity**	A material that will allow heat to pass through it, Example – conductors (metals)
Toughness	If a material is tough, it is hard to break or snap – the material changes shape instead	**Fusibility**	Materials with a high fusibility have a low melting point, Example - solder
Elasticity	Elastic materials can stretch and bend and return to their original shape Product Example - spring	**Density**	Density of a materials is the measure of its mass per unit volume. Density often has units of kg/m³
Malleability	To be hammered or pressed into shape without breaking or cracking	**Absorbency**	A material that is good at soaking up moisture. Product example – paper towels
Ductility	Ductile materials can be drawn into a wire		

Softwoods

Name	Appearance	Characteristics	Use
Larch	Pale to reddish brown with a contrasting grain	Durable, tough, good water resistance, good surface finish and machines well. Issues with loose knots	Exterior cladding, flooring, machined mouldings, furniture and joinery
Pine	Pale yellow to pale brown, attractive grain that darkens with age	Lightweight, easy to work, can split and be resinous near knots	Interior construction (and exterior if treated), cheaper furniture, decking
Spruce	White/cream a fine even grain	Easy to work, high stiffness to weight ratio. Variable results when staining	Construction, furniture and musical instruments
Redwood	Pinkish brown to deep reddish brown, straight grain	Easy to work and machines well, some rot resistance	Outdoor furniture, beams, posts, decking, veneers
Cedar	Reddish brown, with straight, fine even grain. Very aromatic	Easy to work, can blunt tools, finishes well, naturally resistant to rot	Outdoor furniture, fences, cladding for buildings, roof shingles

Hardwoods

Name	Appearance	Characteristics	Use
Ash	Pale brown/cream	Flexible, tough and shock resistant, laminates well	Sports equipment and tool handles
Beech	Dense/close grain with an attractive pink hue	Fine finish, tough and durable	Children's toys and models, furniture and veneers
Mahogany	Rich reddish brown	Easily worked, durable and finishes well	High end furniture and joinery, veneers
Oak	Light brown with an interesting and variable grain	Tough, hard and durable, high quality finish possible	Flooring, furniture, railway sleepers and veneers
Balsa	Pale cream/white. An open grained, large and unusually fast-growing hardwood tree	Very soft and spongy, very lightweight but can snap in thin sections	Prototyping and modelling – especially model aircraft

Manufactured Boards

Name	Appearance	Characteristics	Use
MDF (Medium Density fibreboard)	Smooth, dull, light brown finish available in many veneered options. Edges can be hard to finish as well	Rigid and stable, good value with a smooth, easy to finish surface. Very absorbent so not good in high damp areas	Flat pack furniture, toys, kitchen units and internal construction
Plywood	Alternating layers of natural grain veneers with outer material usually of a higher aesthetics	Very stable in all directions due to alternate layering at 90°, with outside layers running in the same direction.	Furniture, shelving, toys and construction. Interior, exterior and marine grades available for greater water resistance.
Chipboard	Pale grey/brown with no natural grain. Frequently covered with a laminate such as melamine formaldehyde (Formica®)	Good compressive strength, not water resistant unless treated, good value but prone to chipping on edges and corners	Flooring, low-end furniture, kitchen units and worktops