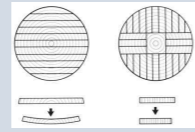


Materials: Wood: Types: Softwood (from quick growing conifers) - Pine, Spruce, Cedar . **Hardwood** (from broad leafed slow growing trees) - Oak, Beech, Ash, Mahogany, Teak. **Manmade boards** - Hardboard, chipboard, blackboard, Plywood, MDF



Metals: Ferrous (metals that contain iron) Steel, Iron. **Non-Ferrous** (metals that don't contain Iron) Aluminum, copper, zinc, gold. Alloy (mixture of metals) - Brass, Bronze

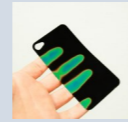
Plastic: Thermoplastics (can be re-used and re-heated) PET (bottles), HDPE (bowls, buckets) PVC (Window frames, guttering), LDPE (carrier bags, transparent packaging), Polypropylene (food containers), Polystyrene (Packaging, High impact polystyrene (toys), Acrylic (signs), Nylon (gears), ABS (safety helmets) **Thermosetting plastics** (cannot be reheated once moulded) - Epoxy resin, melamine formaldehyde, polyester resin, urea formaldehyde.



Modeling and prototype materials: Styrofoam, MDF, foam board, corrugated plastic (fluted board). Finishes on a model: Primer, spray paint, filler, wire, pipe cleaners, balsa

Composites: GRP, Carbon fibre, Kevlar. **Smart and modern materials:** Polymorph, Thermo chromic pigment, shape memory alloys, Nanotechnology

Glues: PVA (wood), contact adhesive, epoxy resin (2 different materials), hot glue gun (plastics/wood), acrylic cement /Tensol (acrylic), super glue

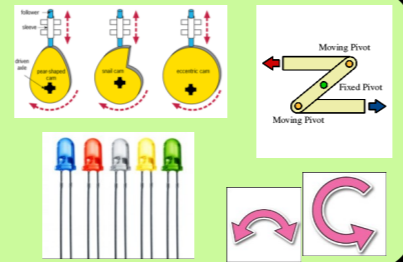


Systems:

Mechanisms: Levers, linkages, CAMS, pulleys, chain and sprocket

Types of motion: Rotary, Oscillating, linear, reciprocating

Electrical Systems: Power, LED's, wires, switches, motors, resistors



Components:

Fixings: Knockdown, frame connector, cam lock, worktop connector, corner plate, captive nut

Fixtures: Bales catch, latch, bolt, toggle latch, lid stay, drawer runners **Hinges:** Soft close, concealed, brass butt, steel butt, tee hinge

Joining: Nails, screws, nuts and bolts, rivets, washers



Design Influences:

Moral: Products should not offend others **Social:** Products should consider different types of users

Ergonomics: Designing a product with the comfort of the user in mind.

Anthropometrics: Using the measurements of people when designing products.

Analysing and evaluating products: ACCESS FM

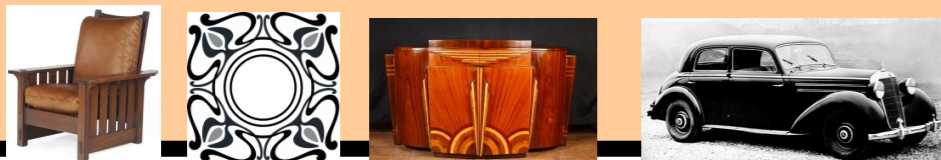
6 R's: Rethink, reduce, refuse, repair, reduce, recycle. Using these to minimise the impact of your product on the environment.

Recycled materials v's virgin material: less deforestation, reduced waste, less rubbish in landfill, less disruption of natural habitats.



Designers: Philippe Stark , Charles Rennie Mackintosh, Hugo Alvar Henrik Aalto

Design Movements: Pre-industrial revolution, Industrial revolution, Arts and Crafts, Art Nouveau, Bauhaus, Art Deco, Utility, post war design.



Health & Safety:

Risk assessment: Identifying the risk and taking precautions to prevent it.

Quality symbols: Kite mark BSI symbol for safety testing. CE mark is the European version.



H&S: PPE (gloves, goggles, visor, apron)



Emergency stop buttons/signage.

COSHH (control of substances hazardous to health)



GCSE Resistant Materials

CAD/CAM/ICT:

ICT: Excel, word, publisher, powerpoint. Used in business to track stock, write letters, present work.

CAD—Computer aided design: 2D design, illustrator, photoshop, sketch up.

Easy to edit, easy to email, more accurate. Expensive to set up, requires constant upgrades, requires training for staff.

CAM—Computer Aided Manufacture: Vinyl cutter, laser cutter, 3D printing, CNC lathe, CNC miller.

Accurate, multiple copies, fast, good for producing high quantities

Difficult to correct mistake, lot of skill, possible loss of jobs.

Communication:

Isometric drawing:



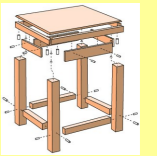
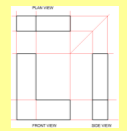
Perspective:

30 degree angle.

presentation work.

Used for Appears to get smaller .

Used for architecture.



Working drawings: Drawings used in the manufacture of products.

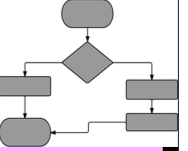
- **Orthographic Drawing:** Flat views of a product from the front, side and top.

- **Exploded drawings:** Shows all elements of the product spaced out from each other

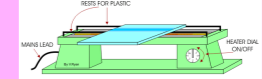
Processes

Scales of production-One off: Tailor made products (hand made table, bespoke wedding dress, school project). **Batch production:** Large quantities of identical products produced in one go. (Magazines, sandwiches). **Mass Production:** Highly automated production line manufacturing products by dividing up tasks into areas. (Electronic products, packaging). **Just in Time (JIT):** Manufacturing a product to order making it ready 'just in time'. (Sofas, cars).

Quality control—ensures products contain no faults and go to client as good as it could be. Costs money and time to implement. **Flow charts**

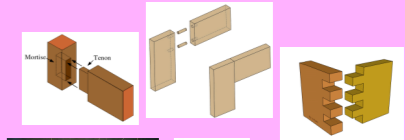


Processing Plastics: Vac forming (trays, blister packs), line bending.



Processing Metals: Sand casting, pewter casting, bending, forming

Processing Wood: Conversion (the process of cutting and slicing wood. **Seasoning** (the process of drying out wood). **Laminating** (layering wood), **turning**.



Joining wood: Butt, comb/finger, halving, dowel, mortise and tenon

Joining Metal: Soldering, welding, brazing, riveting



Systems: Using flow charts to plan the manufacture of products.

Preparing: Planer, disc sander, file, glass paper, wet and dry

Marking out: Pencil, scribe, spirit pen, chino graph pencil, ruler, try square, bevel, marking gauge, callipers, dividers, compass, centre punch



Cutting/Shaping: Tenon saw, coping saw, hacksaw, drilling, shearing,

Finishes: Oil, wax, stain, varnish, polish, sealer, paint, lacquer, plating, dip coating.

Power tools: Pillar drill, belt sander, wood laths, band saw, scroll saw (Hegna), milling machine, mortising machine, cordless drill, jigsaw, router, biscuit jointer, palm sander.



The client, designer, manufacturer

Market pull: the demand for a product from consumers forces the designer to make one. **Market push:** Designers introduce new products to consumers

Planned Obsolescence: Designing a product to only last a certain amount of time, so it needs replacing.

Product life cycle: design, evolution, growth, maturity, decline, replacement.

Client: Consumer choice, designer responsibility, the law, and recycling. Designing for a client, creating a customer profile, target market.

Designer: Design teams, design considerations, patents

Design Question Preparation

Consider what sort of public seating

Consider what materials you are more likely to use

Consider what processes you are more likely to use

Consider what differences there would be from a one off product to a mass produced version

Always add measurements

Always add materials

2017 design question topic:
'Public Seating'

Try to produce designs made from different materials to each other

Always include processes such as joining, finishing and moulding

