KS3 D&T
Recall and Homework Support Booklet

Name	
Class	

Subject Specific Vocabulary

Keywords for DT Core	
Key Word	**Definition**
Abrasive	A material, which smoothes and removes marks from wood, plastics and metal.
Acrylic	Is a type of thermoplastic, which is hard and often transparent, like glass.
Adhesive	A substance used to stick materials together; examples include pva glue, cow gum, low temperature hot melt glue.
Aesthetic Considerations	The area of design concerned with making products look attractive.
Alloy	A mix of two or more metals. For example, brass, pewter and casting alloy (chrome).
Aluminium	Is a lightweight metal that is extracted from the ore bauxite.
Annotations	Brief notes added to design sketches to make things clearer or to give more detail.
Anthropometric Data	Measurements of the human body that help designers to make their products to be ergonomic.
Appearance	The way something looks to an observer.
Apprenticeship	A job with training that allows people to gain a nationally recognised qualification.
Assembly	The way parts of a product are fitted together.
Assembly drawing	Drawing that shows how all the different parts of a product fit together, with each part identified by a number.
Automation	Using control systems to operate equipment.
Batch Production	Batch production refers to the process of making several single items at the same time to give a 'batch' of those items.
Battery	A device for pushing an electric current around a circuit. Batteries come in different voltages 1.5V, 3V, 4.5V, 6V and 9V. The bigger the voltage the harder the battery 'pushes' the electricity around the circuit. If the voltage is too large the components will overheat, stop working properly and may be destroyed.
Battery Holder	A device for holding batteries so that they are connected together to give the voltage you need. A battery holder containing four 1.5V batteries would supply 6V. It is important to make sure that the batteries are the right way round.
Battery Snap	A connector made from a press stud and wire, used for connecting battery holders and pp3 batteries to light bulbs, motors etc.
Bench Hook	A device to make it easy for students to saw strips of wood to length.
Biodegradable	Able to be broken down by the action of microorganisms.
Biodiesel	Fuel use din diesel powered vehicles that is made from plants, vegetables, cooking oil etc.
Biomass	Organic matter that is burned to produce heat, that heat can then be converted to electricity if required.
Biopolymer	A polymer made from plant matter.
Board	When paper is over 220gsm it is called a board.
Bracket	A device used to form a joint between two parts usually at right angles.

Key Word	Definition
Bradawl	A sharp tool for making small holes either through thin materials or into soft block materials; should be used under supervision.
Brainstorming	A way for a group of people to think of lots of ideas quickly.
Breadboard	A board that is used for prototyping and testing electronic circuits.
Brittleness	Inability to withstand sudden shock or stress (fractures when dropped/hit).
Built-in Obsolescence	Designing a product with a limited useful life.
Butt Joint	Two flat edges of a material are joined together without complicated connections.
Buzzer	An electrical component that makes a buzzing noise when connected to a battery.
CAD	Computer Aided Design: the designer uses the computer to help with the production of the design 'on screen' instead of developing the design by drawing on paper or making 3D models.
CAM	Computer Aided Manufacture. A non-circular wheel that rotates and moves a follower. It converts the rotary movement of the cam into reciprocating or oscillating movement of the follower. Sometimes a circular wheel mounted off-centre onto a shaft is used as a cam.
Carbon Fibre	Is a thin, strong filament of carbon, used as a strengthening material.
Carbon Footprint	The amount of CO2 emissions that can be directly or indirectly linked to a product or a manufacturer. The larger the carbon footprint the greater the environmental impact.
High Carbon Steel	Has properties that are determined mainly by the higher amount of carbon it contains (than mild steel). It can be tempered and hardened.
Centre Finder	A device used to mark the centre of a circle.
Characteristics of a Material	The physical properties of a particular material, e.g. its hardness, strength and stiffness.
Chuck	A clamp that will hold cylindrical items, such as drills or a rotating work piece on a lathe.
Circle Cutter	A useful tool, which can cut a circle from paper or card; should be used under supervision.
Circuit	An arrangement of components that provides a continuous pathway through which an electric current can flow.
Clearance fit	When one part is fitted loosely into another to allow the parts to move independently, or to stop a component, such as a screw from damaging the material it is fitted through (clearance hole).
Client	A person using the services of a designer. In school the client is likely to be the person who is going to use the final product but in the world outside school the client is often a manufacturer/seller, and it is their customers who use the final product.
CNC	Computer Numerically Controlled. Is a manufacturing method that automates the control, movement and precision of machine tools by sending data from a computer (CAD).
Collaboration	Working with others on a task.
Commercialism	Enterprise or business that puts profit above all else.
Commodity price	The cost of raw materials.
Component	The name given to one of the parts that make up a product.

Key Word	Definition
Composite	When one material (matrix) is reinforced with other materials to improve the properties of the original (matrix) material. E.g. Plywood or carbon fibre.
Computer modelling/simulation	Modelling a design on CAD to visualise it in 3d, or to simulate how something will work in real life, such as an electronic circuit simulation.
Construction Kit	A set of parts that can be assembled into a variety of working models which can then be taken to pieces e.g. Lego, Meccano.
Consumer/user	Anyone who purchases goods or services.
Continuous production	Non-stop manufacture of a product e.g. nails.
Corrosion	Metal alters/breaks down as it reacts with oxygen and water in the air. Rust is the corrosion of ferrous metals (iron and steel).
Craft Knife	A sharp single bladed knife used to cut paper, stiff card and sheet plastic; should only be used by older students under close supervision.
Critical evaluation	Identifying the positives and negatives from a range of areas to inform your design decisions.
Crank and slider	A mechanism that converts rotary motion to reciprocating motion and vice versa.
Crowd funding	A method of raising funds for a new enterprise, often using an online platform.
Culture	The way a group of people behave, dress, eat and live their lives. It can be influenced by religion, tradition, history and the locality, food sources and climate.
Demographic movement	The way a population changes as people migrate to different areas, often for work.
Density	Compactness of a material, defined as mass per unit volume (e.g. Grams per cm3).
Design Brief	A summary of the aims of a design and the kind of product that is needed. A closed brief says what the product will be. An open brief leaves it for the designer to decide.
Design Criteria/specification	A list describing the standards that a design must meet if it is to be successful.
Design Decisions	A product is the result of the design decisions made by the designer about things such as Why (is it needed?). Who (is the outcome meant for? Who is to be involved in its production?); What (should the outcome do? What should it be made from? What should the shape/colour be?
Design fixation	When designers stick to one idea instead of exploring new design avenues.
Design Proposal	A response to a design brief, a description of the product to be made in sufficient detail that the designer and/or the client can decide whether it is worth developing the proposal further.
Design-related Research	Research to find information that is useful in understanding a design brief and developing design ideas.
Designer	Any person who designs things.
Die	Is a tool used with a punch, when stamping, cutting or moulding resistant materials, to produce a desired shape.

Key Word	Definition
Disassemble	To look closely at or to take apart carefully so that the parts of a product may be inspected to find out their purpose.
Dowel	Is a small rod of wood, used to hold joints together.
Drill	A tool used for making small round holes in wood, plastic and metal.
Drill Bit	The cutting tool used in a drill. It is held in the chuck and cuts into the material as it rotates.
Drive Belt	Is a loop of flexible material that is used to transmit power between two pulleys on different shafts so that as one rotates the other rotates as well.
Ductility	The ability of a material to be drawn or stretched out.
Durability	The ability of a material to withstand weathering, deterioration and corrosion from use.
Eccentric	A circular wheel with an off-centre axle.
Elasticity	The ability of a material to bend or stretch and then to return to its original shape and size.
Electrical Component	A part of a product that is used in an electrical circuit e.g. a bulb, a motor, a buzzer.
Electrical Switch	A component that controls the flow of electricity by either turning it on or off or by changing the path along which it flows.
Electronic	An electronic device is one that uses components such as transistors to control the electric current passing through it.
Elevation	Is a view of a building or other object. It may be drawn from the front, back or side, or may be part of an orthographic drawing.
Engineer	Is someone who uses scientific knowledge to design, construct and maintain engines, machines or structures.
Enterprise	A business, particularly one started by someone with a new initiative or an innovative idea or product.
EPOS	Electronic Point of Sale. Is any computerized system, which may include devices such as barcode readers, scanners, and touchscreens, used to record sales and control stock?
Ergonomics	The study of how easy it is for people to use their working environment. An ergonomic product is easy and comfortable to use,
Ethics	Balancing behaviour with moral principles when carrying out an activity.
Ethical factors	The beliefs, moral values and traditions that affect the design of a product.
Evaluate	Assess how well a product or service meets the design criteria or specification.
Fabric	A thin, flexible sheet material usually made from woven or knitted textiles.
Fabrication	The cutting, shaping and joining of components.
Feedback loop	A loop in a program that goes back to an earlier point to keep repeating that part of the program.
Ferrous	Metal containing iron and magnetic. For example, cast iron, high carbon steel, mild steel and stainless steel.
File	A tool for removing burs from freshly sawn metal, or for shaping timber.
Finishing Techniques	Methods used to make the surface of wood, metal and plastic smooth; these usually involve the use of abrasive papers.

Key Word	Definition
Finite fossil fuels	Fuels that have a limited supply and cannot be replaced, for example, oil and coal.
Fixings	Things used to fix materials together, e.g. nails, screws, nuts and bolts.
Flow Chart	A way of planning how to carry out a task by drawing a sequence of boxes joined by arrows. Each box contains a short statement about one stage.
Foam Materials	Solid materials that include many air bubbles. Plastic foams are useful in design and technology. Expanded polystyrene is foam that comes as rigid lightweight sheets, blocks or 'bobbles'. It is used for packaging.
Follower	Usually, a slider or lever that is moved by a cam or an eccentric.
Font	A particular style or design of lettering.
Form	The product shape/style.
Former	Used to help shape or bent materials to exactly the same shape.
Six (6) R's	Reduce, Reuse, Recycle, Rethink, Repair, Refuse
Framework	A structure assembled from long thin parts as in a pylon or girder bridge.
Friction	The resistance to movement between two surfaces that are trying to slide against each other. Friction generates heat.
Fulcrum (pivot)	The point of support of a lever, around which it moves.
Function	The purpose of a product or part of a product as in the function of the handle in the whisk is to make the gear go round to drive the blades.
Functional Decoration	A decoration that also has a practical purpose e.g. wrapping a handle with string not only makes the handle look more attractive it also improves the grip.
G-Clamp	A device you can use to clamp bench hooks to tables for added stability and/or to hold work steady or to keep parts assembled while glue dries.
Gear	A toothed wheel, usually fixed to a shaft so that it rotates at the same speed as the shaft.
Gear Train	Gear wheels with teeth meshed together so that one drives the other.
Glass Paper	An abrasive paper used to smooth the rough edges of freshly sawn wood.
Glue Gun	A device for applying hot melt glue to parts to be joined together.
Grain	The grain in timber is the pattern of curves and lines that shows up when the wood is cut or polishes and are the result of the growth rings of the tree.
GSM (grams per square metre)	The weight in grams of one square metre of paper.
Hacksaw	Has an adjustable frame and a replaceable blade and is used for cutting metal and plastics.
Hardness	The ability of a material to resist scratching and indention.
Hardwood	Slow growing, normally deciduous, trees (loses leaves in winter). Seeds that the tree produces have a coating. These coatings can either take the shape of a fruit or a shell. For example, oak, ash, walnut, beech and maple.

Key Word	Definition
Hazard	Something that could cause harm to you or someone else.
Hydroelectric	Water trapped by a dam flow through turbines which make electricity.
Identifying user Needs	The process of looking at the behaviour and conditions of people and identifying what they need a product to be like.
Image Board	A collection of pictures, cut-outs from magazines or newspapers, quick sketches, especially taken photographs, to do with people. Pictures of the people themselves, where they live, where they work or go to school, what they do in their leisure time, all contribute to an image board.
Improvements	The process of making things better than they are at this moment in time, usually in response to an evaluation of a product or situation in which shortcomings have been identified.
Research Sources	Places to look for information that will be useful in helping to understand a design brief and develop design ideas e.g. books, magazines, radio and television programmes. The internet. Students can also use people as information sources.
Insulation	A material that is used to prevent heat transfer. It will keep cold things cold and hot things hot. Or a material that does not conduct an electric current and is used to cover wires that are carrying an electric current.
Internet of things	The interconnection of everyday products to the internet.
Investigate	To find out by personal enquiry and experiment. Many small tasks in D&T are investigations.
Isometric Projection	Is a drawing made up of vertical lines and lines inclined at 30˚ to the horizontal, to give the impression of three dimensions.
Iterative design process	Where you continually test, evaluate and refine your ideas.
Jigs	A jig is a device that allows a piece of wood, metal or plastic to be held and cut accurately to give a piece of a particular size without the need for measuring or marking out.
Joint	A means of connecting two pieces of material, some joints are permanent e.g. joints that are held together with an adhesive. Other joints are temporary e.g. joints held together by Velcro.
Junior Hacksaw	A handheld device for cutting plastic and metal strips to length. A small version of a hacksaw.
Knock-down fitting	Commercially produced mechanical joints used for flat-pack furniture.
Laminated	Layers of material that are glued together to improve the properties.
Lathe	Is a machine that can be used for shaping a material such as wood, plastic or metal by rotating it against a sharp tool (turning).
Lever	A rod pivoted on a fulcrum – the class of lever (1, 2 or 3) affects how much effort is needed to move the load.
Life-cycle Analysis	An analysis of all the environmental impacts linked to a product from the extraction of the raw material to its use and disposal.
Line Bender	Is a tool that heats up just a narrow strip on a plastic sheet so that it can be bent accurately.
Linear movement	Movement in a straight line in one direction, for example a train down a track.

Key Word	Definition
Linkage	Levers connected together via fixed and moving pivots; they are used to change the size of a force and/or the direction of motion.
Magnetism	Attracted to magnetic materials.
Malleability	The ability of a metal to permanently deform in all directions without cracking.
Manufacturing	This is the word used to describe the way that products are made in the world outside school. It usually implies making in quantity.
Manufactured Board	Manufactured board is commonly referred to as MDF and is made through the process of heating, gluing and compressing wood chips and sawdust together to create a wood-like composite. For example, plywood, particleboard, chipboard, fibreboard, MDF and veneer.
Market Research	The process of finding out which products and services people want and what they are likely to spend to get them.
Marketing	The process of making customers aware of products and services, attracting new customers to a product or service, keeping existing customers interested in a product or service, building and maintaining a customer base for a product or service. Advertisements play a large part in marketing.
Marking Gauge	Is a tool for measuring and scratching a line, usually on timber, parallel to one edge.
Marking Out	Preparing the material for manufacture by measuring and marking where to cut/drill etc.
Mass Production	Mass production refers to the process of manufacturing in the world outside school where products are made in their thousands. This requires the use of machines as well as people. Increasingly people are being replaced by machines that are computer controlled and can work 24 hours per day without rest.
Materials	The matter from which things are made e.g. wood, metal, plastic.
Material and Component Requirements	How materials and components are required to perform in the product.
Mechanical Component	A part of a product that is used in a mechanism e.g. a wheel, a gear, a pulley.
Mechanism	A set of mechanical components assembled together to perform a particular task e.g. a gear train to increase the speed of rotating parts as in a rotary whisk.
Mitre Block/saw	A device to allow a saw cut to be made at 45° so that two parts can be joined to form a right angle (90°). Can be used to cut other angles to create multi-sided shapes.
Modelling Design Ideas	The process of representing ideas from `inside the head' in a form that can be shared with oneself and others. The form of the model can be either 2D e.g. a sketch or diagram perhaps with notes, or 3D e.g. a construction from paper, card, straws, and pipe cleaners.
Modern materials	Materials that have been developed or engineered to have improved properties.
Modular	A design featuring parts of standard/set sizes so they can be constructed in different ways.
Monomer	A simple chain molecule that when bonded together from long chains known as polymers.

Key Word	Definition
Mood Board	A collection of colours and shapes of paper, card and fabric that evoke an emotional response. Designers and students can use image boards to decide on the right colours and convince others of their choice.
Mould	A hollow shape into which a liquid is poured and left to set solid to produce a product in the shape of the mould e.g. a casting mould or a plaster of Paris mould.
Net	A 2D shape that can be folded to give a 3D form, sometimes called a development.
Nitinol	An alloy of nickel and titanium that returns to original shape with heat/electrical charge.
Non-ferrous	Metal that does not contain iron and is not magnetic. For example, copper, aluminium, lead, zinc and tin.
One-off Production	This is the way students usually make things in school. They make a single item of their design idea, sometimes referred to as a one off. In the world outside school, one offs are often very expensive to buy as a lot of time and effort goes into producing the item.
Opaque	An opaque material is one that you cannot see through.
Optical properties	Ability to absorb or reflect light.
Orthographic projection/drawing	An orthographic drawing shows some or all of the different views of an object and its dimensions or measurements. It is normally drawn to an accurate scale.
Oscillating Movement	Swinging to and fro like a pendulum.
Packaging	The wrapping around products that is used to protect the product from damage, to keep the product clean, to extend shelf life, to promote the product and to provide information about the product.
Paper	A thin, flat material made from natural fibres, weighing less than 220gsm.
Performance Requirements	The requirements needed to make sure a product functions as well as possible.
Permanent Joining	A joining process in which the joining is permanent and not easily reversed e.g. gluing, welding.
Perspective Drawing	A 3d drawing that shows something getting smaller at its furthest points. Often used in architecture when drawing buildings.
Photovoltaics	Using solar (PV) cells to generate electrical power by converting the energy from the sun.
Pilot Hole	Is drilled as a guide before drilling a larger hole, sometimes to stop the material from splitting. Or drilled as a guide for a wood screw.
Pivot Joint	Is similar to a hinge, which allows two-piece of material to rotate relative to each other.
Plasticity	The ability of a material to permanently change in shape.
Pollution	The release of contaminating substances that are likely to harm the natural environment.
Polymer	Is a material that consists of long chains made up of many molecules. Commonly called plastic.
PPE	Personal Protective Equipment.
Precaution	The steps you take to avoid injury by a hazard.
Printability	How easily a material (normally paper or board) accepts printing onto its surface.

Key Word	Definition
Product	Any manufactured item.
Prototype	A first version of a product that shows how it works, what it looks like and can be used so that it can be fully evaluated. Most prototypes are one-offs, so they do not fully reflect the manufactured design. Most products produced by students are prototype models.
Pulley	A wheel used with a belt that grips onto it. There may be a groove in the pulley to help the belt grip.
Push Fit	A tight fit that will not allow two parts fitted together to move independently. You can use a push fit to join a wheel to an axle so that as the wheel turns the axle turns too. In this case, the axle will fit tightly in the hole in the wheel.
Quality Assurance/control	Is the process of checking and testing products at every stage of manufacture.
Questionnaire	A device consisting of a series of questions designed to elicit the views and opinions of those answering the questions.
Reciprocating Movement	Movement backwards and forwards in a straight line. For example, a lift.
Reinforcing	Strengthening or stiffening a part in a product so that it can perform its function better i.e. is less likely to break or bend.
Reliability	Will always perform in the same way, as expected, without failing.
Render	Add colouring or shading to a drawing.
Resistor	Is a component that resists the flow of electrical current.
Rotary movement	Something that is rotary spins or revolves. For example, a washing machine drum.
Rotate	Is to spin or turn on an axis.
Sandpaper	The common term for an abrasive paper used to smooth the rough edges of freshly sawn wood (glasspaper).
Sanding Block	A piece of cork or wood or plastic wrapped round with sandpaper.
Scale of Production	The number of a product that is made. From one-off up to continuous production.
Sensor	An electronic component that can detect changes in its surroundings e.g. a light sensor can detect changes in brightness; a heat sensor can detect changes in temperature.
Shear force	A force acting in opposite directions.
Sheet Material	Material in a form where the length and width are much greater than the thickness e.g. paper, card, fabric, corrugated plastic.
Smart materials	Modern materials that have physical properties that respond to an external input such as temperature, light, moisture, force etc.
Softwood	Relatively fast growing, coniferous (keeps leaves in winter), wood is easier to work with. Seeds do not have any type of coating and are instead dropped to the ground and left to the elements. For example, pine, redwood, larch, fir and cedar.
Stability	Ability to resist changes in shape over time.
Stiffness	That property of a material concerned with how difficult it is to bend. A stiff material is difficult to stretch or bend.
Stock form	The standard shapes and sizes that a material or component is available in.

Key Word	Definition
Strength	The ability of a material to withstand a BENDING force or a COMPRESSIVE (squashing) force or a TENSILE (stretching) force without breaking.
Styrofoam	A modelling foam.
Sustainability	Having a minimum impact on the environment, meaning we can meet the needs of the present but continue to use the same material/product/energy source to meet needs in the future.
Synthetic polymer	A polymer made mostly from crude oil.
Technical textile	A textile developed for its functions rather than its appearance.
Template	A template is a device that allows a shape to be drawn accurately and repeatedly onto a sheet of materials e.g. paper, card, wood, metal.
Temporary Joining	A joining process in which the joining is temporary and easily reversed e.g. screws.
Testing	Investigating a product or material to find out how it performs in use.
Tessellation	The arrangement of components to minimise waste.
Textiles	Any materials in the form of a cloth. These may be woven in which one set of threads passes over and under another set of threads at right angles to it to form the fabric or knitted in which a single thread forms rows of loops which interlock to form the fabric.
Thermochromic pigment	A pigment that changes colour with heat.
Thermoforming plastics	Plastics that can be heated and shaped many times.
Thermosetting Plastics	Can only be moulded into shape once and will eventually burn if reheated too much.
Tolerance	The allowable amount of variation of a stated measurement.
Torque	A measure of a systems turning power.
Toughness	The ability of a material to withstand blows or sudden shocks without breaking.
Translucent	A translucent material is one that transmits light, but you cannot see through it.
Transparent	A transparent material is one that you can see through.
Trend forecasting	Predicting the upcoming colours, textures, materials and graphics that will be in demand in the near future.
Turning	A method of producing cylindrical components with a lathe.
User centred design	The needs and wants of the user are considered at every stage when designing and developing a product.
User Needs	The basic requirements that must be met by a product to be effective, such as comfort, durability, or functionality.
User Wants/ Preferences	Extra requirements that a user may like a product to have, but that it doesn't need to have in order to function effectively. They aren't necessary, but could make the product desirable or appealing.
Vacuum Former	Moulds sheet thermoplastic, softening it by heating it, then uses a vacuum to form it over a pattern.
Vice	A device for holding materials or parts so that they are easy to work on.
Veneer	Is a very thin sheet of one material that can be glued onto the surface of another material.

Key Word	Definition
Warp	Yarn following the length of a fabric.
Wasting	Removing unwanted material.
Weave	The way yarns are laid in a pattern/formation in the construction of fabric.
Weft	Yarn running horizontally across a fabric.
Working Drawing	Plans which show how a product may be made.
Working properties	The abilities of a material which affect how it behaves when in use.
Yarn	A spun thread used for weaving and knitting.

Keywords for GCSE Timbers Specialism	
Key Word	**Definition**
Conversion	Cutting trees into planks.
Coping saw	Has a narrow blade that can be used for cutting shapes in wood and plastics.
Deciduous	A tree that loses its leaves in winter.
Dowels	Wooden rods.
Felling	The process of cutting down trees.
Ironmongery	Parts that can be bought to go on wooden products e.g. Hinges, handles etc.
Jigsaw	A powered saw used to cut large thin pieces of wood.
Mortising	Cutting a square or rectangular hole in wood.
Moulding	Specially shaped long thin strips of shaped wood. E.g., for using round a door or for a picture frame.
PAR	Planed all round.
Planing	Removing wood from the edge of a piece of timber.
PSE	Planed square edge.
PVA	Polyvinyl acetate, a commonly used wood glue.
Routing	A machine with a rotating cutter used to cut slots in timber, or to cut a profile on the edge.
Seasoning	Drying out newly felled timber.
Shellac	A cloudy liquid secreted by a beetle. Applied in layers and polished in between to create a French polish finish.
Tanalising	Pressure treatment of timber with preservatives to improve its resistance to weathering.
Tenon Saw	A solid bladed saw used for cutting straight cuts through timber.
Try Square	Is a tool for measuring or marking out accurate right angles on wood.
Varnish	A clear coating used to protect the wood.
Warping	Bending or twisting that happens to timber as it dries out.
Wood Stain	Is a dye used to colour wood.

Keywords for GCSE Metals Specialism	
Key Word	**Definition**
Annealing	Restore the initial structure of a material (after working it) by heating and allowing to cool.
Anodising	An electrochemical process in which an oxide layer is formed on the surface of a metal.
Billet	A stock form of metal used when casting or extruding.
Case Hardening	Make the outside surface of steel harder than the inside core, by heating and dipping into carbon powder.
Cast	To pour molten materials into moulds so that they solidify to produce shapes that may be quite complex.
Die	Is a plate with holes through which softened metal is pushed (extrusion).
Dip-coating	Is lowering a heated metal object into plastic granules to cover it with a protective coating.
Electroplating	Coating one metal with another metal using an electrolytic process.
Engineers Square	Is a tool for measuring or marking out accurate right angles on metal.
Extrusion	The process of creating a long length of a material (e.g. metal or polymer) with a consistent cross-section.
Forging	Shaping metal by heating and hammering.
Galvanising	coating steel with zinc using a hot dip method.
Gauge	a unit of measurement for sheet metal, and wire.
Hardening	Making high carbon steel harder by heating then dipping in cold water (quenching) - can make it brittle.
Hard Solder	Is used, with heat, to join metals; it melts at a higher temperature and makes a stronger join than soft solder. It is still weaker than brazing.
Milling	A method of slotting, grooving and flattening metal using a milling machine.
Pattern	Used to make a mould when casting in metal or plastic resin. It is a replica of the finished object and may be made in wood or another soft material.
Planish	Is to use a specially shaped hammer to smooth and shape metal, producing a decorative finish.
Plate metal	When metal is over 3mm thick it is called plate rather than sheet.
Powder coating	coating metal with a polymer by electrostatic spraying then heating.
Rivet	Is a soft metal rod used for joining materials; it is passed through holes in the material and hammered to tighten and shape the head. Pop rivets are fixed using a rivet gun.
Stamping	Pressing a sheet of metal into a shape.
Tapping	A method of producing internal screw threads.
Tempering	Heating a metal gently after hardening to remove the brittleness and allowing to cool.
Threading	A method of producing external screw threads.
Tin Snips	Are tools, used in the same way as scissors, to cut metal sheet.
Weld	Is to permanently join materials, usually steel, by heating them to melting point.

Literacy Skills: Sentence Starters

Big Question: How could you use sentence starters to help to explain your ideas?

In Design and Technology, **it's important that you can communicate your thoughts and ideas through a range of methods**. Speaking and writing are often used but it can be difficult, sometimes, to get your ideas across to others, e.g. a teacher, a student or an Examiner. Using sentence starters to get your ideas across is a great way to get yourself started!

If explaining or writing a **Design Brief**

- *I am going to design and make…*
- *...the problem I am solving with my [product] is… My [product] will be made of…*
- *The aesthetics will be in the style of…*
- *The exterior will feature smooth curves and bold colours to capture…..*
- *The design should engage and educate children...*
- *The intended function of the [product] will be…*
- *The [product] will demonstrate various movements such as …*
- *The [product] will be used … (When?) (Where?)*

If explaining or writing a **Design Specification**

- *The style of the [product] will be…*
- *The finish I intend to use on the [product] will be… To ensure my [product] is safe to I will…*
- *The intended user for my [product] is aimed at… I will be making my product out of...*
- *My research tells me that…*
- *The [product] needs to be the following dimensions…. mm*
- *I intend to spend £...making the [product] and I intend to sell the [product] for £… making a profit of £….*

Annotations– these are often used when designing a product or listing out ideas and thoughts

- In this design I have used...this style….
- I intend to use this finish… with my design
- I will use… processes to create this design
- I feel this will be a suitable design to make because …
- I don't like this design because…
- By making these changes I can improve and develop my design by adding (or taking away)…

Evaluation - use this to explain how successful/not an outcome or product is

- Overall, I am feeling my [product] is a [success/ failure] because…
- I found the making process [hard/difficult/easy]… because...
- f I was going to do the project again I would change… to improve it
- I would like to add this… to the [product]

Product Analysis – here, think about cost, materials, quality, aesthetics, etc. of existing products already in use

- I have found that products in my target market have a similar…
- I will take inspiration from this product by…
- This product has… which I can use in my design
- I like the way this product has been made to...
- This product could be adapted by adding...

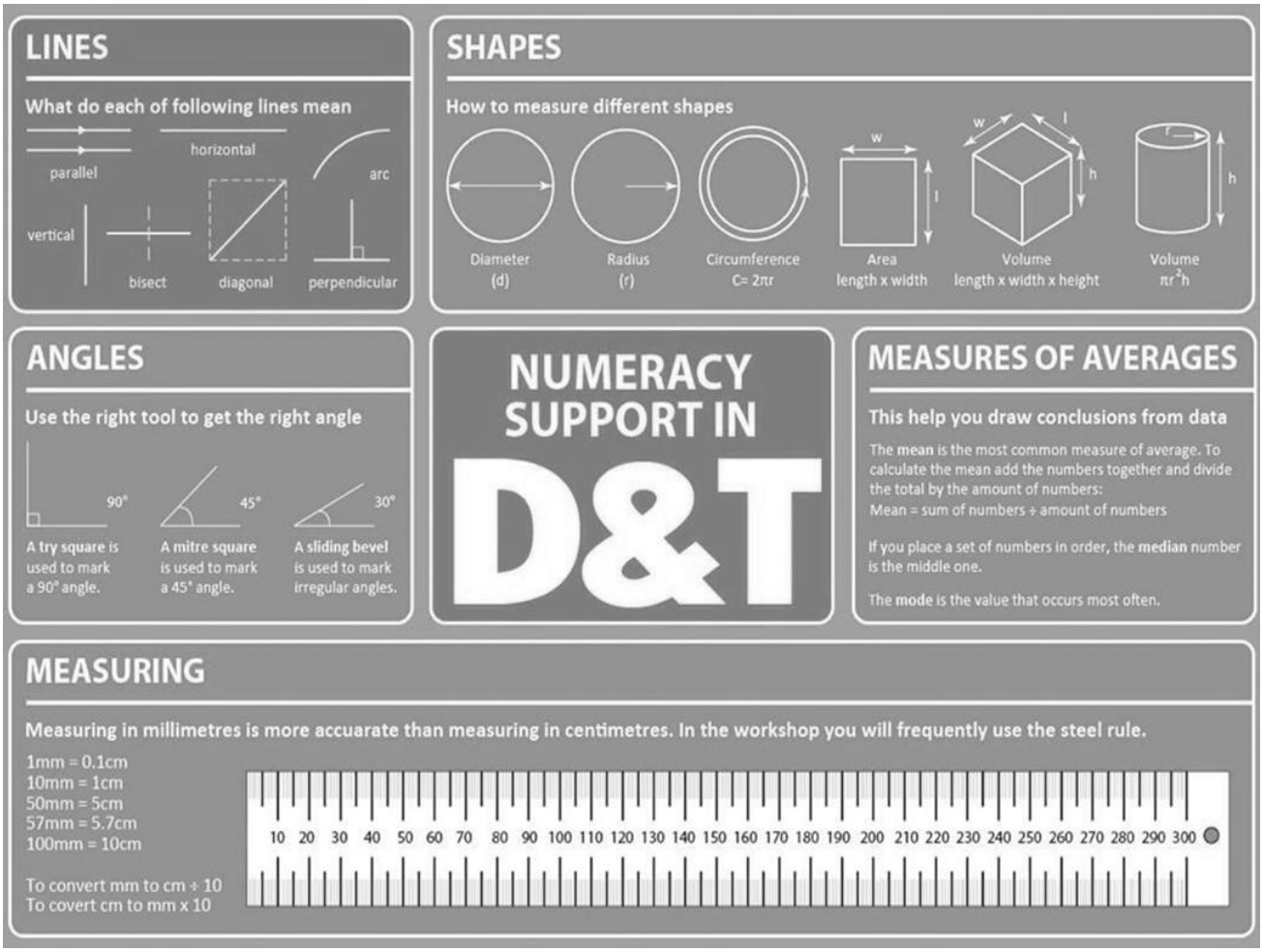
Numeracy Skills

Big Question: Do you know the importance of using a ruler? What is the relationships between **centimetres** (cm's) and **millimetres** (mm's)?

Being able to use a ruler in D&T is very important to let you measure the length and width of different objects. To draw straight lines and lots of other times where accurate measurements are needed

CM to MM - 0.5cm = 5 mm, 1 cm = 10 mm, 1.5cm = 15mm, 2cm = 20mm, 2.5cm = 25mm, 3cm = 30mm, 78mm = 7.8cm, 42mm = 4.2cm, 36mm = 3.6cm, 46.3mm = 4.63cm, 182.7mm = 18.27 cm etc.

MM to CM – 45mm = 4.5cm, 50mm = 5 cm, 65mm = 6.5cm, 82mm = 8.2cm, 124mm = 12.4cm, 263cm = 2630mm, 66cm = 660mm, 108.3cm = 1083mm, 626.62cm = 6266.20mm etc.



Information to Support Homework

Materials

Acrylic is a type of plastic. Oak is a type of wood. Steel is a type of metal. Properties is the characteristics of a material and how it behaves under certain conditions. Transparent is a see-through material. Strength has the ability to resist deformation. Toughness has the ability to absorb energy without fracturing. Durability has the ability to withstand wear and tear. Thermoforming ability can be heated and shaped. Conductivity has the ability to transmit electricity or heat it. The deterioration of metal due to interaction with its environment is called corrosion. Thermoplastic can be reheated and reshaped. Thermoset plastic can be heated and shaped only once. Acrylic is classed a s a thermoplastic. A thermoset plastic is melamine. Ferrous metals are those which are iron based. They contain Iron and carbon in varying amounts. It is Magnetic. For example, cast iron, high carbon steel, mild steel and stainless steel. Non-Ferrous Metals do not contain iron. There are many different metals that fall into this group. For example, copper, aluminium, lead, zinc and tin. An Alloy is a mixture of metals or a metal and a non metal intermixed. For example, brass, pewter and casting alloy (chrome). Rigid polystyrene is an insulator. Materials which decompose naturally are known as biodegradable. Softwood is a relatively fast growing, coniferous (keeps leaves in winter), wood is easier to work with. Seeds don't have any type of coating and are instead dropped to the ground and left to the elements. For example, pine, redwood, larch, fir and cedar. Hardwood is slow growing, deciduous (loses leaves in winter), wood is harder to work with. Seeds that the tree produces have a coating. These coatings can either take the shape of a fruit or a shell. For example, oak, ash, walnut, maple and beech. Manufactured board is commonly referred to as MDF and is made through the process of heating, gluing, and compressing wood chips and sawdust together to create a wood-like composite. For example, plywood, particleboard, chipboard, fibreboard, MDF and Veneer. Engineered wood is an alternative name for manufactured wood.

Tools and Equipment

A vice helps clamp work together and to a wood bench. To check a right angle, you need use a try square. There are a number of tools and materials to smooth edges. For example, hand file, sandpaper and rasp. I tis important to use the right hammer to drive in nails. There are many different types of PPE, for example, google, masks, ear defenders etc. The best tool to use to mark lines on metal is a scriber and the best tool to mark a hole is a centre punch. There are different types of saws. To cut wood you can use a coping saw (good for cutting curves), tenon saw, scroll saw (reciprocating blade) and bandsaw (has a continuous tooth blade). To cut metal you can use a scroll saw, bandsaw and a hacksaw. A wood chisel is used to cut and carve wood. A polisher machine applies a shiny finish to materials. Vacuum former is a piece of equipment that produces plastic moulds. A strip heater heats and bends plastic. The part of the pillar drill which you insert a drill bit into is known as the chuck and the part that allows you to set a specific drilling depth is a depth stop. A belt sander helps remove waste material quicky. A welder uses high levels of heat to form a strong bond between metals. A soldering iron permanently joins electronic components. A computer-controlled machine used for precision carving, engraving and cutting is a CNC Lathe. A jig is a custom-made tool which acts as a manufacturing aid in the workshop. An extraction system removes dust and fumes from the workshop.

Information to Support Homework

The Design Process

A design brief is a short statement which outlines the design task. Research is very important and provides information about a potential new product or the person that will use it. A group of clients whom a product is marketed to or designed for is called a target market. A specification is the exact details how a product should be designed and manufactured. Concept is the generating and creating of design and ideas. Annotation is adding short notes to your work to help communicate your vision and ideas. Measurements are very important when creating working drawings. Fabricating and manufacturing a new product is called manufacturing. Quality control is carried out to ensure that a product is manufactured to the correct specifications and to a high standard. Testing and judging a newly designed product is part of the evaluation process. Modifications or changes may take place after a product has been manufactured and evaluated. An advantage of Computer Aided Design (CAD) is that it is easy to edit. Computer Aided Manufacture (CAM) is the use of software to control machine tools in the manufacturing of work pieces. A mock-up is a quick and cheap model of a potential product and a prototype is a one-off fully functioning product. The intended purpose of a product is described as the function. Aesthetics is the visual qualities of a design or product. The idea that the shape of a product is mainly determined by its function is called a form follows function. 'Design for Disassembly' is important for recycling. Design for human comfort and efficiency is called ergonomics. Design for manufacture is efficient, cost effective and scalable production. Packaging protects products for transport. Limitations or restrictions that influence the design process is called design constraints. The ability to continue using raw materials to manufacture a product is called security as it enables the company to continue to trade and secure jobs for its workforce.

Manufacturing Processes

The process of transferring a design or template onto a workpiece is known as marking out and removing unwanted material or making a material smooth is known as sanding. Drilling creates a hole in piece of work before adding screws, dowels etc. Polishing is the process of applying a shiny finish to material. Soldering connects electronics components together and welding joins metals together permanently. Assembling is the process of putting all the parts of a product together. Vacuum forming is the process of shaping plastic using a mould and air extraction system. It is important to taper sides in order to remove the mould when vacuum forming. PVC is a suitable material to use when vacuum forming. Laser cutting could be classed as a subtractive manufacturing process. 3D printing could be classed as an additive manufacturing process. I tis important to measure twice and cut once to avoid the wastage of materials. Sandpaper comes in different grits. The smoother the grit the higher the number and the courser the grit the lower the number. Steel wool can be used on metal to apply a finish. Liquid cement can be used on acrylic to join it together permanently. Varnish or natural oil can be used on wood to provide a glossy protective finish. It is important to drill a pilot hole before drilling a larger hole. A clearance hole is big enough to accommodate the shank of a screw. A countersunk hole is large enough to fir the head of a screw. A nut and bolt is a semi-permanent joining method and a permanent method is glue. An advantage of suing manufactured wood over natural wood is its durability.

Information to Support Homework

Electronics

Electronics is the study of how electricity is used to control the flow of electrons and manipulate information, often in devices that process and transmit signals. It's a field that encompasses both physics and engineering, focusing on how electrons behave and how they can be used to create useful devices. Electricity is the follow of electronics. Current is the flow of electricity in a circuit. Red is a positive in a circuit and black is a negative. Conductor is a material which allows electricity to pass through it and an example is copper. An insulator prevents electricity from passing through it and an example is polystyrene. A Light Emitting Diode (LED) is a semiconductor device that emits light when an electric current flows though it. A component to slow down and electric current is a resistor. The unit of resistance is ohm (Ω). The ohm (Ω) is the unit of electrical resistance in the International System of Units (SI). It is defined as the resistance between two points on a conductor when a current of one ampere (amp) flows with a voltage of one volt applied across its terminals. A switch is an input component and a buzzer is an output component.

Mechanisms

Mechanisms are a system of parts working together to carry out a particular function. There are four different types of motion that aid us in everyday life; Linear, Oscillating, Reciprocating and Rotary. Linear motion is movement in a straight line. An example of linear motion is the cutting arm of a paper guillotine (below) as it travels from one side of the machine to the other. E.g. Paper cutter, a car driving in a straight line, and a vice. Oscillating motion is movement backwards and forwards in a circular arc. E.g. playground swings (photo) and clock pendulums. E.g. Swings, mass on a pendulum and pendulum on a clock. Reciprocating motion is a backwards and forwards movement in a straight line. Sewing machine needles work with this type of motion. E.g. Needle of a sewing machine violin, a file and hacksaw. When something moves in a circle it is called rotary motion. Fairground 'Big Wheels' and wind farm turbine blades move with rotary motion. E.g. Wind turbine, a wheel, clock and a windmill. A force causes an object to move. A seesaw is a lever type of mechanism. A tooth wheel is also known as a gear. A component that is used to connect two pulleys together is a belt. The fulcrum of a lever is also known as a pivot. Mesh is a word that describes the interlocking of teeth between two gears. Lubrication is used to reduce friction between moving parts in a mechanism.

A CAM is a mechanism which changes rotary motion into reciprocating motion. For example, eccentric, snail, heart, square and pear. he rise is the distance that the follower moves up. The fall is the distance that the follower moves down. The stroke is one full rise and fall of the follower. The dwell is the period during which the follower does not move. The profile is the outer edge of the CAM. The axle is the fixed rotating position of the CAM.