

KS4 'Design and Technology' Curriculum Coverage



Year 10-11

Sequenced	Model Cabinet	Box	Clock	Pen	Chocolate Mould
Key Knowledge	To know: <ul style="list-style-type: none"> Know how to analyse and develop ideas from the Challenge Question understand how and why we model ideas Know how to write a specification know how to evaluate work know what a CAD drawing is Know a range of tool names and their uses 	To know: <ul style="list-style-type: none"> Know how to analyse and develop ideas from the Challenge Question Know how to write a specification Know what box joints are suitable for their work know how to evaluate their work Know what orthographic and isometric drawing techniques are Know a range of specific tool names and their uses 	To know: <ul style="list-style-type: none"> Know how to analyse and develop ideas from the Challenge Question Know how to produce sketches of their ideas understand how and why we model ideas Know how to develop ideas using CAD and CAM know how to evaluate work 	To know: <ul style="list-style-type: none"> Know how to analyse and develop ideas from the Challenge Question Know how to produce workable and realistic sketches of their ideas Know how to develop appropriate ideas using CAD and CAM 	To know: <ul style="list-style-type: none"> Know how to analyse and develop ideas from the Challenge Question Know a wide range of specific tool names and their uses understand how to use the vacuum forming machine
Key Skills	To be able to: <ul style="list-style-type: none"> use tools equipment and machinery safely and accurately be safe and accurate in the use of tools, machinery and equipment be able to spot hazards have an awareness of safety procedures be able to evaluate and annotate work be able to develop and improve their work work effectively as an individual 	To be able to: <ul style="list-style-type: none"> be able to select the correct tools and equipment be safe and accurate in the use of tools, machinery and equipment be able to sketch design ideas be able to spot hazards be able to use accurate measuring and marking skills be able to annotate and evaluate their work be able to develop and improve their work work effectively as an individual 	To be able to: <ul style="list-style-type: none"> to be able to sketch design ideas by hand be able to evaluate and annotate their work be able to develop and improve their work through different modelling and manufacturing techniques work effectively as an individual 	To be able to: <ul style="list-style-type: none"> be able to analyse and develop ideas from existing designs and products be able to develop and improve their work through different modelling and manufacturing techniques 	To be able to: <ul style="list-style-type: none"> be able to select the correct tools and equipment be safe and accurate in the use of tools, machinery and equipment be able to develop and improve their work work effectively as an individual
	Tier 3 key vocabulary	Tier 3 key vocabulary	Tier 3 key vocabulary	Tier 3 key vocabulary	Tier 3 key vocabulary
Subject specific	<ul style="list-style-type: none"> model design heat treatment MDF HIPS plywood thermoplastics thermosetting plastics orthographic projection isometric drawing 	<ul style="list-style-type: none"> shoulder joint butt joint dowelled joint ploughed groove marking gauge annotate engrave redwood setting out rod 2D design Ploughed groove laser cutter 	<ul style="list-style-type: none"> 2D design CAD materials laser cutter evaluate design lifecycle finish lacquer stain assemble 	<ul style="list-style-type: none"> design brief analysis research design ideas acrylic lifecycle specification manufacturing evaluation 	<ul style="list-style-type: none"> MDF HIPS thermoplastic thermosetting smart materials former mould greyboard

Year 10-11

Sequenced	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	unit 6
Key Knowledge	<p>To know:</p> <ul style="list-style-type: none"> Know how new technology has affected children and people with disabilities Know that new technologies need to be developed and produced in a sustainable way Know the impact that excessive use of certain resources has on the environment Know how products are produced in different volumes Know the impact of science and technology parks on local area and demographic movement Know how population movement and social segregation can be influenced by technologies Know how the environment can be protected by responsible design and manufacturing with regards to pollution and transportation costs Know how waste can be separated or disposed of with the least impact Know the impacts new products have on the environment Know ethical and environmental concerns when designing with new technologies 	<p>To know:</p> <ul style="list-style-type: none"> Critically evaluate an existing product using given criteria Know how budget and timescale affects manufacture Know how global warming is caused and how it can be slowed Know the difference between ethics and the law Know the term fair trade Be aware of energy usage in the production of new materials Know the environmental impact of material selection Know the term 'carbon footprint' Know the term life Cycle Assessment Know how ethical factors can inform design and manufacturing decisions Know how a manufacturer can reduce the carbon footprint Know how human intervention and technology can help reduce the effects of global warming 	<p>To know:</p> <ul style="list-style-type: none"> Name and define a range of modern, smart and composite materials Identify the properties for a range of technical textiles Recognise and describe a range of input and output components, physically and symbolically Know that all systems comprise of one or more inputs, processes and outputs Recognise different types of mechanical movement State examples of first, second and third order levers Know how linkages change the direction of movement Know how the action of forces, levers and gears transmit and transform the effects of forces Know the unique properties and uses of technical textiles 	<p>To know</p> <ul style="list-style-type: none"> Identify the fundamental differences in structure between the main categories for each material area Know of the working properties of a range of materials and how this affects their performance Name and identify most of the primary sources of raw materials for producing specific materials in each of the five categories Recognise a wide range of different materials from each of the Know and explain the physical structure of the main categories for each material area 	<p>To know:</p> <ul style="list-style-type: none"> Know how to investigate a given product and the work of others Know how investigating the work of other designers and companies can inform design Appreciate the diverse needs and values of different social, ethnic and economic groups Explain the opportunities and constraints resulting from environmental, social and economic factors Describe how products can be designed and analysed to reduce environmental impact Explain how products are developed according to the capabilities of humans and machines Be aware of a range of techniques to support clear communication and presentation of design ideas 	<p>To know:</p> <ul style="list-style-type: none"> Know the main processes involved in producing workable forms of timber Explain sustainability and ethical factors in timber production and in use Know the role of FSC and PEFC organisations Name the common commercial stock forms, types and sizes of timber-based materials Identify different types of knock-down fittings Explain how timbers and boards are selected and processed for commercial products Know the processes of conversion and seasoning Know the consequences of illegal logging Describe the production and use of veneer Explain the advantages and disadvantages of manufactured board compared with natural wood
Key Skills	<p>To be able to:</p> <ul style="list-style-type: none"> Explain how the Internet of Things (IoT), remote working and video conferencing has developed with new and emerging technologies Explain when and why different manufacturing methods are used for different production volumes Identify changes in job roles due to the emergence of new ways of working Explain how the workforce and wages have been affected by changes in technology including changes in hours and shift patterns Explain the effect of new technology on staff and apprenticeships Demonstrate how computers and automation have changed manufacturing Explain the impact of new and emerging technologies on tools and equipment Explain how 'robotics' have affected the workplace State what is meant by privately-owned and not-for-profit organisations 	<p>To be able to:</p> <ul style="list-style-type: none"> Give examples of where new and emerging technologies have been used in disaster recovery, medicine, travel, effect on global warming and communications Explain the effects of global warming on the world's climate Consider the working conditions of employees in the production of new materials Apply findings from an evaluation of an existing product to the design of a new product Explain how material selection affects performance and manufacturing capabilities Apply knowledge of contemporary and future scenarios to the design decision making process Conduct a basic Life Cycle Assessment on a product and make conclusions regarding carbon emissions 	<p>To be able to:</p> <ul style="list-style-type: none"> Explain how power is generated from fossil fuels including oil, gas and coal Explain how renewable energy is generated from a variety of sources Explain the use of batteries to power portable systems Justify where the use of a technical textile might be suitable Suggest a suitable input or output device for a given scenario Know how to turn one form of motion into another Recognise different types of cams and followers Argue for and against the selection of fossil fuels or renewable energy 	<p>To be able to:</p> <ul style="list-style-type: none"> Be able to identify the working properties of a wide range of materials and how this affects their performance in use Categorise most of the specific materials into their appropriate areas 	<p>To be able to:</p> <ul style="list-style-type: none"> List some opportunities and constraints resulting from environmental, social and economic factors Explain design fixation and how to avoid it Explain how to develop, communicate and record design ideas Be able to use a range of design strategies to help produce imaginative and creative design ideas Know how to investigate, analyse and evaluate a given product and the work of others Explain how to develop, communicate, record and justify design ideas 	<p>To be able to:</p> <ul style="list-style-type: none"> demonstrate how materials are cut, shaped and formed to a tolerance Identify techniques for preparation and application of treatments and finishes to enhance functional and aesthetic properties Describe school-based cutting, forming and processing techniques, tools and equipment Explain how common faults in timber can be reduced or avoided Identify and explain the comparative advantages of different wood joints

	Tier 3 key vocabulary	Tier 3 key vocabulary	Tier 3 key vocabulary	Tier 3 key vocabulary	Tier 3 key vocabulary	Tier 3 key vocabulary
Subject specific	Emerging technology, robotics, automation, workplace, workforce, demographic movement, migration, privately-owned business, crowdfunding, not-for-profit organisations, finite, non-finite, pollution, global warming, materials separation, apprenticeships, early-adopter, social segregation, Internet of Things (IoT), remote working, videoconferencing, standardised components, JIT, lean manufacturing, volumes, one-off, prototype, jig, pattern, template, batch, mass production, continuous production.	Budget, constraint, contemporary, ethics, environment, manufacturing, labour, shipping, evaluation, global warming, climate, communication, emissions, greenhouse effect, gases, atmosphere, legislation, battery, carbon, fair trade, energy, consumption, life cycle analysis, sustainability, origin, slavery, carbon footprint, distribution, recycling, end of life.	Power, coal, gas, oil, fossil fuel, wind, solar, tidal, hydroelectric, biofuel, renewable energy, batteries, cells, mains electricity, National Grid, kWh, LCD, nanomaterials, modern material, smart material, shape memory alloy, reactive glass, piezoelectric material, heat responsive polymers, conductive ink, composite material, robotic materials, CRP, GRP, reinforced polymers, reinforced concrete, technical textiles, agro-textiles, geo-textiles, microfibres, sensors, input, output, sensors, analogue, digital, microcontroller, movement, lever, linkage, rotary system, cam and follower, gear train, pulley and belt, mechanical advantage, velocity ratio, efficiency, systems diagram, flowchart, time delay, counting.	Alloy, ferrous, ferrite, iron, brass, stainless steel, patina, ore, extraction, smelting, electrolysis, aluminium, blast furnace, mining, ductile, malleable, hardness, toughness, molecular structure, rust, carbon, cast iron, mild steel, oxidation, conductivity, copper, board, cellulose fibre, pulp, sizing, GSM, micron, cartridge paper, translucency, corrugated, biodegradability, flexibility, printability, degrade, laminated, polymer, monomer, crude oil, thermosetting, thermoplastic, thermoforming, durability, insulator, glass reinforced plastic, moulding, HIPS, acrylic, polyester, resin, urea formaldehyde, wool, cotton, poly cotton, synthetic fibres, woven and non-woven fabrics, knitted, elasticity, resilience, durability, twill, weft, warp, felt, manufactured boards, timber, strength-to-weight ratio, felling, seasoning, softwood, hardwood, end grain, mahogany, oak, beech, pine, plywood, larch, cedar, MDF, tonewood, veneer.	Social, economic, environmental, ethnic, culture, capabilities, corporate social responsibility, carbon footprint, Fairtrade, co-operatives, carbon offsetting, 'green' design, reduce, reuse, recycle recover, mono-material, disassembly, over moulding, maintenance, life cycle analysis, ergonomics, form, function, client/user requirements, performance requirements, components, systems, scale of production, sustainability, aesthetics, marketability, innovation, design fixation, collaboration, user-centred design, systems approach, technique, biomimicry, iterative design, communication, presentation, isometric, perspective, oblique, schematic diagrams, orthographic, models, testing, evaluation.	timber, conversion, cultivation, harvesting, plantation, thinning, felling, planed all round, rough sawn, green timber, seasoning, fault, bowing, splitting, cupping, twisting, desertification, deforestation, lamination, veneer, compression, stock form, standardisation, moulding, self-tapping, countersink, dowel, knock-down fitting, connecting block, cross-dowel, cam lock, plane, surform, rasp, turning, routing, lathe, joint, bending, engineered wood, flat-pack, self-assembly, CNC, milling, tolerances, finishing, VOCs, finishing.