



Design & Technology Department – Curriculum Intent

Overview of KS3 Curriculum						
Head of Department: Mr T Barber						
Design and Technology is taught as part of the Technology rotation. KS3 students will spend approximately 30 hours each year studying Design and Technology. At the end of KS3, students can choose if they would like to continue their studies at GCSE level.						
	Year 7		Year 8		Year 9	
Covered over 30 lessons.	<u>Mr Barber’s Classes</u>	<u>Mr Reid’s Classes</u>	<u>Mr Barber’s Classes</u>	<u>Mr Reid’s Classes</u>	<u>Mr Barber’s Classes</u>	<u>Mr Reid’s Classes</u>
	<p>Mini-Light – 2 units</p> <ul style="list-style-type: none"> Mini light Blister Packaging <p>Mini Light Research: LEDs in products, LEDs and Batteries, Acrylics and Plastics, evaluating existing products Ideas: Drawing templates, Exploded Isometric (layers) Final Design: 2D Design (CAD). Hand and machine tools: The file, the sander, the fretsaw, the pillar drill</p> <p>Blister Packaging Design of suspension card Serif draw+ (CAD) Design and make diary</p> <p>Unit test – Product, electrics, packaging</p> <p>Practical Adhesives Machine sanding (bobbin, disc, linisher) Cross and draw filing</p>	<p>Fruit pen project: Create designs, drawings- branding and lettering, 3d model (papier-mache), net design-packaging (Graphic Design)</p> <p>Note-book project: Design a cover, card 3d/relief mould, vacuum forming, learn a book-binding technique.</p> <p>Pop-up card project: Learn paper engineering and folding techniques, research Henri Rousseau (artist), research Robert Sabuda (designer/artist), create a pop-up gift card (collage and drawing techniques)</p> <p>1a. 2D Design CAD Unit - draw and laser cut a box design (choice of two types) with</p>	<p>Lamp Project 3 units</p> <ul style="list-style-type: none"> Lamp base Lamp circuit Lamp shade <p>Folder work Box and frame joints Exploded Isometric – lamp base Wood rendering (texture, tone, thick and thin line techniques) Research: Existing Lamps, Sensing Circuits Electronic Systems, Components, circuit diagrams and PCBs</p> <p>Plan of Making: Assembly 4 Ideas for shade in Isometric Final design: 3RD angle orthographic Evaluation: Mood board (designers, design movements) 2D Design lampshade (CAD) Design and make diary</p>	<p>Fairground Attraction: Learn motion types, research existing rides, create designs, construct working model and add decorative features.</p> <p>Design: eco-bottle: Research logos/branding and create own designs, research existing bottle forms and create own designs, create 3D model (clay), vacuum form (plastic prototype) and apply decorative features</p> <p>POR and TFB classes CC NEA mini-project Investigating CCs - ‘Socialising or educating pre-school children’ (to development model stage) 1. Strategies for investigation (PIEs needs, Venn diagrams, photographs, 6Ws and H</p>	<p>Speaker (audio amplifier) 3 units</p> <ul style="list-style-type: none"> Speaker circuit Speaker casing Speaker Base (docker) <p>Folder work Units, prefixes, Ohms law Existing docking stations Electronic CPTS and their symbols, switches, resistor colour code, ICs, Production flowchart – PCB, casing and fixings 2D Design drawing – Casing assembly Isometric (CAD)</p> <p>Isometric skills Isometric designs for speaker base Rendering tone (planar, curved objects) Scale drawings Design drawing - Motif vacuum forming Production flowchart-MDF/polystyrene base 2D Design drawing – Base Isometric (CAD)</p>	<p>Corporate Identity- retail outlet: Research existing business’s and create designs -logos/branding, use typography/lettering create shop/business name. Create designs of business/shop front, create 3d model (shop), apply decorative surfaces and features</p> <p>Eco House: Architecture Research renewable energy sources. Conduct analysis of existing eco house. Research sustainable building materials. Create designs (plans and elevations). Create 3d model (house front or room)-addition of ecological features and illustration of sustainable materials and surfaces Architectural CAD drawing unit (following model in</p>



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	<p>Pillar drill Buffing (polishing) machine Vacuum forming Laser-cutting (CAM)</p> <p>3D Puzzle Project</p> <ul style="list-style-type: none"> • Puzzle • Packaging (net) <p>Folder work Soft and hardwoods, man-made boards Isometric – exploded/ assembled Net developments</p> <p>Practical Marking out and measuring Sawing – tenon saw, bench hook, steel rule tools Adhesives Packaging – net development Graphic Design – puzzle label (CAD)</p>	<p>packaging construction methods used in Graphic Products (crash bases, tabs, slots, access).</p> <p>1b. Serif draw plus CAD unit</p> <p>Design and Print Branding for packaging using serif draw plus</p>	<p>Unit tests</p> <ol style="list-style-type: none"> 1. Electronic components and soldering 2. Wood processes <p>Practical Wood casing jointing Use of jigs Machine tools - Pillar drill, sanding stations (bobbin, disc, finisher) Soldering PCB Casing and circuit assembly Card Surface developments Laser-cutting polypropylene shade (CAM)</p>	<ol style="list-style-type: none"> 2. Writing a brief and manufacturing Specification 3. Isometric and orthographic sketching 4. Making element - solid/structural development models of concept products (Spaces, games, toys etc) <p>Products have a broad remit and mechanical, structural, electronic components <u>referenced</u> or built into development models where possible (e.g. some working mechanical components)</p> <p>Reference to existing GCSE work giving lower school students insight into GCSE work.</p> <p>Tinker CAD and Google sketch-up experience 2 lesson units for additional CAD software experience and use</p>	<p>'Think-do' design essay on one topic in the GCSE syllabus</p> <p>End of Unit test - Speaker CPTS and soldering</p> <p>Practical Soldering PCB Laser-cut casing assembly Assembling final speaker Styrofoam modelling MDF former construction Vacuum formed shell Laser-etching motif</p>	<p>Graphic Products legacy GCSE Graphics project - TFB).</p> <p>Drawing Elevations and plans to scale and in 2D design (wall thicknesses, floors, columns, roof details shown in in 3rd angle orthographic projection)</p> <p>Signage CAD -serif draw+ unit - ideas for signs then manipulated in Corel draw for potential laser cut signage in resistant materials (extension task)</p>
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Overview of KS4 Curriculum		
Subject: GCSE Design and Technology		Exam Board: Edexcel
	Year 10	Year 11
Autumn Term	<p>A. Core section A</p> <p>1. Mechanical Systems and Forces – Cams, gears, linkages and levers, pulleys, forces and stresses</p> <p>Practical 1 – Mechanical Toy and Packaging – Cams, linkages and lever (+paper engineering), Net developments, crash bases, slots and tabs, laser cutting</p> <p>2. Maths -Areas and Volumes, Moments and Equilibrium, Ratios</p> <p>3.Designers -Set of Power-points (8 designers in total)</p> <p>4.New and Emerging Technologies – Word-fill, short answer questions</p> <p>5.Formal Drawing Systems – Orthographic, Isometric, Perspective, scale, flowcharts</p> <p>6a. Core Material Technologies – Papers and Boards, Metals, Woods, Polymers, Systems</p> <p>6b. Other Materials - Modern and Composites, technical textiles, Smart Materials (PG Resources)</p> <p>Practical 2 – Metal Processes -hammer/screwdriver – Taps, dies, internal/external threads, plastic dipping, riveting</p>	<p style="text-align: center;">GCSE D+T NEA Deadlines – 2023</p> <p style="text-align: center;">Workload is one sheet per week (not including 2 weeks for mock exams)</p> <p>A. Investigation - 16 marks in Total Friday 13th October</p> <p>1.Context, Research Plan</p> <p>2.Client profile, Questionnaire and Specification</p> <p>3. Field work/Product Disassembly</p> <p>4. Existing Products</p> <p>5. Further research (Inc. designers, Anthropometrics/Ergonomics, 6Rs, materials etc) (1+7=8 Marks)</p> <p>6. Brief and summary of research</p> <p>7. Specification (Sheets 6+7 = 8 Marks)</p> <p>B. Ideas – 16 marks total</p> <p>Including from :3D and 2D sketches (3RD Angle Orthographic), Annotation (SP1,2 etc), Tinker CAD drawings, possible electronic systems (boxes), designer influences, research (possible technical details/cpts/materials/finishes)</p> <p>8.Idea 1 27th October</p> <p>9.Idea 2 3rd November</p> <p style="text-align: center;">NOVEMBER MOCK EXAM WEEK</p> <p>10.Idea 3 (+4) 17TH November</p> <p>11.Review of ideas (table against Spec.) (Sheet 11=8 marks) 24th November</p> <p>C. Development - 12 marks total (Fluid section depending on design requirements)</p> <p>12.Intermediate/Solid modelling (photos, sketches) 1st December</p> <p>13.SCARED development (tracings) 8th December</p> <p>14.Specialist Research, further development details 15th December</p> <p style="text-align: center;">XMAS HOLIDAYS</p>



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Spring Term	<p>7. Sustainability – Packaging, 6Rs, footprints</p> <p>B. Systems section B – Electronics specialism (60%)</p> <ul style="list-style-type: none"> • Revision – KS3 Electronic theory, soldering and casings • Industrial/school processes – PCB Manufacturing - Flow soldering, photoetching, CNC • Sustainability- Eco social and cultural electronic product footprints • PICs theory • Systems theory word-fill and long answer (Manufacturing, Jigs, JIT, vacuum forming etc) <p>Practical 3 - Prototype Modular Circuits in Stripboard, astable, monostable, decade counter etc) . electro-mechanics - Fischer technic mechanisms, motors and relay</p> <p>NEW - Practical 4 -PICs -Programming Arduino boards – in pairs alongside Practical 3</p>	<p style="text-align: center;">Development Continued</p> <p>15.Orthographic 1 (pencil sketch) 12th January</p> <p>16.Final 2D Design Ortho CAD drawing (and cutting lists) 19th January</p> <p>17.Final design drawing (3D CAD) 26th January</p> <p>18. Review of final design – (Sheet 18=6 marks) 2nd February</p> <p style="text-align: center;">FEBRUARY MOCKS – 1WEEK REVISION 5th-9th February</p> <p style="text-align: center;">HALF-TERM HOLIDAY –Practical Workshop day</p> <p style="text-align: center;">FEBRUARY MOCK EXAM WEEK</p> <p>D. Making - 40 marks total Continue with Practical 26th Feb -22nd March</p> <p>A03a -Fully functioning prototype – Final Product with System (electro-mechanical)</p> <p>19. A03b Ongoing photo sequence (annotated processes, H+S) 15th March</p> <p>20. Review of Materials (Summary of choices and why) 22nd March</p> <p style="text-align: center;">EASTER HOLIDAYS – 2 DAYS PRACTICAL SUPPORT</p>
Summer Term	<p>9. Year 10 Exam strategies</p> <ul style="list-style-type: none"> • Pre-Exam questions - GCSE Edexcel Bitesize, CGP and CGP systems (Core) • GCSE Exam Practice – AQA multiple choice • Year 10 exam Preparation (Full GCSE paper), techniques, timings • ‘Green pen’ exam de-brief (including Mark scheme) <p>10. Beginning NEA (released June)</p> <p>A01 – Investigation – 5 A3 sheets</p> <p>A3 sheet 1- Contextual challenge – Investigate and develop a product to design <u>Product identified, brief written and relevant research undertaken below before Year 11</u></p> <p>Extension - A3 sheet 2– Existing Products – R+A relevant products</p>	<p>Finishing NEA</p> <p>E. Evaluation A04 - 6 marks</p> <p>21.Evaluation -against specification 5th April</p> <p>22. Evaluation -testing (with client including working systems) 12th April</p> <p>23 - Life cycle analysis 19th April</p> <p>NEA Grand Total = 100 marks (+ Communication of ideas = 8 marks)</p> <p>Exam Preparation</p> <p>Pre-mock exam</p> <p>Past papers</p> <p>Exam Techniques</p> <p>Long answer topics and model answers (sentences)</p> <p>Focussed support on topics for individual students</p>



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Curriculum Rationale

Overview

Design and Technology is about identifying needs and products, generating ideas, planning, making and testing to find the best solutions.

In society, students need to be aware of the ways in technology is used in homes, the workplace and lifestyles and be better placed to respond to the employment needs of business and industry.

Skilled design will enable citizens to cope with a rapidly changing society and meet the challenges of the 21st Century. Students therefore need to be inspired to learn about technological changes, the potential of materials technology and their responsible, sustainable, controlled use in product design.

Curriculum

To offer as wide as possible an experience of product design throughout KS3 and KS4 using combinations of material technologies including Resistant Materials, Systems (structures, electronics and Mechanisms), Graphic Products, Textiles, Modern and Smart materials, energy and sustainability. Students therefore design products using a wide range of material combinations and properties as exist in society.

To consider the relevant theory and practical skills in KS3 D+T education needed as preparation for progression into GCSE (e.g. developing electronics theory and practice each year in KS3 and a knowledge of all the core Technologies)

Extra-curricular

To offer broader, relevant experiences in the D+T department by running D+T clubs, in-house days and entering regional and national competitions such as Go4SET and STEM challenges which introduce students to the STEM agenda and professions relevant to Technology such as Engineering or Architecture.



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Design and Technology – Careers Links by Year group					
	DETAILS				
Year Group	Focus on employability skills eg teamwork; presentation; communication; problem solving; research; time management	Learning about a specific career/job role within lessons	Encounter with an Employer / Workplace or HE subject specific visits	Enrichment/links with subject specific themed days where careers are promoted (Eg World Book Day, World Health Day)	Please use this space to highlight any relevant employer links that you would like us to investigate or have considered.
7	<p>Vocational skills, presenting folder work to support designs, developing solutions.</p> <p>Typography, book-binding Industrial processes – vacuum forming Printing processes</p> <p>Industrial processes – Vacuum forming and Graphic Design</p>	<p>Animated, paper engineering project (Henry Rouseau and Robert Sabuda inspired)</p> <p>Graphic Design, advertising and illustration (mechanisms)</p> <p>Graphic Designer, Joinery, Electrical engineer</p>	<p>Graphic Design Illustration careers/degree courses</p> <p>Stratford upon Avon – ‘mad museum’ trip – (mechanical art and design)</p>	<p>Exhibition of student’s work –Summer 2022 Robert Sabuda, career in paper engineering, industrial manufacture.</p>	<p>PoR has links with Manchester Metropolitan University –Graphic Design and Print-making –to consider University visit /workshop</p>
8	<p>Lamp project Folding Technology Plastics (acrylic, polypropylene) Materials (woods) Electronics – Sensors</p> <p>Time managing three project elements and technologies</p> <p>Presentations skills, Graphic Communication, Research, Development, Refinement, exploration of solutions, final production, evaluation</p>	<p>Electronic Engineering Product Design CAD and CAM use– laser cutting</p> <p>Graphics Design, Product Design, Illustration, , Manufacturing , Retail Buyer, Interactive Media Design</p>	<p>Siemens</p>	<p>Siemens roller coaster challenge – Visit to Siemens, Manchester</p>	<p>Possible 1 week or overnight D+T trips to promote subject (e.g. Barcelona, Reykjavik etc)</p>
9	<p>Speaker IC Electronics Flowcharts of manufacture with quality Control, health and safety, tools, materials and processes.</p>	<p>Electronic Engineering Product Design CAD and CAM Quality assurance in companies</p>	<p>BAM construction visit to building design offices</p>	<p>Go4SET Regional STEM project Manchester Town hall presentation</p>	<p>D+T related courses at 6th form colleges</p>



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	Presentations skills, Graphic Communication, Research, Development, Refinement, exploration of solutions, final production, evaluation	Graphics Design, Product Design, Illustration, packaging Design, Textile Design, Fashion, Manufacturing, Retail Buyer, Stylist, Garment Technologist, Interactive Media Design	Horticulture RHS garden design (D+T) School Garden (STEM)	Alu challenge in house and national competition at the Birmingham NEC (nationals)	
10	Using a wide variety of tools, materials and processes Skills manufacturing in electronics, mechanisms and Graphics New and emerging technologies used in companies, eco and social footprints of products from manufacture, use and disposal (product life cycle)	Electronic Engineering and Systems Design (I,P and O) Mechanical Engineering (toy) Packaging design (mechanical toy box)	School Trip – ND New Designers Exhibition, London Arkwright engineering scholarships	Animatronics – Interactive, mechanical toys trip	Alton Towers trip – Systems experience (mechanisms, electronics and structures)
11	Succinct 20 A3 page folder with a range of media including CAD drawings, design sketches Manufacture - 3D modelling in machine foam and structural modelling CAM (laser cutting)	Architectural design Graphic Design Structural, Mechanical, Electronic Engineering project choices	Skills using CAD transferrable to design office e.g. engineering, Architecture or product design	None - GCSE exam and project work focus	None - GCSE exam and project work focus

Post-16 Study options

A Levels - A level Design and Technology including 3D/Product Design, Graphic Design and Fashion and Textiles, A level Engineering

Vocational courses - HNC, Diploma and foundation degree in Product Design, Engineering, Graphic Design, Diploma in Fashion and Textiles.

Advanced Apprenticeships - HND in Building Engineering and Architecture, Level 2 and 3 Apprenticeships in Product Design, Graphic Design, Engineering and Textiles/Apparel.