January 2023

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.	**Mr Barber's Classes** **Mini-Light – 2 units** • Mini light • Blister Packaging **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 **Blister Packaging** Design of suspension card Serif draw+ (CAD) Design and make diary **Unit test** – Product, electrics, packaging **Practical** Adhesives Machine sanding (bobbin, disc, linisher) Cross and draw filing	**Mr Reid's Classes** **Fruit pen project**: Create designs, drawings- branding and lettering, 3d model (papier-mache), net design-packaging (Graphic Design) **Note-book project**: Design a cover, card 3d/ relief mould, vacuum forming, learn a book-binding technique. **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)	**Mr Barber's Classes** **Lamp Project** **3 units** • Lamp base • Lamp circuit • Lamp shade **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 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	**Mr Reid's Classes** **Fairground Attraction**: Learn motion types, research existing rides, create designs, construct working model and add decorative features. **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	**Mr Barber's Classes** **Speaker (audio amplifier)** **3 units** • Speaker circuit • Speaker casing • Speaker Base (docker) **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) 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)	**Mr Reid's Classes** **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 **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

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	Pillar drill Buffing (polishing) machine Vacuum forming Laser-cutting (CAM) **3D Puzzle Project** • **Puzzle** • **Packaging (net)** **Folder work** Soft and hardwoods, man-made boards Isometric – exploded/ assembled Net developments **Practical** Marking out and measuring Sawing – tenon saw, bench hook, steel rule tools Adhesives Packaging – net development Graphic Design – puzzle label (CAD)		**Unit tests** 1.Electronic components and soldering 2. Wood processes **Practical** Wood casing jointing Use of jigs Machine tools - Pillar drill, sanding stations (bobbin, disc, linisher) Soldering PCB Casing and circuit assembly Card Surface developments Laser-cutting polypropylene shade (CAM)		'Think-do' design essay on one topic in the GCSE syllabus **End of Unit test -** Speaker CPTS and soldering **Practical** Soldering PCB Laser-cut casing assembly Assembling final speaker Styrofoam modelling MDF former construction Vacuum formed shell Laser-etching motif	

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Overview of KS4 Curriculum

Subject: GCSE Design and Technology **Exam Board:** Edexcel

Year 10

Autumn Term

A. Core section A

1. Mechanical Systems and Forces – Cams, gears, linkages and levers, pulleys, forces and stresses

Practical 1 – Mechanical Toy and Packaging – Cams, linkages and lever (+paper engineering), Net developments, crash bases, slots and tabs, laser cutting

2. Maths -Areas and Volumes, Moments and Equilibrium, Ratios

3.Designers -Set of Power-points (8 designers in total)

4.New and Emerging Technologies – Word-fill, short answer questions

5.Formal Drawing Systems – Orthographic, Isometric, Perspective, scale, flowcharts

6a. Core Material Technologies – Papers and Boards, Metals, Woods, Polymers, Systems

6b. Other Materials - Modern and Composites, technical textiles, Smart Materials (PG Resources)

Practical 2 – Metal Processes -hammer/screwdriver – Taps, dies, internal/external threads, plastic dipping, riveting

Year 11

NEA Tasks – 21 A3 sheets – 1 A3 sheet per week

1.1 Investigation total = 8 marks	**Mark awarded**
1. Task Analysis- 2 marks	2
2. Client Questionnaire - 2 marks	2
3. Existing Structures and Mechanisms-2 marks	2
4. Logo research - 2 marks	2
Total for 1.1	**8**

1.2 Brief and Specification total = 8 marks	
5. Brief - 4 marks	4
6. Specification -4 marks	4
Total for 1.2	**8**

2.1 Design Ideas total = 8 marks	
7. Ideas – Architectural form – Solid Modelling ('SCARED' dev +make) -2 marks	**1**
8. Ideas - festival structure- 2 marks	2
9. Ideas - Collaborative Design of a Functioning System - 2 marks	2
10. Ideas – Festival Logo -Iterative design 2 marks	2
Total for 2.1	**7**

2.2. Review of ideas total = 8 marks	
11. Review of ideas (including logos) 4 marks	3
12. Review – Further considerations in analysis of Architect - 4 marks	4
Total for 2.2	**7**

2.3. Development total = 12 marks	
13. 'SCARED' Development - festival structure - 2 marks	1/2
14. 'Aluminium' Structural model (+make)(+standard components) -3 marks	3
15. Manufacturing Specification (Collaborative) – Standard Components -1 mark	1
16. Development of 3rd Angle Orthographic- 1 mark	1
17. 2D Design 3rd Angle Orthographic- final - 2 marks	2
18. CAD kit of parts for final model - 1 mark	1
References to applied earlier research pages **3**, **12,** also dev. **Page 7** – 2 marks	2
Total for 2.3	**11**

2.4. Communication of ideas (+CAD)= 8 marks	8

Mock exam – two weeks Revision Focussed on Section B worth 60%

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Spring Term

7. Sustainability – Packaging, 6Rs, footprints

B. Systems section B – Electronics specialism (60%)

- 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)

Practical 3 - **Prototype Modular Circuits** in Stripboard, astable, monostable, decade counter etc) . electro-mechanics - Fischer technic mechanisms, motors and relay

NEW - Practical 4 -PICs -Programming Arduino boards – in pairs alongside Practical 3

2.5. Review of final design **Total =6 marks**	**Total for 2.5=6**
19. Review of final structure against Specification= 2+2* =4	**2**
Reviews of electronic system, structure + logo designs **on pages 9,10,14** 2mks	**2**
*Reference made in review to architect/client feedback (pages **2 ,12**) - 2 marks	**2**

3.1 Making (models/circuit) total=36 marks	
a Materials selection 8 marks	8
b. Skills and processes 16 marks	16
3.2 Making - Quality and Accuracy 12 marks	12
Total for Making 3.1+3.2	36

4.1 Testing and Evaluation total= 6 marks	
20. Functioning system -circuit (+Making) 2 marks	**2**
21 Life cycle analysis of structure and circuit (+circuit) (1 A3) 2 marks	**2**
Evidence of testing throughout e.g. in scale models and reviews 2 marks	2
Total for 4.1	**6**
Total/100	**97**

Summer Term

9. Year 10 Exam strategies

- 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)

10. Beginning NEA (released June)

A01 – Investigation – 5 A3 sheets

A3 sheet 1- **Contextual challenge** – Investigate and develop a product to design

Product identified, brief written and relevant research undertaken below **before Year 11**

Extension - A3 sheet 2**– Existing Products** – R+A relevant products

Finishing NEA

Exam Preparation

Pre-mock exam

Past papers

Exam Techniques

Long answer topics and model answers (sentences)

Focussed support on topics for individual students

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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	Vocational skills, presenting folder work to support designs, developing solutions. Typography, book-binding Industrial processes – vacuum forming Printing processes Industrial processes – Vacuum forming and Graphic Design	Animated, paper engineering project (Henry Rouseau and Robert Sabuda inspired) Graphic Design, advertising and illustration (mechanisms) Graphic Designer, Joinery, Electrical engineer	Graphic Design Illustration careers/degree courses **Stratford upon Avon – 'mad museum' trip** – (mechanical art and design)	**Exhibition of student's work –Summer 2022** Robert Sabuda, career in paper engineering, industrial manufacture.	PoR has links with Manchester Metropolitan University –Graphic Design and Print-making –to consider University visit /workshop
8	Lamp project Folding Technology Plastics (acrylic, polypropylene) Materials (woods) Electronics – Sensors Time managing three project elements and technologies Presentations skills, Graphic Communication, Research, Development, Refinement, exploration of solutions, final production, evaluation	Electronic Engineering Product Design CAD and CAM use– laser cutting Graphics Design, Product Design, Illustration, , Manufacturing , Retail Buyer, Interactive Media Design	**Siemens**	**Siemens roller coaster challenge** – Visit to Siemens, Manchester	Possible 1 week or overnight D+T trips to promote subject (e.g. **Barcelona**, Rekyavik etc)
9	Speaker IC Electronics Flowcharts of manufacture with quality Control, health and safety, tools, materials and processes.	Electronic Engineering Product Design CAD and CAM Quality assurance in companies	**BAM construction** visit to building design offices	**Go4SET** Regional STEM project Manchester Town hall presentation	D+T related courses at 6th form colleges

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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.