Design & Technology Department – Curriculum Intent

	KS3 Curriculum Intent									
	Head of Department: Mr T. Barber									
	Year 7				**Year 8**			**Year 9**		
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 1	Unit 2	Unit 3	Unit 1	Unit 2	Unit 3
Product Design Technologies	Pen and Fruit (Pen) Pop-up card (Rousseau)	Book-binding and 3D/relief cover	Mini-light **2 Units**	3D Wood puzzle **1 unit**	Mood Lamp 3 units Base, Circuit,+ Shade	Fairground Attraction: Design and model construction	Graphics ECO Bottle	Festival Project 9 **1 unit** - Architecture	Speaker and Docker **2 units**	Graphic Design: Corporate Identity, Retail outlet
Resistant Materials Woods Plastics Modelling Materials	Packaging – card Net design and making (scoring, folding and joining –box) Pop-ups – cutting, folding	Drilling machines Hips for book cover Creating a mould for book cover	Acrylics and Tensol Pillar drill Sanding machines PVC Blister Packaging Buffing Machine Vacuum forming	Woods, dowel joints Pillar drill Sanding machine	Pine and Plywood, slotted, rebated and jointed base Laser cut Clear Acrylic lid Polypropylene folded lampshade	Wood and card modelling materials	Vacuum Forming Hips to form bottle shapes Clay Moulding	Styrofoam (machine foam) Corrugated card, wire, batons, card Aluminium processes Forming, fixing, finishes	3mm acrylic sheet Acrylic rod Fixings, tolerances MDF system Vacuum forming	Modelling and construction (relief techniques) - business/shop-front design
Electronics Components, circuits and casings			Batteries, LEDs and switches		Sensing circuit PCB Components and Soldering			Extension – 555 timing circuit (monostable or astable)	Audio Amplifier PCB further components (+IC) and soldering	
Structures (Mechanisms in year 10)	Mechanisms Paper Engineering and moving components (sliding character)					Structures and Mechanisms Stability, functionality, aesthetics Movement and forces		Trusses, ties, portal Shell, frame Structures, connectors etc		

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Design strategies/ Graphic Products	Typography, branding and logo design Composition Rendering designs Research: Pop-up Artist – Sabuda and artist Rousseau Collage and rendering techniques	Graphic Design History Rendering designs	Suspension card Exploded Isometric Drawing tools	Isometric exploded and assembly drawings	Design Movements (Lampshade and base) Exploded Isometric	Research existing products and structures, design and annotation Rendering designs	Research existing products Rendering/drawing Crating	4x4, Modelling, Sustainability, serif+ festival signage	Making without designing (speaker) D+M (docker) System Design	Research and analyse existing businesses. Advertising and marketing and creation of promotional products. Typography, logo design Rendering designs Create 3D outcome
CAD/CAM Laser cutting Serif draw+ 2D Design	Packaging design Laser Cutting Net development		Laser cutting and etching (4th layer) **Serif draw +** lettering	Packaging Laser-cut window 2D Design Serif draw+	Laser cutting and etching clear acrylic (for fitting circuit) **2D Design** - Polypropylene net		2D Design CAD Research board photoshop/powerpoint/illustrator	Laser cut standard architectural components serif+ X2	2D design casing exploded Isometric Laser cut speaker faces	Adobe Illustrator Photoshop PowerPoint
Manufacturing Techniques Modelling Forming Folding Fabrication	Sheet card - Modelling Forming Folding	Vacuum Forming Book binding Heat Pressing	Fabrication (casing and electrics) Vacuum Forming (blister packaging) Extension	Fabrication - puzzle Folding -net packaging	Fabrication (circuit, slotted, rebated and jointed box frame, lid and base) Folding – Card modelling and Polypropylene shade	Modelling and constructing and joining using materials provided (wood, wire, card and string)	Modelling Clay Printing techniques Vac Forming	Solid Modelling Structural (intermediate) Modelling Fabrication (intermediate and laser-cut final model)	Fabrication – casing and soldering (speaker) Forming – MDF docker former) (extension)	Construction and modelling using card Surface decoration – representing building materials and surfaces

Overview of KS4 Curriculum

Subject: GCSE Design and Technology   Exam Board: Edexcel

Year 10	Year 11

Autumn Term

Year 10

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%

Design & Technology Department – Curriculum Intent

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	(tables below)

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

Design & Technology Department – Curriculum Intent

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.

Design & Technology Department – Curriculum Intent

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)**
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)

Note: The fifth column header reads "Please use this space to highlight any relevant employer links that you would like us to investigate or have considered."

Design & Technology Department – Curriculum Intent

9	Speaker IC Electronics Flowcharts of manufacture with quality Control, health and safety, tools, materials and processes. Presentations skills, Graphic Communication, Research, Development, Refinement, exploration of solutions, final production, evaluation	Electronic Engineering Product Design CAD and CAM Quality assurance in companies Graphics Design, Product Design, Illustration, packaging Design, Textile Design,Fashion, Manufacturing , Retail Buyer, Stylist, Garment Technologist, Interactive Media Design	**BAM construction** visit to building design offices Horticulture **RHS** garden design (D+T) School Garden (STEM)	**Go4SET** Regional STEM project Manchester Town hall presentation **Alu challenge** in house and national competition at the Birmingham NEC (nationals)	D+T related courses at 6th form colleges
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.