

## Design & Technology KEY STAGE 3 CURRICULUM MAP

By the end of Key Stage 3, students should:

<b>Know</b>	<ul style="list-style-type: none"> <li>understand and use the properties of materials and the performance of structural elements to achieve functioning solutions</li> <li>understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]</li> </ul>	<ul style="list-style-type: none"> <li>apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].</li> <li>understand how more advanced mechanical systems used in their products enable changes in movement and force</li> </ul>
<b>Do</b>	<ul style="list-style-type: none"> <li>use research and exploration, such as the study of different cultures, to identify and understand user needs</li> <li>identify and solve their own design problems and understand how to reformulate problems given to them</li> <li>develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations</li> <li>use a variety of approaches [for example, biomimicry and user-centred design], to generate</li> </ul>	<ul style="list-style-type: none"> <li>creative ideas and avoid stereotypical responses</li> <li>develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools</li> <li>select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture</li> <li>select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties</li> </ul>
<b>Appreciate</b>	<ul style="list-style-type: none"> <li>analyse the work of past and present professionals and others to develop and broaden their understanding</li> <li>investigate new and emerging technologies</li> </ul>	<ul style="list-style-type: none"> <li>test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups</li> <li>understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists</li> </ul>

### Curriculum coverage

	Topic	Coverage
Year 7	<b>Health &amp; Safety - Paddle Boat Project</b>	Introduction to the workshop tools, machines and routines in order to work safely. Large practical focus on this project. Make a paddle boat
	<b>Moisture Sensor Project</b>	Introduction to Electronics Soldering skills Make a Moisture Sensor
	<b>Graphics Project</b>	Isometric & Orthographic Drawing Typography, TinkerCAD
Year 8	<b>Desk Tidy</b>	Students investigate, analyse and evaluate the work of past and present designers and companies to inform their own designing. Students should investigate the work of a minimum of two of the following designers: • Harry Beck • Marcel Breuer • Coco Chanel • Norman Foster • Sir Alec Issigonis • William Morris • Alexander McQueen • Mary Quant • Louis Comfort Tiffany • Raymond Tempier • Marcel Breuer • Gerrit Reitveld • Charles Rennie Macintosh • Aldo Rossi • Ettore Sottsass • Philippe Starck • Vivienne Westwood. Students should investigate the work of a minimum of two of the following companies: • Braun • Dyson • Apple • Alessi.
	<b>Graphics Project</b>	Develop, communicate, record and justify design ideas using a range of appropriate techniques such as: • freehand sketching, isometric and perspective • 2D and 3D drawings • system and schematic diagrams • annotated drawings that explain detailed development or the conceptual stages of designing • exploded diagrams to show constructional detail or assembly • working drawings: 3rd angle orthographic, using conventions, dimensions and drawn to scale • audio and visual recordings in support of aspects of designing: eg interviews with client or users • mathematical modelling • computer based tools • modelling: working directly with materials and components, eg card modelling, producing a toile when designing garments, constructing a circuit using breadboard.
	<b>Structures, Motion &amp; Mechanisms</b>	Students investigate different types of structures. Levers: • first order • second order • third order Linkages: • bell cranks • push/pull. Rotary systems: • CAMs and followers • simple gear trains • pulleys and belts.

## Curriculum coverage

	Topic	Coverage
Year 9	Timbers	Students should have an overview of the main categories and types of natural and manufactured timbers: hardwoods including: • ash • beech • mahogany • oak • balsa softwoods including: • larch • pine • spruce manufactured boards including: • medium density fibreboard (MDF) • plywood • chipboard. <i>Make a Light Display Box</i>
	Plastics	Students should have an overview of the main categories and types of polymers: thermoforming including: • acrylic (PMMA) • high impact polystyrene (HIPS) • high density polythene (HDPE) • polypropylene (PP) • polyvinyl chloride (PVC) • polyethylene terephthalate (PET) thermosetting including: • epoxy resin (ER) • melamine-formaldehyde (MF) • phenol formaldehyde (PF) • polyester resin (PR) • urea-formaldehyde (UF). <i>Make the feet/stand for the Light Display Box.</i>
	Metals	Students should have an overview of the main categories and types of metals and alloys: ferrous metals including: • low carbon steel • cast Iron • high carbon/tool steel non ferrous metals including: • aluminium • copper • tin • zinc alloys including: • brass • stainless steel • high speed steel. <i>Make an aluminium Robot Head.</i>

At KS3 each project students undertake has 3 fixed homeworks. Students may undertake extra research homeworks as required with particular projects.  
Maker Lunchtime Club is available for students to attend.

## KS3 Food Tech Teaching Schedule

	Year 7 Food Tech		Year 8 Food Tech	
Lesson 1	Theory:	Food Safety	Theory:	Basic Nutrition and Dietary requirements
Lesson 2	Practical:	Fruit Salad	Theory:	Basic Nutrition and Dietary requirements
Lesson 3	Theory:	Kitchen Management & Equipment	Practical:	Bread rolls
Lesson 4	Practical:	Pitta Pizza	Theory:	Food sources
Lesson 5	Theory:	Healthy Eating and Nutrients	Practical:	Healthy Burger
Lesson 6	Practical:	Pasta Salad	Theory:	
Lesson 7	Theory:		Practical:	Potato Cakes
Lesson 8	Practical:	Flapjack	Theory:	
Lesson 9	Theory:		Practical:	Mac n cheese
Lesson 10	Practical:	Cinnamon/ Pizza rolls	Theory:	
Lesson 11	Theory:		Practical:	Fajitas
Lesson 12	Practical:	Cake investigation	Theory:	
Lesson 13	Theory:		Practical:	Cupcakes
Lesson 14	Practical:	Veg Soup	Theory:	
Lesson 15	Theory:		Practical:	Cornflake chicken nuggets
Lesson 16	Practical:	Apple/seasonal Crumble	Theory:	
Lesson 17	Theory:		Practical:	Granola Bars
Lesson 18	Practical:	Scones	Theory:	
Lesson 19	Theory:		Practical:	Ready Steady Cook!
Lesson 20	Practical:	Ready Steady Cook!		

# Design & Technology KEY STAGE 4 CURRICULUM MAP

## Curriculum coverage

	Topic	Coverage
Year 10	Core Technical Principles	<ul style="list-style-type: none"> <li>• New and emerging technologies</li> <li>• Energy, materials, systems and devices</li> <li>• Energy storage and generation</li> <li>• Developments in new materials</li> <li>• Systems approach to designing</li> <li>• Mechanical devices</li> <li>• Materials and their working properties</li> </ul>
	Specialist Technical Principles	<ul style="list-style-type: none"> <li>• Forces and stresses</li> <li>• Ecological and social footprint</li> <li>• Scales of production</li> <li>• Specialist material areas</li> <li>• Selection of materials or components</li> <li>• Sources and origins</li> <li>• Using and working with materials</li> <li>• Stock forms, types and sizes</li> <li>• Specialist techniques and processes</li> <li>• Surface treatments and finishes</li> </ul>
Year 11	NEA: Portfolio + Make	<p>The Non-exam assessment will contribute towards 50% of the students overall mark. The NEA project in its entirety should take between 30-35 hours to complete and consist of a working prototype and a concise portfolio of approximately 20 pages of A3 paper, equivalent A4 paper or the digital equivalent. Students' work should consist of an investigation into a contextual challenge, defining the needs and wants of the user and include relevant research to produce a design brief and specification. Students should generate design ideas with flair and creativity and develop these to create a final design solution (including modelling). A manufacturing specification should be produced to conclude your design findings leading into the realisation of a final prototype that is fit for purpose and a final evaluation. Students should investigate, analyse and evaluate throughout the portfolio and evidence all decisions made.</p>
	Design & Make Principles	<p><b>Designing principles</b></p> <ul style="list-style-type: none"> <li>• Investigation, primary and secondary data</li> <li>• Environmental, social and economic challenge</li> <li>• The work of others</li> <li>• Design strategies</li> <li>• Communication of design ideas</li> <li>• Prototype development</li> </ul> <p><b>Making principles</b></p> <ul style="list-style-type: none"> <li>• Selection of materials and components</li> <li>• Tolerances</li> <li>• Material management</li> <li>• Specialist tools and equipment</li> <li>• Specialist techniques and processes</li> </ul>

### Wider KS4 Curriculum:

At KS4. There is 12 fixed homeworks for each core unit of study across the course. During periods of NEA (coursework) it is expected that students keep up to date with an hours HW per week if required. After school catch-up club is available for students to attend.

# Design & Technology KEY STAGE 5 CURRICULUM MAP

## Curriculum coverage

	Topic	Coverage
Year 12	<b>3.1 Technical principles</b>	3.1.1 Materials and their applications 3.1.2 Performance characteristics of materials 3.1.3 Enhancement of materials 3.1.4 Forming, redistribution and addition processes 3.1.4.5 The use of adhesives and fixings 3.1.5 The use of finishes 3.1.6 Modern industrial and commercial practice 3.1.6.2 Efficient use of materials 3.1.7 Digital design and manufacture 3.1.8 The requirements for product design and development 3.1.9 Health and safety 3.1.10 Protecting designs and intellectual property 3.1.11 Design for manufacturing, maintenance, repair and disposal 3.1.12 Feasibility studies 3.1.13 Enterprise and marketing in the development of products 3.1.14 Design communication
	<b>3.2 Designing and making principles</b>	3.2.1 Design methods and processes 3.2.2 Design theory 3.2.3 How technology and cultural changes can impact on the work of designers 3.2.3.4 Product life cycle 3.2.4 Design processes 3.2.5 Critical analysis and evaluation 3.2.6 Selecting appropriate tools, equipment and processes 3.2.7 Accuracy in design and manufacture 3.2.8 Responsible design 3.2.9 Design for manufacture and project management 3.2.10 National and international standards in product design
Year 13	<b>NEA: Portfolio + Make</b>	<p>Students will be required to undertake a small-scale design and make task and produce a final prototype based on a context and design brief developed by the student.</p> <p>With reference to the context, students will develop a specific brief that meets the needs of a user, client or market. The brief must be of an appropriate level of complexity and contain a degree of uncertainty of the outcome so that students can engage in an iterative process of designing, making, testing and evaluating. Students must produce a final prototype based on the design brief they have developed, along with a written or digital design folder or portfolio. Students must produce a written or digital design folder clearly evidencing how the assessment criteria have been met together with photographic evidence of the final manufactured prototype outcome.</p> <p>Evidence Students must produce a final prototype based on the design brief that they have developed. Students should produce a concise folder. We recommend that this folder should not exceed 45 pages.</p>
	<b>Review 3.1 &amp; 3.2 Exam Preparation</b>	<p><b>Paper 1 - Technical principles</b></p> <p><b>Paper 2 - Designing and making principles</b></p>

At KS5. It is expected that student complete at least 2 hours per week independent study. This may be a set task, design research or consolidating knowledge learned in lessons. During periods of NEA (coursework) it is expected that students keep up to date with an hours HW per week if required.  
 After school catch-up club is available for students to attend.