DESIGN AND TECHNOLOGY CURRICULUM

Design and Technology (D&T) serves as a foundational subject that bridges educational experiences with real-world career opportunities. Our curriculum equips students with a diverse skill set, ranging from practical woodworking for the construction industry, to advanced Computer-Aided Design (CAD) for engineering roles, as well as essential marketing techniques aimed at promoting careers in the creative sectors. We continuously update our teaching methods to include the latest technological advances, ensuring our students not only learn about the design process but also adapt to the evolving tools and technologies used in industry.

Situated in a strategic location, Ashton under Lyne is uniquely positioned to prepare students for a variety of career paths in both the bustling creative sector of Central Manchester and the traditional industries scattered across the North Manchester crescent, including Oldham, Rochdale, and Bury. In collaboration with the Manchester Chamber of Commerce and its 'Local Skills Development Plan' (June 2023), which surveyed 3,000 businesses, we've identified crucial skill gaps in our local economy:

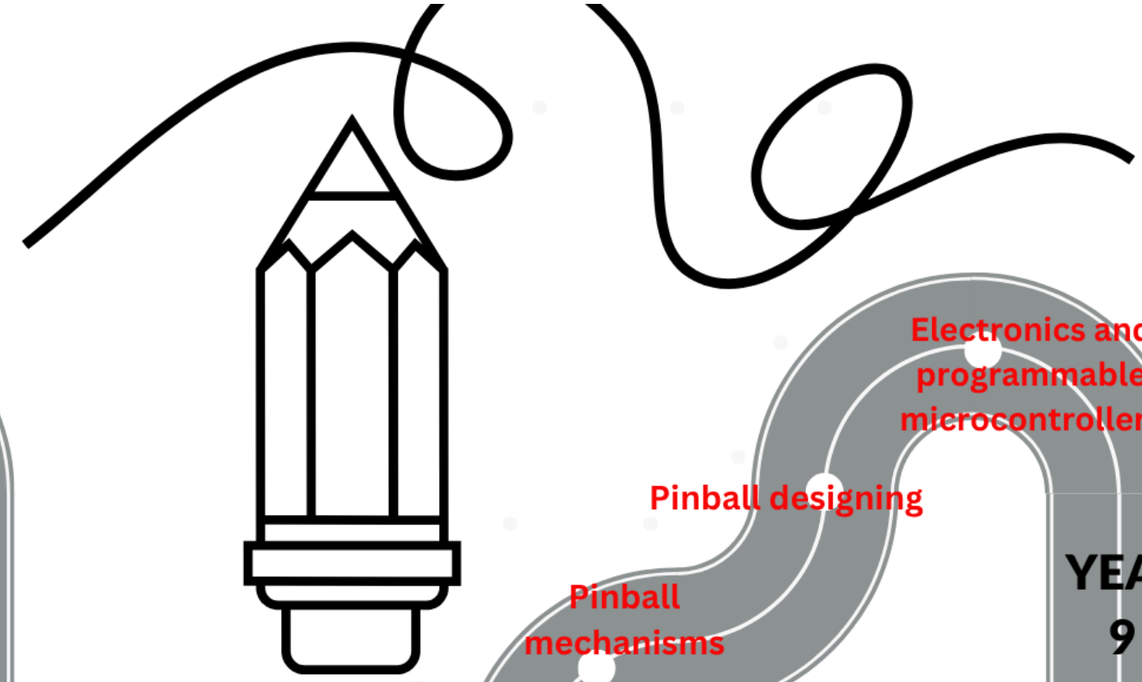
Construction and Retrofitting: there is a high demand for skills in retrofitting buildings with net-zero installations, such as insulation and solar technologies.
Advanced Manufacturing: skills in lean manufacturing, sustainable product development, and automation technologies are increasingly sought after, along with expertise in electrical engineering.

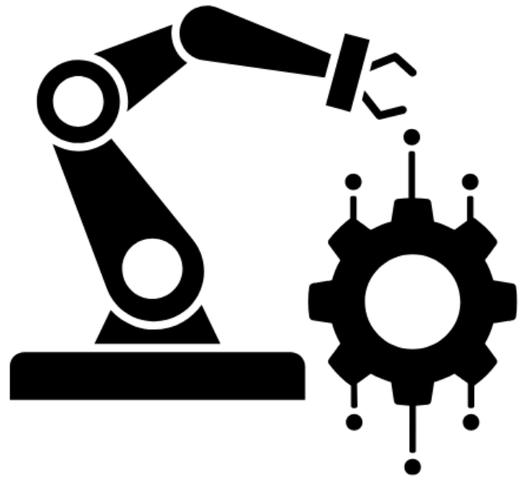
Additionally, the feedback from employers highlights a significant gap in 'soft' skills among new recruits, such as professional attitude, aptitude, effective presentation, strategic planning, and time management. These skills are pivotal for success in the GCSE's Non-Examined Assessment (NEA) component, emphasising the need for students to develop a proactive and responsible approach to project management.

Vision and Goals for Our D&T Curriculum

Our vision extends beyond traditional education, aiming to cultivate a comprehensive skill set that empowers our students to excel in a dynamic job market. This involves:
- Character education: we are dedicated to nurturing self-motivation, lateral thinking, and robust problem-solving skills. Encouraging students to persistently seek innovative and creative solutions is at the heart of our curriculum.
- Communication skills: effective communication is key. We focus on enhancing students' abilities to express their ideas through both sketches and presentations, increasing their confidence and competence in articulating design concepts.
- Technical proficiency: to meet the varied needs of our local economy, our curriculum offers a blend of traditional skills and modern techniques, including opportunities to engage with CAD and electronics.
- STEM Integration: recognising the integral role of D&T within STEM, we emphasise the practical application of scientific and mathematical principles in our projects. This approach not only enriches students' understanding of these subjects but also boosts their confidence and pride in their achievements.

By fostering these essential skills and knowledge, we prepare our students not just to meet but to exceed the expectations of future employers, ensuring they are well-equipped for success in whichever career path they choose.





Cam toy design

YEAR 7

Pinball designing

Electronics and programmable microcontrollers

Pinball mechanisms

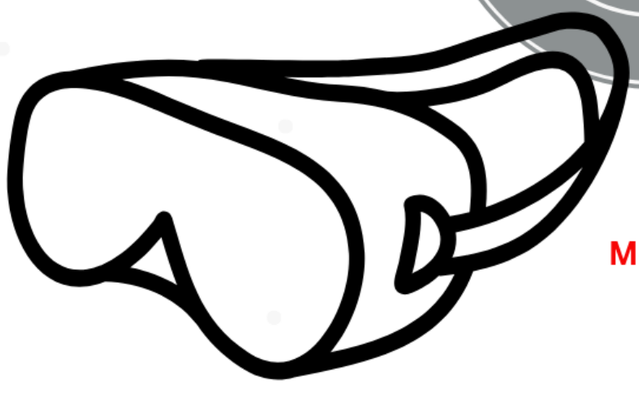
YEAR 8

YEAR 9

Brief, spec, initial designs

Making a quality product and evaluation

Cam toy structure



Modelling and development

KS3 DESIGN TECHNOLOGY CURRICULUM

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Year 7											
Autumn				Spring				Summer			
Unit Title: Cam toy structure	Unit Length: 6 lessons	Unit Title: Cam toy design	Unit Length: 6 lessons	Unit Title: ?	Unit Length: 6 lessons	Unit Title:	Unit Length:	Unit Title:	Unit Length:	Unit Title:	Unit Length:
Domains of knowledge: In the 'character car' project. Students customise a generic car body shape and make with hand tools, install a cam or cams in order to create mechanisms and design a character to drive the car. The character is inspired by Japanese Kokeshi dolls but should also be designed to look like a named end user for the product. Teaching will cover nationalism in design – Japanese cultural approach to design. Examples of Japanese products, including Kokeshi toys will be shared with students.		**Domains of knowledge:** In this project students design the customisable part of their cam toy project. In this project students design then make the moving parts for their cam toy. Learning will take place on Japanese Kokeshi Dolls and Japanese culture, Shintoism and respect for materials. WAGOLLs will be provided as reference points.		**Domains of knowledge:** In this project students design then make the moving parts for their cam toy. Learning will take place on Japanese Kokeshi Dolls and Japanese culture, Shintoism and respect for materials		Domains of knowledge:		Domains of knowledge:		Domains of knowledge:	
Key concepts: Domestic, local & industrial contexts – Character Toys Oldham or Playforever traditional wooden toys, headquarters in London. Past & present professionals & others – look at examples of Kokeshi toys and the products designed and made by Playforever Toys Reverse Engineering – students will be provided WAGOLLs to take apart in order to understand how they will build their own project Environmental impact including sustainability and product lifecycles. Students given opportunity to learn about the environmental and aesthetic advantages of wooden toys. Impact of D&T on society and individuals – students encouraged to think about the fact that children's toys are designed to inspire and entertain. Materials e.g. sources, classifications & properties (materials could be considered within the context of the GCSE classifications) - Characteristics of wood		**Key concepts:** Materials e.g. sources, classifications & properties (hardwoods and softwoods) Understand how mechanical systems enable change in movement & force - cams innovative, functional, appealing products Annotated sketches – working from a scaffolded start drawing students will develop a side elevation of their intended design and label components. Develop specifications – students to pick an end user for their toy and record decisions. User needs & user centred design - students designing for a named end user and adapting designs to react to feedback. Non-stereotypical responses – by working with an end user students will be driven to produce work that isn't necessarily what they had in mind at the beginning of the project.		**Key concepts:** Create innovative, functional, appealing products Past & present professionals & others - Japanese XXXX inspired designs Different Cultures – look at the Japanese approach to design, being respectful of materials and nature in line with Shinto/ Zen Buddhism teachings. Select and use CAM – choice of laser cut wheel designs, cut from 4mm birch ply in 2 parts? Understand the design influence of different cultures – Japan, Shintoism and other wooden toys. Design drawing – annotated sketches to aid design decisions Detailed plans – students will create design drawings in isometric. Evaluate (including test, evaluate & refine ideas & products against a specification & getting views of intended users & other interested groups) Students to test their		Key concepts:		Key concepts:		Key concepts:	

taught. Acrylic plastic for washers taught. Metal for axles/ fasteners taught. Materials & performance of structural elements to achieve functional solutions – students will learn about the fibrous nature of wood and suitability to a toy design Health and Safety – students will be taught requirements of the workshop before making commences. Responsibilities of designers, engineers & technologists – students to think about the safety aspects of toy design. These points will be added into the specification. Select and use specialist techniques and processes – students will be using a combination of hand or machine tools for the car body build.	Oral and digital presentations -students will be asked to present their ideas in small groups and receive feedback Iterative Design Process – following presentation and feedback students will be given the chance to adapt their designs. How mechanical systems enable change in movement & force – the core of the toy is a cam (or cams).	finished character car against their specification.			
Relevant end points covered: Health and safety Making - Using a combination of traditional hand tools and technology to develop prototypes and end products using specialist tools and equipment.	**Relevant end points covered:** To innovate and take risks, to be resourceful and to be an enterprising citizen with an understanding of technological developments Designing – using a range of techniques (drawing, soft modelling and CAD) to produce non stereotypical solutions to given and self-set problems.	**Relevant end points covered:** Making - Using a combination of traditional hand tools and technology to develop prototypes and end products using specialist tools and equipment.	Relevant end points covered:	Relevant end points covered:	Relevant end points covered:
Assessments:	Assessments: Grade awarded for quality of making skills	Assessments: Summative test on cams, Health and Safety, advantages of CAD/CAM, microcontrollers	Assessments:	Assessments:	Assessments:

Year 8

Autumn				Spring				Summer			
Unit Title: Pinball mechanisms	Unit Length: 6 lessons	Unit Title: Pinball designing	Unit Length: 5 lessons	Unit Title: Electronics and programmable microcontrollers	Unit Length: 5 lessons	Unit Title:	Unit Length:	Unit Title:	Unit Length:	Unit Title:	Unit Length:
Domains of knowledge: In this project students make the necessary slots to convert a CD case into a pinball machine. Next, they cut stickers to size to decorate the pinball machine case. The cutting of the component stickers involves using the components themselves as templates.		**Domains of knowledge:** Students reverse engineer, then make the flipper and flicker mechanisms for their pinball machines. By experiencing using the flipper and flicker to fire a ball bearing around the pinball machine students gain experiential knowledge of mechanisms, forces and physics.		**Domains of knowledge:** Designing 'playground' components with the ball bearing as the 'end user' Starting with paper designs then making prototypes from card, then a final design in resistant materials. A stand-alone lesson on the teacher WAGOLL pinball machine with its basic electronic circuit will cover some aspects of curriculum.		Domains of knowledge:		Domains of knowledge:		Domains of knowledge:	
Key concepts: Scales of production – batch production Production aids – templates – using a template to mark-up slots Production aids – jigs – drilling CD case using a jig Advantages of CAM/CAM - laser cut components Cutting to waste – cutting side slot in CD case Finishing processes – finishing CD case side slot with a file Polymers – thermoforming – CD case recycling at end of life Polymers – injection moulding –CD case production discussed Use a wide range of complex materials & components Impact of D&T on society and individuals -lightweighting CD case		Key concepts: Understand how mechanical systems enable change in movement & force - flicker and flipper. Applied physics – mechanisms and friction Environmental impact including: sustainability, product lifecycles, lifecycle analysis, cradle to the grave, circular economy - recycling CD case components. Reverse engineering – to help understand flipper and flicker construction take apart existing examples. Select and use CAM – teaching on advantages of CAD/CAM to give context to laser cut components used in the pinball machine Select & use specialist tools, equipment & machinery – slots cut with tension files as well as hacksaw. Hole drilled on a custom jig on the pillar drill. Ergonomics & anthropometrics – the wingnut and pushrod size/design Smart and modern materials – the laser cut components can be made from light Gathering Acrylic in order to make teaching on smart materials experiential.		Key concepts: User centred design Annotated sketches Component marking out and making To understand and apply the iterative design process Using a range of design strategies – designing the independent components using card, foam then plywood in order to test and evaluate design ideas. Specialist tools and equipment – choose hacksaw or tension file when cutting final, ply components. To understand principles of costings - Complex measurement tasks and conversions – tessellation and costing acrylic plastic components Design Drawings – isometric 'pinball' lettering outputs e.g. programmable components (microcontrollers) How more advanced electrical & electronic systems can be powered & used (inputs & outputs e.g. heat, light, sound & movement) - teaching on real pinball machines and how sensors, actuators, solenoids create pinball play – A GIANT, SOLENOID		Key concepts:		Key concepts:		Key concepts:	

		PINBALL ACTUATOR AND LDR TRIGGERED BUFFERS MADE IN THE WORKSHOP WOULD BE A GOOD WAY TO ACHIEVE THIS. Investigate new and emerging technologies – films on latest developments in pinball machine technology to be shown. Electronics – focussed practical tasks making circuits with Crumble kits Apply computing & use electronics to embed intelligence that responds to inputs & control			
Relevant end points covered: Making - Using a combination of traditional hand tools and technology to develop prototypes and end products using specialist tools and equipment.	**Relevant end points covered:** To have an understanding of materials, their properties, sources and environmental impacts. To select materials based on their properties.	**Relevant end points covered:** Researching and developing design ideas. To understand the difference between primary and secondary research. to be able to design for an end user, meeting their needs. Designing – using a range of techniques (drawing, soft modelling and CAD) to produce non stereotypical solutions to given and self-set problems. To innovate and take risks, to be resourceful and to be an enterprising citizen with an understanding of technological developments.	Relevant end points covered:	Relevant end points covered:	Relevant end points covered:
Assessments: Cutting the two ‘leg’ shaped slots /10	**Assessments:** Cutting the side slots in the CD case /10	**Assessments:** Summative assessment on making techniques, forces and mechanisms, thermoforming polymers, advantages of CAD/CAM	Assessments:	Assessments:	Assessments:

Year 9											
Carousel subject											
Unit Title: Brief, spec, initial designs	Unit Length: 6 weeks	Unit Title: Modelling and development	Unit Length: 5 weeks	Unit Title: Making a quality product and evaluation	Unit Length: 5 weeks	Unit Title:	Unit Length:	Unit Title:	Unit Length:	Unit Title:	Unit Length:
Domains of knowledge: Memphis deisgn inspired picture frame. Traditional woodwork aspect of the project. Measuring, marking, cutting to waste and finishing timber components. Learning on wood joints		Domains of knowledge: Studying the work of Memphis group, putting into context of 20th Century design history. Write specification, designing then making Memphis inspired components to customise the frame from half term 1. Detailed plans Pattern designing using CAD? - link colour scheme choice to pattern and a room at home/end user Iterative design process		Domains of knowledge: Working from specification and prototype models, students to build a high quality finished product using traditional woodworking skills and techniques Students to evaluate their completed project against the specification that they developed earlier in the project. This is done in order to give a flavour of how GCSE major projects run.		Domains of knowledge:		Domains of knowledge:		Domains of knowledge:	
Key concepts: Link to GCSE, start point for project is a context given to all students, as with major GCSE project. Past & present professionals & others – 20th Century design movements, particularly Memphis group – students to gain understanding of key points of the Memphis style User needs and user centred design – research needs of an end user/room at home for pic frame to match in with/contrast. Develop Specifications – following research at home students to work on a spec using a writing frame as start point. Iterative Process – develop a card prototype for review/improvement		Key concepts: Different cultures – 20th Century design history, link to 20th Century history Write Specification with an end user in mind. End user to choose colour way for pattern 3D MAthematical modelling - CAD pattern – didactic lesson to explain CAD and Techsoft. Outside edge shapes of repeat pattern provided, inner shapes and colours to be customised by students on laptops. Using a range of design strategies – students to use a variety of modelling techniques when developing and improving prototypes. Detailed Plans – students to draw up detailed plans for their final product before starting the final build innovative, functional, appealing products		Key concepts: outputs e.g. programmable components (microcontrollers) How more advanced electrical & electronic systems can be powered & used (inputs & outputs e.g. heat, light, sound & movement) Investigate new and emerging technologies – English comprehension exercise working from articles on new and emerging technologies from T3 magazine or similar.		Key concepts:		Key concepts:		Key concepts:	

Relevant end points covered: Making - Using a combination of traditional hand tools and technology to develop prototypes and end products using specialist tools and equipment. To have an understanding of materials, their properties, sources and environmental impacts. To select materials based on their properties.	Relevant end points covered: Designing – using a range of techniques (drawing, soft modelling and CAD) to produce non stereotypical solutions to given and self-set problems. To innovate and take risks, to be resourceful and to be an enterprising citizen with an understanding of technological developments.	Relevant end points covered:	Relevant end points covered:	Relevant end points covered:	Relevant end points covered:
Assessments:	Assessments:	Assessments:	Assessments:	Assessments:	Assessments:

KS4 DESIGN AND TECHNOLOGY CURRICULUM

Great Academy Ashton
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COURSE ASSESSMENT

Design and technology assessment.

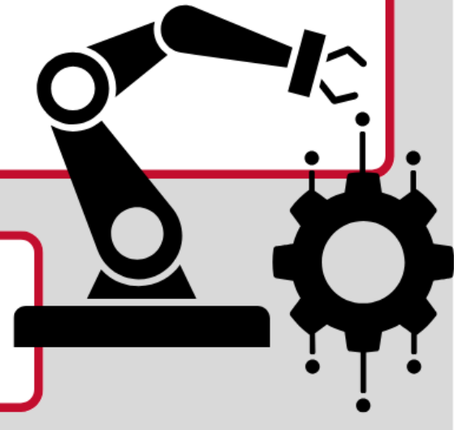
1. Written Examination (50% of qualification): A 2-hour exam assessing students' understanding of design and technology principles, including materials, processes, and the impact of design on society.
2. Non-Exam Assessment (NEA) (50% of qualification): An internally assessed and externally moderated design and make task, approximately 35 hours in duration. Students select one of three contextual challenges provided by WJEC, leading to the creation of a prototype and a supporting portfolio

COURSE DETAILS

Course: WJEC GCSE DESIGN AND TECHNOLOGY

COURSE DESCRIPTION

The WJEC GCSE Design and Technology course offers students a comprehensive understanding of the design process, enabling them to identify and solve real-world problems by creating innovative products or systems. Throughout the course, learners engage in both theoretical and practical activities, fostering creativity and technical proficiency. They explore a wide range of materials, components, and manufacturing techniques, gaining insights into the impact of design and technology on society, culture, and the environment. The curriculum emphasizes the development of critical thinking and problem-solving skills, encouraging students to consider user needs and sustainability in their designs. Assessment comprises a written examination and a non-exam assessment (NEA), where students undertake a design and make task based on a contextual challenge set by WJEC. This balanced approach ensures that learners are well-prepared to participate confidently and successfully in an increasingly technological world.



PROGRESSION ROUTES

The course is designed to develop the skills needed for further education, employment and training such as A levels, apprenticeships or further education courses leading to degrees. There are a vast range of careers in engineering including mechanical, chemical, electrical and structural engineering

KS4 FOOD PREPARATION AND NUTRITON CURRICULUM

Great Academy Ashton
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COURSE ASSESSMENT

Food and nutrition assessment.

The assessment for this GCSE typically consists of two main components:

- Written Examination (50%) – A final exam covering theoretical knowledge of nutrition, food provenance, cooking methods, and scientific principles behind food preparation. This is usually 1 hour and 45 minutes long.
- Non-Examined Assessment (NEA) (50%) – Students complete two internal tasks:
  - Food Investigation Task (15%): This task requires students to demonstrate their understanding of the scientific principles that underpin the preparation and cooking of food.
  - Food Preparation Task (35%): This is a practical exam where students plan, prepare, and cook a series of dishes to showcase their culinary skills and understanding of nutrition(

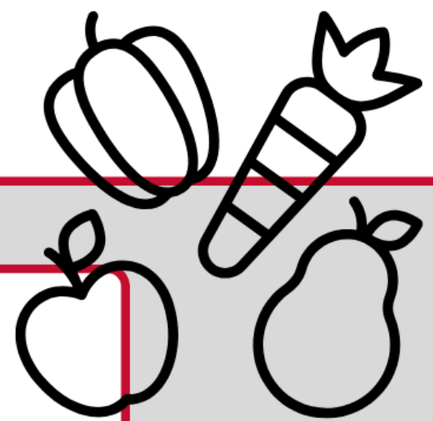
COURSE DETAILS

Course: WJEC GCSE FOOD AND NUTRITON

COURSE DESCRIPTION

The GCSE in Food Preparation and Nutrition is an engaging qualification designed to teach students practical cooking skills while deepening their understanding of nutrition, food science, and food safety.
The course focuses on five core areas:

- Food, nutrition, and health: Understanding nutrients, their functions, and the consequences of excess or deficiency.
- Food science: Exploring the scientific principles of cooking and the physical changes that occur during food preparation.
- Food safety: Learning about hygiene, food storage, and contamination prevention.
- Food choice: Investigating factors that influence food selection, including social, cultural, and economic aspects.
- Food provenance: Examining where food comes from, environmental impacts, and sustainable practices in food production



PROGRESSION ROUTES

Students who complete this GCSE can pursue various routes:

- A-Level Food Science and Nutrition: This leads to further study in food-related fields.
- Vocational Courses: Such as Level 1/2 Vocational Awards in Hospitality and Catering, or Food Science and Nutrition Level 3.
- Career Pathways: roles in catering, dietetics, food product development, food safety, and hospitality management.