Curriculum Progression Pathway - Design Technology

AQA Level 1/Level 2 GCSE (9-1) in Design and Technology

Why is the study of GCSE Design and Technology important?

GCSE Design and Technology (AQA) is the inspiring, rigorous and practical subject which prepares all young people to live and work in an increasingly technological world. Studying Design and Technology allows our students to gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Our curriculum offers all students the opportunity to work creatively when designing and making and applying technical and practical expertise.

Studying GCSE Design and technology allows students to study core technical and designing and making principles, including a broad range of design processes, materials techniques and equipment. These skills and knowledge are then used to help solve real and relevant design problems that affect the world we live in.

Across the study students will be taught to:

- How to make effective design choices using a breadth of core technical knowledge.
- Explore a specialist technical principle in a material area of their choice.
- Understand how the prototypes they develop must satisfy the wants or needs of the intended user.
- Demonstrate and apply knowledge and understanding of designing and making principles.

What skills will the study of GCSE Design and Technology teach you?

We live in a fast paced, technological and multifaceted society that our students are going to be entering when they leave our School community. Design and Technology helps to prepare our students to take on the problems that they encounter and build the foundations for key skills such as resilience, problem solving and decision making. Design and Technology is teaching our students how to make the world a better place by providing a framework to prepare students for real life scenarios through exposure to a wide variety of design briefs in which they have to solve. Studying Design and Technology will primarily teach them to be innovative but with a clear focus on converting ideas and raw materials into the products and services that we all need and use every day of our lives.

Design and Technology requires them to use all of their skills and knowledge that they have learnt from every aspect of the School curriculum and gives great opportunity to put theory into practice. Students are taught the skills to understand the materials and technology in which things are made as well as the services which make them work.

Design and Technology will teach students the following skills…

- Soft skills - that allow students to become more interpersonal and unlock the potential of others when working as a team.
- Technical ability – Knowing which materials, tools and equipment to use to bring the best results to their given problem.
- Innovation and logical thinking when understanding how to tackle poorly designed products.
- Empathy when relating to other users that have different needs / requirements.
- Harnessing Self-confidence to appreciate when an idea or solution is worth pursuing.
- Discipline / accuracy and attention to detail to ensure the best outcome is achieved under the given conditions.
- Communication by liaising with clients to determine the requirements of the brief / project.
- Analytical, evaluative and critical thinking skills to allow problem solving and decision making to progress constant iteration of an idea / theory.
- Organisation and managing client proposals from initial brief, conception of idea to realisation of the finished product.
- Cross curricula knowledge - Applying what students have learnt in Maths and Physics and allowing that learning to come to life.

What will you know and understand from your study of GCSE Design and Technology?

In order to make effective design choices students will need a breadth of core technical knowledge and understanding that consists of:

- New and emerging technologies
- Energy generation and storage
- Developments in new materials
- Systems approach to designing
- Mechanical devices
- Materials and their working properties

In addition to the core technical principles, all students should develop an in-depth knowledge and understanding of the following specialist technical principles:

- Selection of materials or components
- Forces and stresses
- Ecological and social footprint
- Sources and origins
- Using and working with materials
- Stock forms, types and sizes
- Scales of production
- Specialist techniques and processes
- Surface treatments and finishes.

How can you deepen your understanding of GCSE Design and Technology?

Design and Technology is in everything you do, the products you use and the services you make use of every day. You don't 'do' Design and Technology you 'live it', it's part of your life. There are a number of ways that you can deepen your interest in Design and Technology;

- Volunteer for Design and Technology enrichment clubs. This is a great way of gaining more experience and having fun at the same time. This might be making robots, being part of a STEM club or even volunteering to make the props for your School play.
- Visit some quality museums and learn how technology and design have changed over the years. It's far easier to go forward when you have learnt about why things have changed.
- Go out of your way to experience good design, go and visit a building because of its layout, form or function. Go and sit in a friend or family's car to experience how different designers interpret what good design should look like.
- Get creative at home, whether that's Lego, modelling out of card, experimenting with free CAD software or practicing drawing techniques. Don't wait for someone to teach you those skills, go and learn them yourself and impress those around you.
- Be nosey! Listen to people, watch documentaries, and ask questions about how and why products are made. Without the knowledge then ideas are just a picture on a page.

How are you assessed in GCSE Design and Technology?

There are 6 assessment points each year that we term Praising Stars©. We assess how students at their current stage of study are on track to reach their end of stage targets which are formulated on aspirational expectation from their KS2 starting points. We make an informed prediction from our holistic assessments based on our subject mapping of expectation across the Design and Technology curriculum.

GCSE Design and Technology is accredited at the end of the course in the form of one **examination paper** (Paper 1) and one **Non Examined Assessment** (NEA)

Paper 1 (Written Examination)
This will be a written examination lasting 2 hours and will be worth 50% of the overall GCSE. The exam paper will be marked out of 100 Marks and question will be structured as follows:

Section A – Core technical principles (20 marks) A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding.

Section B – Specialist technical principles (30 marks) Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles.

Section C – Designing and making principles (50 marks) A mixture of short answer and extended response questions.

In addition: at least 15% of the exam will assess maths, at least 10% of the exam will assess science.

Non Examined Assessment (NEA)
This element of the course allows students to respond to a given contextual challenge set by AQA on the 1st June in the year prior to submission. It represents 50% of the overall GCSE, will take 30 – 35 guided learning hours and will be marked out of 100. Students will respond to the contextual challenge by completing a substantial design and make activity guided by their own independent learning. Students will identify a clear need from a Primary user in which they will hope to solve through generating ideas and developing a solution through an iterative approach. The body of work is internally assessed by the teacher and moderated externally by AQA.

Key Assessment Objectives

The exams and non-exam assessment will measure how students have achieved the following assessment objectives.

AO1: Identify, investigate and outline design possibilities to address needs and wants.

AO2: Design and make prototypes that are fit for purpose.

AO3: Analyse and evaluate:

- design decisions and outcomes, including for prototypes made by themselves and others
- wider issues in design and technology.

AO4: Demonstrate and apply knowledge and understanding of:

- technical principles
- designing and making principles.

Study of GCSE Design and Technology can lead to a wide range of careers:

Design	Fashion and Textiles
Product design Robotics Industrial Automotive Carpet manufacture Fashion/haut couture Interior design Packaging Games industry Advertising Marketing Digital media Publishing Film and media	Hosiery Footwear Clothing Menswear/womenswear Materials development Furniture Accessories Sportswear Aerospace Automotive Carpets Fashion/haut couture Interior design
Electronics and Systems & Control	**Engineering and Construction**
Robotics Computing Digital media Transport Broadcasting Security Armed forces Electronics Aerospace Automotive Services & infrastructure	Civil engineering Construction Mechanical engineering Robotics Armed forces Electronics engineering Aerospace Automotive engineering Services & infrastructure

Students taking a GCSE in Design and Technology will receive one hour of theory every week which will be examined at the end of their final year taking the course. The theory taught will also be used throughout their other lessons during the course bringing the theory to life within a practical environment. Some of the projects typically delivered on these courses are outlined on the next page.

AQA Level 1/Level 2 GCSE (9-1) in Design and Technology Course Overview		
Term	**Year 1**	**Year 2**
Autumn 1	**Exploring core materials: timbers, metals and textiles.** Introduction to the core element of the course learning about the origins, properties and characteristics of these materials. Students will complete projects to understand the tools and machinery to use with these core materials. These core materials will lead on from the knowledge and skills learnt from the projects taught at KS3.	**Non Examined Assessment (NEA): Section B Producing a design brief & specification and C Generating design ideas.** Based on conclusions from their investigations students will outline design possibilities by producing a design brief and design specification. Students should review both throughout the project. Students should explore a range of possible ideas linking to the contextual challenge selected. These design ideas should demonstrate flair and originality and students are encouraged to take risks with their designs. Students may wish to use a variety of techniques to communicate.
Autumn 2	**Exploring a specialist technical principle: Polymers / Timbers** GCSE groups will learn about one or two materials in greater depth than in the first term. Students will explore the sources, properties, tools and equipment needed to manufacture a product out of this material. They will develop a greater understanding of this material at all levels of production and be able to articulate this in their project work. The specialist technical principle studied will be determined by the experience of the teaching staff and interests of that particular cohort of students.	**Non Examined Assessment (NEA): Section D Developing design ideas and E Realising the** Students will develop and refine design ideas. This may include, formal and informal 2D/3D drawing including CAD, systems and schematic diagrams, models and schedules. Students will also select suitable materials and components communicating their decisions throughout the development process. Students are encouraged to reflect on their developed ideas by looking at their requirements; including how their designs meet the design specification. Students will work with a range of appropriate materials/ components to produce prototypes that are accurate and within close tolerances. This will involve using specialist tools and equipment, which may include hand tools, machines or CAM/CNC. The prototypes will be constructed through a range of techniques, which may involve shaping, fabrication, construction and assembly.
Spring 1	**Modelling materials and techniques: Architectural Visualisation** How to utilise modelling techniques and materials, including papers and boards to create a scaled model of a building or structure. Students should research and design a building based on eco-technology they have identified to make buildings more energy efficient. The project will focus on the accuracy of their model to create a 3D visual representation of their solution. Students will also be taught 2D and 3D drawing techniques to help communicate their ideas clearly. This project allows students to learn 3D modelling software that will use throughout the course.	**Non Examined Assessment (NEA): Section E Realising Ideas and Section F Analysing and Evaluating** Within this iterative design process students are expected to continuously analyse and evaluate their work, using their decisions to improve outcomes. This should include defining requirements, analysing the design brief and specifications along with the testing and evaluating of ideas produced during the generation and development stages. Their final prototype(s) will also undergo a range of tests on which the final evaluation will be formulated.
Spring 2	**Iterative Design Project; Passive Amplifiers** Develop the use of an iterative design approach to a design context. Students will research and test how sound travels by making prototypes of a passive amplifier. The knowledge learnt from this can be used to make small changes to improve the functionality of the final amplifier. The skills learnt from trailing and testing are key in the success of a product and vital that students know that iteration is part of the design process.	**External Examination Preparation. Revision for all key skills and knowledge.**

Summer 1	Systems based designing: LED Lighting Students will look at different strategies for developing an idea and solving design contexts given to them. One of which will be a systems based approach to designing. Students will design and manufacture their own lighting solution based around the developing technology of LED lighting. This project will allow students the opportunity to use microcontrollers to make intelligent products that react to external influences.	External Examination Preparation. Revision for all key skills and knowledge.
Summer 2	Non Examined Assessment (NEA): Section A - Identifying & investigating design possibilities. On June 1st of every academic year the contextual challenges are released by the exam board for the Non Examined assessment (NEA) 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. Work will be completed in the form of a portfolio often produced on the computer that can be worked on throughout the project to record the stages the students go through when completing the project.	