

GCSE Design and Technology

Syllabus: Edexcel - Design and Technology

Course Outline

The GCSE in Design and Technology enables students to understand and apply design processes through which they explore, create and evaluate a range of outcomes. The qualification enables students to use creativity and imagination to design and make prototypes, (together with evidence of modelling to develop and prove product concept and function), that solve real and relevant problems, considering their own and others' needs, wants and values. It gives students opportunities to apply knowledge from other disciplines, including mathematics, science, art and design, computing and the humanities. Students will acquire subject knowledge in Design and Technology that builds on Key Stage 3, incorporating knowledge and understanding of different materials and manufacturing processes.

Students learn how to take design risks, helping them to become resourceful, innovative and enterprising citizens. They should develop an awareness of practices from the creative, engineering and manufacturing industries. Through the critique of the outcomes of design and technology activity, both historic and present day, students should develop an understanding of its impact on daily life and the wider world and understand that high-quality design and technology is important to the creativity, culture, sustainability, wealth and wellbeing of the nation and the global community. In the context of this document, the term 'prototype' refers to a functioning design outcome. A final prototype could be a highly-finished product, made as proof of concept before manufacture, or working scale models of a system where a full-size product would be impractical.

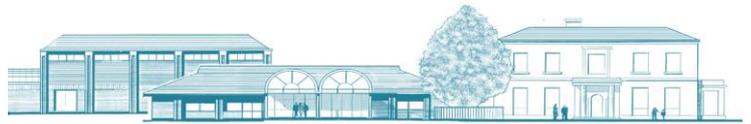
The new GCSE introduces an interactive approach to design and making. Students opt to study in a material based area:

Papers and Boards – When designing, making or modifying a product, students should be able to apply their knowledge and understanding of papers and boards, components and manufacturing processes. Students are given a context that could, for example, involve them designing and making a Board game, or a Popup Book, or a Child's Activity pack.

Textiles – When designing, making or modifying a product, students should be able to apply their knowledge and understanding of Textiles, components and manufacturing processes. Students are given a context that could, for example, involve them designing and re-modelling a tee shirt, designing a print pattern that will be applied to a material which will be used to make a cushion and designing and making a waistcoat or skirt.

Timbers - When designing, making or modifying a product, students should be able to apply their knowledge and understanding of Timbers, components and manufacturing processes. Students are given a context that could, for example, involve them designing and making Timber based products. Students could for example be asked to design and make a device for lighting, or a storage container, or a pull along mechanical toy.

Regular homework tasks are set throughout the course. This is an important and integral part of the course requirements as students are expected to work independently. The completion of regular homework tasks is vital to gaining a successful final grade.



A Guide to the Curriculum at Key Stage 4 (Years 10 & 11)

Areas of Study

Candidates are encouraged to be creative, be original and take risks in their controlled assessment work. They need to consider sustainability throughout their controlled assessment task and produce work that is of the best quality and content that they are capable of. Candidates investigate the Design Context given. They are encouraged to undertake focused and relevant research which must be analysed. Research should include analysis of the design context, product evaluation, market research, research of target market/client. This should then lead to the clear identification of Design Criteria reflecting the student's analysis. They will then be able to design ideas and develop them into a final outcome. Students create ideas by sketching, develop the chosen ideas by sketching and modelling their ideas. A final design idea, parts list, and a cutting list need to be produced. A final product is then manufactured, with students recognising the relevant tools and processes needed to create an appropriate practical outcome. Testing and evaluation should be on going and evident throughout the designing, development and making of the student's own product. They should show evidence of client testing and have a summative evaluation against the original specification. Modifications should also be included in the evaluation.

Assessment:

Unit 1: Examination – The Examination at the end of the course represents 50% of the marks and will test the knowledge and skills learnt throughout the course. It consists of two sections;

Section A: Core

This section is 40 marks and contains a mixture of different styles of questions on metal, paper and boards, polymers, systems, textiles and timbers.

Section B: Material Categories

This section is 60 marks and contains a mixture of different style questions on one of the chosen materials studied for the course.

The examination includes questions linked to Maths and Science.

Exam Preparation

It is essential that students start preparing for the examination in plenty of time. Revision activities could include researching information for the pre-release sheet to prepare for Section A of the examination paper. Practising designing techniques, sketching, drawing, applying colour etc. revising the design process and getting a better understanding of the language used in the examination and what it requires to answer the question.

Unit 2: Controlled Assessment – This part of the course represents 50% of the final grade and should represent 40 hours of the Candidates work.

There are four points in the controlled assessment that are assessed;

Investigation – This includes investigation into the needs, areas of research, and a product specification.

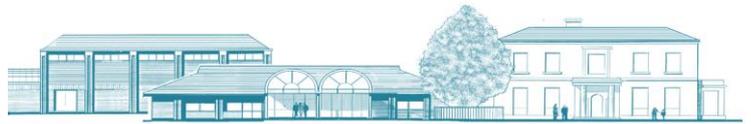
Design – this includes different design ideas, reviews of initial ideas and development of the design ideas into a chosen design.

Make – This includes the manufacture of a quality prototype.

Evaluate – This includes the testing and evaluation throughout the design and make process.

Grouping

Students are taught Design and Technology in mixed ability groups of around 20 students for two hours per week in Year 10 and three hours in Year 11.



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Literacy/Numeracy Skills

Students are encouraged to develop their skills in literacy through Design and Technology in a number of ways. When designing their ideas, students are encouraged to annotate their work. Students are also encouraged to investigate Design and Technology through various research, product analysis and design tasks. It is particularly important for students to be able to give their opinion on their and other designers work.

Promoting Reading for Pleasure/Independent Reading

The Design and Technology department has a number of reference books in each work room, which are regularly used in conjunction with design projects. In addition, students are encouraged to use the extensive collection of design reference books in the Library.

Support, Strategies and Interventions for students (SEN, Most Able, Students not making Expected Progress)

Students are supported through a well-resourced curriculum. Materials are differentiated to allow all students access to each project. Students are shown examples of the kind of work they are expected to make and tasks are broken down into 'bite size' chunks. Carefully planned homework tasks allow students to extend their learning beyond the classroom. Specialist equipment is used in order to enable students of all abilities to access the task.

Useful Resources for Home

Here are some useful websites that link to the GCSE curriculum:

www.technologystudent.com

www.design-technology.info

www.practicalaction.org

www.bbc.co.uk/schools/gcsebitesize/

How to help your child

Relying on last minute preparation for six exams is always a risky strategy. We have found that the most successful students are those who organise and start their revision preparations at the start of Year 10. We recommend that students prepare revision cards mind maps etc. as the course progresses.

Post 16 Progression

A good grade at GCSE will prepare students for entry onto an AS/A2 Level Art & Design or Design and Technology course or any of the Level 3 BTEC courses offered by local providers. This course will also help to provide an opportunity for progression onto an Art, design related Degree and a career within the Creative Industries. Students can also apply for apprenticeships which involve and develop specialist practical skills.

Glossary of Terms used in Resistant Materials

Aesthetics – How various features combine to make something 'beautiful' or 'attractive'

Analyse – To reduce to basic elements – a term often used in the early stages of the designing process.

Annotation – The addition of explanatory notes.

Anthropometrics – The study of the measurements and movement of human beings.

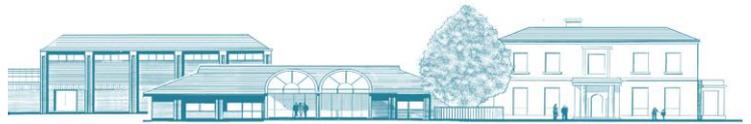
Brief – A clear statement of the Design objective / Design task.

CAD – Computer aided design.

CAM – Computer aided manufacture.

Criteria – Working characteristics that a product or process must achieve.

Design – The process of solving problems through the development of ideas to produce a solution within set constraints.



A Guide to the Curriculum at Key Stage 4 (Years 10 & 11)

Development – The refinement of ideas to produce a final solution, dealing with the details of materials/ingredients, construction/method of manufacture, appearance/aesthetics and function including quantities and sizes.

Evaluation – Judgements made throughout the designing process which test the outcome against the specification.

Mass Production – The production of an artefact in very large numbers.

Mechanism - (Mechanical Movement) A mechanism creates movement within a product e.g. a pop up card, push pull linkage to create movement etc.

Mind Mapping – A rapid collection of initial thoughts regarding a problem.

Mock-up – A model (often full-size) of a design to allow evaluation.

Model – A representation that can be either 2D or 3D, to a scale and made from easily manipulated materials.

Primary Research – Research done by an individual from original sources.

Prototype – The initial version of a product used for testing, development and evaluation.

Quality Control – Operational checks and tests carried out to ensure that the product performs to specification.

Questionnaire – A series of questions aimed at obtaining information on a specific situation. The analysis of the results is a key feature of this activity, time needs to be spent creating the actual questions.

Render - To add colour, shading, textures, shadows, wood-graining, plastic effects etc. to a drawing or sketch.

Research – The gathering of relevant information.

Risk Assessment – The process of judging the likelihood of a problem occurring – using a high, medium and low scale.

Smart Materials - These are modern materials that respond to differences in temperature or light and then change in some way. Some also have a memory and they revert back to their original state – e.g. colour changing dyes.

Specification – The criteria that a solution must achieve. (2) **Specification** also means the complete description of the subject content, assessment arrangements and performance requirements for a qualification. This now replaces the word 'syllabus'.

Survey – Research carried out by questioning a number of different people or organisations.

System – A group of processes organised to perform a task.

Varnishing – This is the application of a thin glossy varnish that is applied to a printed product. It has a number of functions – it can help to protect the printed product, it makes it more attractive and can also be used to create dramatic highlights. There are various types of varnish used for different applications.

Vacuum Forming – The process of shaping thermoplastics onto a former