

GCSE Design & Technology

Overview of the Curriculum

GCSE Design & Technology - Key Stage 4 (Years 10 & 11)

The GCSE Design & Technology course offers students the opportunity to add breadth and depth to the technical knowledge and skills developed at Key Stage 3. The curriculum continues to emphasise the importance of practical skills, whilst building up their theoretical understanding of the subject. Our aim is to ensure students understand the practical application of the technical knowledge they are taught.

The GCSE course starts with students studying a range of technical principles that form the foundations of making effective design choices. Students then have the opportunity to apply this knowledge to a practical design project; the brief for the project will be determined by a student's chosen pathway within the Design & Technology specification. At Parmiter's we offer a Graphic Design project where students focus on working with papers and boards, or a Product Design project with a focus on resistant materials. This practical project reflects the iterative design process students are familiar with from Key Stage 3, and which forms the structure of the Non-Exam Assessment (NEA) project that accounts for 50% of the GCSE Design & Technology course.

Students then move on to complete a focussed study of technical principles, considering how these principles apply to a narrower selection of materials. From June of Year 10, the focus moves to the Iterative Design Project (NEA); this remains the focus of curriculum time until the February of Year 11. Whilst the project milestones ensure students move through the iterative design process effectively and efficiently, the design work created by the students is unique and offers an opportunity for students to showcase a personal response to the design brief. Throughout the project, students build their portfolio of evidence that documents their journey through the design and process, before creating their prototype. Throughout the project, opportunities are taken to reinforce the technical principles that will be examined on the written examination paper. Once the NEA project is complete, the focus of the curriculum returns to the written examination paper and ensuring students can apply and communicate their knowledge to the examination, rather than a project based scenario.

To enable students to put their learning in context and experience the design and making processes in the commercial world, GCSE students have the opportunity to visit the Disneyland Paris, Museum of Brands, HH GlobalDisplayplan and the Mini Cooper factory.

At GCSE, we deliver the AQA GCSE Design & Technology specification. Nationally, AQA is the most popular examination board for GCSE Design & Technology, ensuring students and staff have access to a range of resources to support the effective delivery of the course. Our experience of working with AQA is positive; in a subject where 50% of a student's grade is based on their NEA project - with each student having a unique outcome - it is important that staff and students have confidence that student outcomes are judged reliably and fairly.

A Level Design & Technology - Key Stage 5 (Years 12 & 13)

At A Level, we offer the AQA Design & Technology Product Design specification. This course offers students a natural progression from GCSE to A Level as they are familiar with the assessment requirements, the technical language and the balance of Non-Exam Assessment (NEA) and theory work. As at GCSE, the course is supported by a wide range of resources to support students and teachers.

Students engage in both practical and theoretical study throughout the course. The skills and knowledge covered in the two written examinations, technical principal (paper 1) and design and making principles (paper 2) are sequenced across Year 12 and 13 to align with practical tasks (Year 12 term 1) or the focus of the NEA project. A cycle of revisiting prior learning and the application of knowledge to practical project work ensures learning is continually embedded. There is also a focus on a range of mathematical and scientific skills required for effective design, the development of sophisticated technical language and an opportunity to investigate historical, social, cultural, environmental and economic influences on design.

The NEA project, which represents 50% of the qualification, is a substantial design and make task. Whilst students work to common project milestones, the context and design brief developed by themselves. In order to be able to evidence the knowledge and skills required at A Level, 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 produce a written or digital design portfolio and manufacture a final prototype. This is a substantial piece of work, but one in which students have an opportunity to pursue a particular area of interest and build their confidence as an independent, creative and effective designer.

Overview of schemes of work at each key stage

Key Stage 4 - GCSE

Year 10

The theory content of the GCSE course is covered in Year 10.

Term 1

Core Technical Principles

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

Key Stage 5 - A Level

Year 12

Term 1

Students study the following areas of the specification, sequenced to support the practical skill tasks:

Technical Principles

3.1.1 Materials and their applications

- new and emerging technologies
- energy generation and storage
- developments in new materials
- systems approach to designing
- mechanical devices
- materials and their working properties.

Term 2

Continue and complete The Core Technical Principles unit is completed before students move onto a design & make project:

- Graphics brief - Movie design standee project
- Product Design brief - Desk tidy project

Students complete the project by Easter of Year 10. This project provides a key opportunity to practise the iterative design process students will need to use for their NEA project.

Term 3

Specialist technical principles

Building on the core technical principles studied in term 1, students build 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

The **NEA Iterative Design Project** is introduced in June of Year 10, with a focus on completing section A and B in Year 10.

Section A - Identifying and investigating design possibilities.

- 3.1.6 Modern industrial and commercial practice
 - 3.1.6.2 Efficient use of materials
- 3.1.7 Digital design and manufacture, Digital Design Skills, Computer Aided Design (CAD), Computer Aided Manufacture (CAM), Virtual Modelling
- 3.1.2 Performance characteristics of materials
- 3.1.8 The requirements for product design and development
- 3.1.9 Health and Safety

Design and making Principles

- 3.1.14 Design communication
- 3.2.4 Design processes
 - 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

Alongside the above, students develop their **practical skills** through:

- A project in which they work with wood, polymers and metals.
- Developing industrial design sketching techniques
- Developing 3D CAD skills

NEA

The NEA Design and Make project is introduced in the second half of Term 2, with milestones as detailed until final submission in February of Year 13.

NEA - Section A: Identify, investigate & outline design possibilities

NEA - Section B: Product a design brief and specification

NEA - Section C: Design and make prototypes that are fit for purpose

Students carry out primary and secondary research, investigate client needs and wants and consider factors such as economic and social challenges.

Section B - Producing a design brief and specification.

Based on their research, students outline design possibilities by producing a design brief and design specification.

Students sit a written theory based exam paper during the Year 10 exams.

Year 11

Students continue with the NEA project from September to February of Year 11.

Term 1

Section C - Generating design ideas

Students explore a range of design ideas and be expected to present free hand sketches and refine ideas in 2D & 3D.

Section D - Developing design ideas

Students develop and refine design ideas and communicate these through CAD (working drawings - orthographic views, exploded, 3D), creating schematic diagrams and models using paper/corrugated cardboard. Students also produce a manufacturing plan and specification

Term 2

Section E - Realising design ideas

Students produce a prototype. Students are expected to use specialist tools and equipment and work within close tolerances.

Section F - Analysing & evaluating

Students are expected to continuously analyse and evaluate

Term 2

Students study the following areas of the specification, sequenced to support the work done on the NEA project:

Technical Principles

3.1.10 Protecting designs and intellectual property

3.1.11 Design for manufacturing, maintenance, repair and disposal

3.1.4 Forming, redistribution and addition processes

3.1.12 Feasibility studies

3.1.13 Enterprise and marketing in the development of products

Designing and making principles

3.2.3.4 Product Life Cycle

3.2.5 Critical analysis and evaluation

3.2.6 Selecting appropriate tool, equipments and processes

3.2.7 Accuracy in design and manufacture

3.2.8 Responsible design

Term 3

Technical Principles

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 (2.6)

3.1.6.2 Efficient use of materials

Design and making Principles

3.2.9 Design for manufacture and project manufacture

3.2.10 National and international standards in product design

Students will study effective exam techniques and revision in A Level Product Design. They will complete a written examination during the Year 12 exams.

their work and then test their prototype to inform their final evaluation.

The final submission for NEA is February of Year 11.

Term 2-3

Students then return to the theory content of the course to revise and prepare for their written examination. Students will have sat a written paper during the Year 11 trial examinations.

Year 13

Term1

Students study the following areas of the specification, sequenced to support the work done on the NEA project:

Technical Principles

- 3.1.1 Materials and their applications
- 3.1.7 Digital design and manufacture
- 3.1.2 Performance characteristics of materials
- 3.1.8 The requirements for product design and development
- 3.1.9 Health and Safety

Designing and making principles

- 3.2.14 Design communication
- 3.2.4 Design processes
- 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

NEA - Section D: Development of design prototype

Term 2

Students study the following areas of the specification, sequenced to support the work done on the NEA project:

Technical Principles

- 3.1.4 Forming, redistribution and addition processes
- 3.1.10 Protecting designs and intellectual property
- 3.1.4.5 The use of adhesives and fixings
- 3.1.5 The use of finishes
- 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

Designing and making principles

3.2.3.4 Product Life Cycle

3.2.7 Accuracy in design and manufacture

3.2.5 Critical analysis and evaluation

3.2.6 Selecting appropriate tools, equipment and processes

3.2.8 Responsible design

3.2.9 Design for manufacture and project manufacture

3.2.10 National and international standards in product design

Exam prep & revision

NEA - Section E: Analyse & Evaluate and final submission

The final submission for NEA is February of Year 13.

Term 3

Revision and preparation for written examinations.