



A Level Design and Technology

Why study Design and Technology?

Design and Technology heavily influences the world around us – product and industrial designers create the everyday products we use, architects design the buildings we live and work in, and engineers develop a vast array of functional devices that allow society to operate.

All of these careers stem from a problem that needs to be solved and thinking of creative ways in which to achieve this – this is at the heart of Design and Technology, as it encourages pupils to develop working solutions for a whole host of problems by using a variety of skills. Critical thinking involving analysis and evaluation, visually communicating ideas to others, and practical work to create working prototypes are only a few examples of essential skills pupils who study the subject can develop. The subject draws together skills from a broad range of disciplines including Physics, Mathematics, History and Art, and consequently requires pupils to develop their knowledge and abilities in numerous areas, which can ultimately lead to a wide range of careers.

We are keen to support pupils in realising their design ideas and the department is very well equipped to do so, as we have specific wood and metal workshops, which have a wealth of tools and equipment. These include engineering machines such as the centre lathe and a milling machine, as well as a variety of computer-controlled devices including a CNC microrouter and laser cutter. The department also features two 3D printers, which the pupils are encouraged to use as part of their prototype outcomes. Alongside the workshops, we have two computer suites which feature the 3D modelling software programme, Solidworks. This is heavily used in multiple industries and this educational edition enables pupils to develop their skills in this area which can be drawn upon for future use.

Entry requirements

While there are no prior learning or other requirements for this qualification, it is immensely beneficial for pupils to have studied the subject at GCSE given the experience of the assessment, and skills and knowledge developed during these years. However, it is possible for students to study the A Level having not studied the subject at GCSE – Year 12 is used to develop the necessary skills required for the Non-Examination Assessment (NEA) and all theory topics are covered for the external exam, regardless if these have been introduced earlier at GCSE. Pupils who do not have a GCSE qualification in the subject must attend Engineering Activities for their Thursday afternoon enrichment option to help develop their practical skills. As such, a discussion with the Head of Department is required to assess a prospective candidate's suitability in undertaking the course.

The subject will particularly appeal to students who enjoy:

Solving problems – the nature of the subject requires students to develop their own solutions to design problems through a variety of means.

Communicating ideas to others through drawing and other media.

Creating physical prototypes using a variety of tools and machines.

Independent study – the nature of the NEA requires the pupils to manage all areas of the project work, which is supported by department staff.

Understanding the impact the subject can have in the development of current products and future ones.



What skills will be developed in the Design and Technology A Level course?

Through the completion of the A Level, pupils will be able to:

use creativity and imagination when applying iterative design processes to develop and modify designs, and to design and make prototypes that solve real world problems, considering their own and others' needs, wants, aspirations and values.

identify market needs and opportunities for new products, initiate and develop design solutions, and make and test prototypes.

acquire subject knowledge in design and technology, including how a product can be developed through the stages of prototyping, realisation and commercial manufacture.

take every opportunity to integrate and apply their understanding and knowledge from other subject areas studied during Key Stage 4, with a particular focus on science and mathematics, and those subjects they are studying alongside A Level Design and Technology.

develop intellectual curiosity about the design and manufacture of products and systems, and their impact on daily life and the wider world.

work collaboratively to develop and refine their ideas, responding to feedback from users, peers and expert practitioners.

develop an in-depth knowledge and understanding of materials, components and processes associated with the creation of products that can be tested and evaluated in use.

be able to make informed design decisions through an in-depth understanding of the management and development of taking a design through to a prototype.

be able to create and analyse a design concept and use a range of skills and knowledge from other subject areas, including mathematics and science, to inform decisions in design and the application or development of technology.

be able to work safely and skilfully to produce high-quality prototypes.

have a critical understanding of the wider influences on design and technology, including cultural, economic, environmental, historical and social factors.

Further information

Due to the nature of the subject and the iterative nature of the project work, the course is very demanding in terms of time and pupils are expected to spend some of their free period time within the Department, particularly in Y13. There are many opportunities for them to do so during the course of the school week as the department is very keen to support the pupils in fulfilling their potential. There is a cost of £15 per academic year for the materials used as part of prototype production.

It is requested that any pupils who are interested in studying the subject mail t.moseley@lsf.org for further information **before** selecting the option.

Design and Technology is offered at Loughborough Grammar School.



What does the course involve?

The subject is assessed through one external exam and one NEA project, both equally weighted at 50%. In preparation for these, the following areas are covered as part of the course over the duration of the two years.

Year 12

NEA preparation:

During Year 12, pupils will complete a variety of tasks in preparation for the NEA. These include analysing researched information for a specific design context, communicating design ideas through drawings, and manufacturing effective prototypes through practical activities. Although this work is not submitted to the exam board, it provides pupils with an essential opportunity to develop their skills in multiple areas before beginning the formal NEA in the summer term of Year 12 which continues into Year 13.

Exam preparation

Theory lessons are delivered on a weekly basis and cover the following topics.

1. Materials
2. Performance characteristics of materials
3. Processes and techniques
4. Digital technologies
5. Factors influencing the development of products
6. Effects of technological developments
7. Potential hazards and risk assessment

Pupils receive supporting homework tasks to develop their knowledge in these areas and regular assessments per half term to confirm their understanding.

Year 13

NEA:

Started at the end of Year 12, pupils continue with their NEA throughout Year 13 before its eventual submission in the spring term. This project will require pupils to determine their own project direction in consultation with a specific user or client. This project requires pupils to produce a portfolio of work and accompanying prototype.

Exam preparation:

Theory lessons continue to be delivered on a weekly basis and covers the following topics.

8. Features of manufacturing industries
9. Designing for maintenance and the cleaner environment
10. Current legislation
11. Information handling, Modelling and forward planning
12. Further processes and techniques

Pupils receive supporting homework tasks to develop their knowledge in these areas and regular assessments per half term to confirm their understanding.

Exam Board

Pearson Edexcel Level 3 Advanced GCE in Design and Technology (Product Design) (9DT0)



How is the course assessed?

The A Level is assessed through the following two components:

Component 1: Principles of Design and Technology

Written examination: 2 hours 30 minutes

50% of the qualification

This paper includes calculations, short-open and open-response questions, as well as extended-writing questions. Pupils receive weekly theory lessons in both Year 12 and 13 to equip them with the skills and knowledge required to complete this assessment, which is completed at the end of Year 13.

Component 2: Independent Design and Make Project

Non-examined assessment

50% of the qualification

The assessment requires pupils to work through a design process where they will produce a substantial design, make and evaluate project. This is very similar to the assessment completed at GCSE in that the pupils will complete a portfolio which will contain approximately 60 sides of A3 paper and accompanying prototype that the pupils have manufactured. The assessment is completed at the school and is internally assessed and externally moderated.

There are four parts to the assessment:

Part 1: Identifying and outlining possibilities for design

Identification and investigation of a design possibility, investigation of client/end user needs, wants and values, research and production of a specification

Part 2: Designing a prototype

Design ideas, development of design idea, final design solution, review of development and final design and communication of design ideas

Part 3: Making a final prototype

Design, manufacture and realisation of a final prototype, including tools and equipment and quality and accuracy

Part 4: Evaluating own design and prototype

Testing and evaluation

What can an A Level in Design and Technology lead to?

The nature of the subject equips pupils with a wealth of skills and pupils who have studied Design and Technology have pursued a variety of different courses at a higher level. These have included:

Industrial Design and Technology

Architecture

Aerospace Engineering

Aerospace Engineering

Civil Engineering

Mechanical Engineering

Civil Engineering

Business Management

Pupils will often utilise the work completed at part of the portfolio documents to strengthen applications to higher institutions.

