



A Guide to the Curriculum at Key Stage 3 (Years 7, 8 & 9)

Design

Year 7

The Year 7 course aims to develop the knowledge, understanding and skills needed to engage in a process of designing and making, through a variety of creative and practical activities. Students will build on the Design and Technology that they have studied at Key Stage 2 but will have the opportunity to use a wider selection of tools and equipment in a workshop environment. The course is designed to develop skills in designing and making. The Year 7 course will introduce students to working with wood metal and plastics.

Unit 1: Health and Safety.

Students will begin by completing a short Health and Safety awareness course. It is very important that students know how they are expected to behave in a practical environment. The success of this unit is shown by our excellent safety record.

Unit 2: Lost in Space.

Students will develop their understanding of Design and Technology and the design process. The first lesson involves them working as part of a small team. The aim is to build the tallest structure that will support a small weight. The students cover the whole of the design process in this lesson. To complete the unit students design and make a wooden spaceship this is designed to develop the student's skills when working with wood.

During the unit Students will:

- Learn how to build a structure.
- Develop their Knowledge and understanding of the Design Process.
- Learn how to dimension a drawing.
- Learn what is meant by the term half scale.
- Learn the difference between hardwoods and softwoods.
- Learn techniques of how to measure and mark out accurately on wood.
- Learn which tools to use to cut, shape and join wood.

Unit 3: Sporting Figure.

Students will develop their understanding of Design and Technology and the Design Process. The aim of the unit is to design and make a Sporting figure based on their own anthropometric measurements but scaled down and is designed to develop the student's skills when working with metal.

During the unit students will:

- Learn how to collect Anthropometric Data.
- Develop their Knowledge and understanding of the Design Process.
- Learn what is meant by the term One Tenth Scale.
- Learn the difference between ferrous and non-ferrous metals.
- Learn which tools are appropriate for which making processes.
- Learn techniques of how to measure and mark out accurately on Metal.
- Learn which tools to use to cut, shape and join metal.
- Learn how to braze metal together.
- Learn how to Dip Coat metal.

Unit 4: Key fob Torch

Students will develop their understanding of Design and Technology and the design process. The unit is to design and make a key fob torch based on an endangered animal and is designed to develop the student's skills when working with plastics as well as introducing some basic electronic components and circuit.

During the unit students will:

- Develop their knowledge and understanding of the design process.
- Research endangered animals.
- Develop their knowledge of vacuum forming.
- Develop their skills when working with plastics.
- Make a simple electronic circuit.
- Learn which tools are appropriate for the making processes.

Year 8

The Year 8 course aims to develop the knowledge, understanding and skills needed to engage in a process of designing and making, through a variety of creative and practical activities. Students will build on the Design and Technology that they have studied at Year 7 but will have the opportunity to use a wider selection of tools and equipment in a workshop environment. They will be taught how to use Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) programs. The course is designed to develop skills in designing and making. The Year 8 course will develop the students' skills and knowledge when working with wood, metal and plastics. There is also a unit that includes some aspects of Graphic Design.

Unit 1: Board Game and Electronic Dice

Students will develop their understanding of Electronic components and how to assemble an electronic circuit. They will write a program to test the circuit and install it onto their circuit. They will design and make a board game based on a book.

In Textile lesson they will design and make a bag on the same book theme, for the game and dice too fit into.

During the unit students will:

- Develop knowledge and understanding of the design process.

- Learn how to build and solder a programmable circuit.
- Learn about electronic components.
- Learn which tools are appropriate for the making processes.
- Develop research skills.
- Learn how to design a template for a board game using CAD.
- Learn about, and apply, appropriate graphic techniques for designing and presenting ideas.

Unit 3: Bird Feeder.

Students will develop their knowledge and understanding of Design and Technology by following a plan to build a Bird Feeder made from wood and plastic. They will use Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) techniques to make their bird feeder unique and appeal to their chosen target market.

During the unit students will:

- Develop knowledge and understanding of the design process.
- Develop their skills working with wood and plastics.
- Develop their knowledge and understanding of wood and plastics.
- Learn how to mark out and cut a lap joint.
- Learn which tools are appropriate for which making processes.
- Use CAD/CAM to decorate the roof of your bird feeder.

Year 9

The Year 9 course aims to continue and further develop the knowledge, understanding and skills needed to engage in a process of designing and making, through a variety of creative and practical activities. Students will build on the Design and Technology that they have studied in Year 7 and Year 8. The course is designed to develop skills in designing and making. The Year 9 course will enhance the Students knowledge of working with wood metal and plastics. It will develop their Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) skills and also develop their knowledge of electronics

Unit 1: MP3 Amplifier

Students are taught how to make a simple electronic amplifier circuit, and then develop an enclosure to put the circuit, battery and speaker into. Then using the images collected from their research they design and make a speaker grill using CAD CAM technology. They also have to design and make a cushion in Textiles which incorporates similar imagery to hold their mobile phone.

During the unit students will:

- Develop knowledge and understanding of the design process.
- Learn how to build and solder an audio amplifier circuit.
- Build an amplifier enclosure.
- Design and make a speaker grill.
- Develop Computer Aided Design and Computer Aided Manufacturing techniques.
- Learn about electronic components.
- Learn which tools are appropriate for the making processes.

Computer Aided Design

During this unit, students will develop their knowledge and understanding of Computer Aided Design. Students will complete a series of tutorials to gain a good understanding of the Computer Aided Drawing package. They will then design a Mobile Phone or MP3 player and make a virtual model of it. They will then use other CAD programs to design advertising material.

During the unit Students will:

- Learn how to use the CAD 3D drawing package to draw a mobile phone.
- Produce a 3D image of a mint with a hole.
- Produce a 3D image of a block pyramid.
- Produce a 3D image of a boat.
- Produce an inspiration board based on mobile phones for teenagers.
- Gain an understanding of the abbreviation CAD.
- Gain an understanding of the abbreviation CAM.
- Produce 3 design Ideas.
- Produce a 3D image of a mobile phone in one hour under test conditions.
- Design and develop advertising material for the Mobile Phone using CAD.

Grouping

Students are taught Design and Technology in mixed ability groups of around 23 students for one hour per week in Y7-9.

Useful Resources for Home

Here are some useful websites that link to the Y7-9 curriculum:

www.wwf.org.uk

www.technologystudent.com

www.design-technology.info

www.practicalaction.org

www.aqa.org

How to help your child in Key Stage 3

Students are expected to complete homework for Design and Technology, a lot of these will involve researching existing designs and finding images to inspire their design work. In addition, you can encourage your child to explain their opinions about any aspects of design new and old. Think about what materials have been used to make it and why? What influenced the aesthetics of the design? How does it work? How it was made?

Design and Technology is involved many aspects of everyday life. You could discuss environmental issues, or sustainable designs.

You could encourage your child to get involved in everyday problem solving activities, they could design their ideal bedroom, or design a piece of furniture, or plan a new garden layout etc. You could encourage

them to use construction kits, or maintain their bicycle. Any problem solving or practical activity will help develop their knowledge and understanding.

Assessment

Formative assessment is an on-going process within the department and includes teacher comments in addition to peer and self-assessment. Summative feedback is given using established criteria linked to the National Curriculum and will include a Level.

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. Students also evaluate their own and others 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.

Glossary of Terms used in Design and Technology

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.
Artefact	A product that has been designed and made.
Brief	A clear statement of the Design objective / Design task.
CAD	Computer aided design.
CAM	Computer aided manufacture.
Compliant	A material that can be easily shaped, folded, cut or joined.
CNC	Computer numerical control.
Consumer	A person who purchases or uses a product or service.
Constraints	Limits placed on the designing process.

Crease	Folding card or paper over a straight edge in a straight line.
Criteria	Working characteristics that a product or process must achieve.
Data	Relevant facts and figures collected by research or experimentation and testing.
Database	A collection of information now commonly stored on computer.
Design	The process of solving problems through the development of ideas to produce a solution within set constraints.
Development	(1) 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.
Development	(2) The flat form of the surface area of a container (sometimes known as a net).
Ergonomics	The study of human interaction with the environment.
Evaluation	Judgements made throughout the designing process which test the outcome against the specification.
Function	What an artefact or process is expected to do.
Jigs	Devices for holding parts in the appropriate position for machining or assembling.
Logo	A symbol associated with the identity of a company or organisation.
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.
Profit	The difference between the cost of production, including overheads, and the selling price.
Prototype	The initial version of a product used for testing, development and evaluation.
Render	To add colour, shading, textures, shadows, wood-graining, plastic effects etc. to a drawing or sketch.
Research	The gathering of relevant information
Resources	The equipment, materials, knowledge and skills required to design and make a product.
Risk Assessment	The process of judging the likelihood of a problem occurring – using a high, medium and low scale.
Risk Control	The steps taken to stop an assessed risk occurring.
Score	Indent a line in board or paper etc. to help fold the material accurately. This is usually done with a modelling knife, paper scorer, used ball point pen or hard pencil.
Secondary Research	Research drawn from existing sources such as books and magazines.

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.
Solution	The means by which the need is satisfied.
Specification	(1) The criteria that a solution must achieve.
Spider Diagram	A means of presenting the results of research and analysis. Surface Development (Net) – Unfolding a package or box creates a Surface Development of the product.
Symbol	A design idea that can be abstract or realistically represent a solution.
System	A group of processes organised to perform a task.
Template	A pattern or gauge used as a guide for marking/cutting out single or batches of a selected design idea.
Testing	Checking the outcome in relation to the original specification and brief.
Tolerance	The range/allowance permitted when manufacturing a product.
Typography	The construction / layout of neat lettering / typestyles.
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 by the application of heat and a vacuum.