GCSE
Design and Technology
Handbook

Course Overview

Examining Body: AQA

Design and Technology is part of everyday life and is constantly evolving. In this GCSE, students will participate confidently and successfully in an increasingly technological world. Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. The qualifications focuses on developing practical skills and allows students to manufacture high quality outcomes. They'll learn about commercial processes and careers in related industries, as well as developing core transferable skills, such as collaboration and communication.

This qualification is linear. Linear means that students will sit all their exams and submit all their non-exam assessment at the end of the course.

The course content is divided up into three areas:

- Core technical principle
- Specialist technical principles
- Designing and making principles

Assessment

Exam	Non Exam Assessment (NEA)
How it's assessed ● Written exam: 2 hours ● 100 marks ● 50% of GCSE	**How it's assessed** ● Non-exam assessment (NEA): 30–35 hours approx ● 100 marks ● 50% of GCSE
What is assessed ● Core technical principles (CORK) ● Specialist technical principles ● Designing and making principles	**What is assessed** Practical application of: ● Core technical principles ● Specialist technical principles ● Designing and making principles
Questions **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)**	**Task(s)** Substantial design and make task Assessment criteria: ● Identifying and investigating design possibilities ● Producing a design brief and specification ● Generating design ideas ● Developing design ideas ● Realising design ideas

| 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. | ● Analysing & evaluating

Contextual challenges to be released annually by AQA on 1 June in the year prior to the submission of the NEA.

Students will produce a prototype and a portfolio of evidence

Work will be marked by teachers and moderated by AQA |

Teaching Timeline:

Topics and course content:
- Core Technical Principles
- Specialist Technical Principles
- Design and Making Principles

Assessment will be based on end of term exams for the theoretical knowledge and marking of the end of unit NEA.

Year 9

	Theoretical Knowledge	**NEA Preparation**
Half term 1	**3.1 Core Technical Principles** 3.1.1 New and Emerging Technologies 3.1.2 Energy Generation and Storage	**Unit: Skill Stick** In this unit you will learn a range of manufacturing processes used in the workshop and how to use tools and equipment. These include hand tools, machinery and CAD/CAM. You will be set a number of making challenges that you must complete to the best of your ability as the **quality of the finish product** is assessed.
Half term 2	3.1.3 Development of new materials	
Half term 3	3.1.4 Systems Approach to Designing	**Unit: Working in collaboration: User Centred Design** In this unit you will work in teams to create a model of a product for a specific end user. You will identify specific tasks each team member will lead on and research key areas that will help develop a final product.
Half term 4	3.1.5 Mechanical Devices	**Unit: 'Miss I Can't Draw'…but either could…** In this unit you will learn a range of communication tools in order to generate design ideas.
Half term 5	3.1.6.1 Materials and their working properties	
Half term 6	3.1.6.2 Material Properties	**Unit: CAD/CAM** Learn how to use a range of CAD software to support your communication and design ideas in 2D and 3D design.

Year 10

	Theoretical Knowledge	NEA Preparation
Half term 1	**3.2 Specialist Technical Principles (Natural and Man made timbers)** 3.2.1 Selection of materials or components 3.2.2 Forces and stresses 3.2.3 Ecological and Social Footprint 3.2.4 Sources and Origins	**Unit: Focus Practical Tasks –All materials** In this unit of work you will complete a series of practical tasks focusing on technical skills in order to develop a further understanding of materials, properties and manufacturing processes for the Core
Half term 2	3.2.5 Using and working with materials 3.2.6 Stock forms, types and sizes 3.2.7 Scales of Production 3.2.8 Specialist techniques and processes 3.2.9 Surface treatments and finishes	
Half term 3	**3.3 Designing and Making Principles** 3.3.1 Investigation, primary and secondary data 3.3.2 Environmental, social and economic challenge 3.3.3 The work of others 3.3.4 Design Strategies	**Unit: MOCK NEA** In this unit of work you will complete a MOCK NEA in order to understand the expectations that a required for their GCSEs.
Half term 4	3.3.5 Communication of Design Ideas 3.3.6 Prototype Development	
Half term 5	3.3.7 Selection of materials and components 3.3.8 Tolerances 3.3.9 Material management	
Half term 6	3.3.10 Specialist tools and equipment 3.3.11 Specialist techniques and processes	**NEA Introduction** NEA is released by Examining board. Preparations for criteria A and B will begin.

Year 11

	Theoretical Knowledge	NEA Preparation
Half term 1	Design and Making Principles continued	NEA: Design possibilities, brief, specification and generation of ideas.
Half term 2	Revision on Specialist Technical Principles	**Completion of Criteria A, B, C**
Half term 3	Revision on Core Technical Principles	NEA: Developing and Realising Design ideas
Half term 4	Exam Preparation	
Half term 5	Exam Preparation	**Completion of Criteria D, E, F**

Independent Learning

Independent learning will be shared with you via 'Show my Homework' and/or in class. It is expected that you complete all work and hand it in on time. IL will be a range of activities including case studies, skill development, research and analysis and problem solving.

Rules and Expectations in GCSE Design and Technology

1) Spend **at least** 60-90 minutes per week on Independent Learning
2) In addition to IL tasks set, spend about 20 minutes every week revising and learning new vocabulary
3) Meet all IL deadlines
4) Look up unknown vocabulary any other texts set as IL using a dictionary
5) When you experience difficulty with a topic or particular skill, seek help   straight away
6) See staff in advance if you are unable to attend a lesson
7) Catch up on work missed
8) Do not be afraid of making mistakes the process of making mistakes and learning how to improve things especially for your NEA preparation is part of your development.
9) Familiarise yourself with the criteria for the GCSE grades.
10) If you are below target, ensure that you know exactly what to do to get back on track.

Rules and Expectations for NEA Preparation

1) Enter the workshop ready for learning.
2) Follow all instructions given and remember to follow all rules especially the health and safety rules.
3) Work together with others on your workbench to ensure your area is kept neat and tidy.
4) Understand that we have 'collective responsibility' for clearing up the practical work.
5) Remove your jumper and blazer and wear an apron, and to tie back your hair ready for practical work.

Book Title	Author / Publisher
How Things Work	By David Macaulay
I Know You Got Soul	By Jeremy Clarkson
Presentation Techniques	By Dick Powell
Product Design – Teneues – Designs That Inspired Great Design 1000 Chairs	By Charlotte & Peter Field
Interior Design Atlas	By Anne Wilson
Making It – Manufacturing Techniques For Product Design	By Chris Lefteri
Industrial Design	By Tashen
Design Of The 20th Century	By Charlotte And Peter Field
Materials For Inspiration: Wood, Metal, Plastics	By Chris Lefteri
How To Make – Animated Toys	By David Wakefield
Collapsible	By Per Mollerup
Experimental Eco Design	By Brower/Mallory/Ohlman
Design Secrets – Products	By IDSA
New Chairs	By Mell Byars
Designing And Making Wooden Toys	By Terry Kelly
What Is Product Design	By Laura Slack
1000 Lights	By Tashen
The Best Table, Chairs And Lights	By Mel Byars
The Eco Design Handbook	By Alistare Fuad–Luke

Design and Technology Glossary	
Aesthetics	The study of the shape or form of everyday products; as in … "That product is aesthetically pleasing"
Analysis	Looking in detail at the design problem, what the problem involves what needs to be looked at (researched), and who needs to be consulted for advice.
Anthropometrics	The measurements of humans, e.g. heights, arms / leg lengths, hand widths, head sizes, or similar.
Batch Production	The production of products in 'batches'. E.g. batches of different types of bread products …brown then white bread … large and then small loaves, etc. batches of red china mugs, then blue ones, etc. A batch of benches for a park, or a batch of children's seating for a McDonald's restaurant.
Brainstorming	Listing all possibilities for the design problem, usually in a spider-type diagram or similar.

Brand Loyalty	Being Loyal to one Brand that makes different products. For example buying groceries from Tesco or buying Samsung phones and other electronic goods.
	British Standards Institute has responsibility of devising standards that particular products must meet, for a variety of reasons. For example toys must be tested to BS EN 71, for safety reasons. The full definition is at http://www.bsieducation.org/Education/14-19/default.shtml
	Computer software that helps the designer to create designs, plan, technical drawings and 3-D images of the design being explored.
	Computer software programs and Computer Numeric Control (CNC) machinery, such as a milling machine lathe or vinyl cutter machine, that allows CAD produced designs to be made by the CAM machinery.
	A person who the designer is making the product for, and they may be different to the end user or consumer. For example designing clothes for Monsoon, Marks and Spencer's etc.
Compressive strength	The ability to resist a pressing force, e.g. concrete or cast iron.
Conductivity (Electricity)	The ability of a material to conduct electricity e.g. copper, aluminium, gold.
Conductivity (Heat)	The ability of a material to conduct / transmit heat, e.g. copper.
Corrosion	The tendency of a material to rust (iron/steel) or corrode (aluminium)
Corrosion Resistance	The ability for a material to resist corrosion / discolouring /rotting, e.g. copper, lead, gold, silver.
Consumer	A person who buys products and uses them for their intended purpose.
Design Brief	A single sentence that states exactly what the design problem is
Development 1	The process of improving your initial ideas by looking at alternatives, making the design more attractive, smaller, simpler, lighter, easier to make, etc.
Development 2	The 'flattened-out' shape or outline of a box or other package. Also called a 'net'.
DTP (Desktop Publishing)	Computer software that is designed for producing leaflets, booklets and text-based documents.
Ductility	The ability of a material to be drawn / stretched pulled into thin strands, e.g., copper electrical cables.
Durability	The ability of a material or product to last a long time. The ability to do its job for a long period.

End User	A person who uses the product for its intended purpose, but may not have bought it.
Ergonomics	The study of 'Man in his Environment', e.g. work space, activity space, sitting, working heights or similar.
Evaluation (ongoing)	The process of making judgements about a design as you go along, so that changes / improvements can be made.
Evaluation (final)	The process of recording the good and bad features the final design / product, what other people think of it and what you would change if you were to repeat the design task.
Feedback (1)	Information you are given concerning your designs, research or prototypes, so you can use it in your design development.
Feedback (2)	An electrical signal from a component that is 'fed back' to a computer/microprocessor so that a motor or output can be switched on or off, e.g. a heat sensor (thermostat) that switches a heating system on/off or a light beam/pressure pad that activates a burglar alarm.
Flexibility	The ability of a material to bend and change shape, without cracking or breaking.
Graphic Designer	A person who is responsible for the design of the lettering and colour schemes of packaging, labelling and adverts. They will devise logos of companies and for products.
Gantt Chart	A method of planning that places tasks down the left hand side of the page and dates across the top, to enable you to see what needs to be done by when.
Initial Designs	Your first design sketches that show a range of possible ideas. (These are usually accompanied by comments that are you on-going evaluation)
Investigation	(See Research)
Malleability	The ability of a material to be bent, shaped, hollowed, etc. into a complex shape, e.g. steel sheets pressed into car body panels or copper sheet shaped into hot water cylinders.
Media	The general term for paper, card, paint, printer print-outs and other materials that are used in producing design work and products (mainly in Graphic Products).
Manufacturer	A person or company that will make the product.(See also One OFF production, Batch Production and Mass Production)
Market Research	The process of finding out what customers require from a product, e.g. questionnaires and interviews.

Mass Production	The continuous production on one product: e.g. motor cars, TVs, aluminium cans, plastic vending beakers, etc. The product may be produced around the clock and once it has commenced, the (sometimes automated?) machinery is made maximum use of.
Model	An attempt to build a version of your design to see if it works, if it is the right size or if it looks good. This could be done using CAD.
One-off production	The design and manufacture of one product only, e.g. a sculpture for a shopping centre or a signboard for a shop front.
Patent	A form of Intellectual Property Protection that applies to the function of a newly invented product.
Pattern	(See Template)
PCB	Printed Circuit Board
Planning	The process of sorting out how the design work will be done, how the product will be made, which processes get done first and the time needed for all of these activities.
Plasticity	The ability to change shape, to deform or to mould. (Similar to malleability).
Product Designer	A person who designs the overall shape and appearance of a product and concerns themselves with the aesthetics of the product, shape size, form etc.
Product Life	The period of time that a product is designed to last. (Related to planned obsolescence).
Prototype	The first model made to decide if the design works, if it is the right size, comfortable, safe, attractive or suited to the user's needs. This allows changes to be made, before the final version is made.
Quality Assurance	The guarantee a company can give that their product will be reliable based upon the reliability of the tests carried out when the product was made.
Quality Control	Individual tests carried out to check the product is being assembled correctly during production.
Questionnaire	A list of questions that are given to potential customers to find out their needs and preferences.
Recycle	Recycling involves processing used materials into new products in order to prevent waste.
Reduce	Reduce everything about the product. Reduce the size of the product making it less of an impact on the environment. Reduce the energy

	consumption when making the product. Reduce the number of batteries in the product.
Refuse	Refuse to use certain materials because they are not sustainable. Refuse to buy products that are not made ethically. Refuse to make products that are not sustainable.
Registered Design	A form of Intellectual Property Protection that applies to the outward appearance of a product. For example the glass coke bottle design was registered in 1937. Design registration lasts up to 25yrs.
Repair	Repair the product, don't throw it away. Graphics – facelift. Systems – fix it. Design for disassembly so parts are not thrown away.
Research	Gathering information to help with design work. The process of looking at existing ideas, designs and listing good and bad features. Gathering other information that will assist with design work.
Retailer	A person who sells products through shops directly to consumers.
Rethink	Designing products by "re-thinking" about the needs and wants for the product. Is the product REALLY needed? Is the product ONLY wanted, but not needed. Re-thinking the types of material to make the product.
Reuse	Reuse the product when it has come to end of its lifecycle. Reuse food. Rechargeable batteries. Reuse textiles. Reuse containers. Reuse the product in some way. Don't throw it away.
Rigidity	To make a product or structure stiff and resist deformation
Six R's of Sustainability	Sustainability can be refined down into 6 'R's those being 'Refuse', Rethink, Repair, Reduce, Reuse, Recycle.
Shelf life	The period of time a product remains safe to sell and / or safe to eat.
Smart Material	Smart materials are materials that have one or more property that can be significantly altered in a controlled fashion by external stimuli, such as stress, temperature, moisture, pH, electric or magnetic fields. E.g. Nitinol Wire, Thermochromic pigments, Thermochromic film.
Star diagram	A diagram that compares the good and bad features of a product.
Stiffness	(See Rigidity)
Strength	The ability of a material to resist pressure / loads.
Sustainable Design	Designing a product using the philosophy of RETHINK, REFUSE, REDUCE, REUSE, REPAIR, RECYCLE in order to reduce the use of energy and environmental impact of products. (each is defined in this glossary)

Target Group	When producing new products, the likely purchaser or user's needs and preferences are considered by the designer and manufacturer.
Template	A paper or card cut-out showing the shape of a product. Used to improve / finalise a shape and to transfer it to the chosen manufacturing material.
Tensile strength	The ability to resist a pulling force, e.g. a tow rope or lift cable.
Testing	The process of trying out a product to see if it does it's job or to see if it is strong enough or durable enough.
Toughness	Similar to durability. The ability to withstand repeated force, impact and rough use.

Textbooks

AQA GCSE (9-1) Design and Technology: Timber, metal-based materials and polymers Authors: Bryan Williams, Louise Attwood, Pauline Treuherz, Dave Larby, Ian Fawcett, Dan Hughes
Publisher: Hodder Education

Revision Guides

CGP GCSE AQA Design and Technology (for the Grade 9-1 Course) –The revision Guide

During the duration of the course, the revision guide will be provided to you in order to support your revision and to supplement the work completed in class.

Online References

Technology Student: http://www.technologystudent.com/despro_flsh/NEW_GCSE3.html

Bitesize: http://www.bbc.co.uk/education/subjects/zybc87h
http://www.bbc.co.uk/schools/gcsebitesize/design/

Jobs in the Design Industry

Design and Technology works well with Science subjects and Art subjects, it is a good partner to other practical subjects, and a way of applying knowledge from other subjects such as Maths and ICT. Most subjects have links with Design and Technology. We cover historical, geographical, environmental, artistic, scientific, financial, structural, mathematical aspects, within the context of designing and making products.

If you would like to follow a career path that involves working with your hands, being creative, coming up with practical or innovative solutions, having a broad understanding of the commercial world around us, then this may be for you. Design and Technology has paths into Art, engineering (mechanical, electrical, civil, marine, aerospace, automotive) architecture, interior design, graphic design, illustration, industrial design, ICT, craft trades and apprenticeships.

Jobs include:
- **Product Designer** – designs the outward appearance of a product and suggests ways in which the product could be made.
- **Product Champion** – someone like James Dyson who champions a product and perseveres in its manufacture all the way through to its eventual sale and use by the consumer.
- **Graphic Designer** - designs the logos, graphics, packaging and advertisements for a product.
- **Product Engineer** - talks to the product designer about the best way the product could work and suggests ways in which parts could be made or how technology can be developed.
- **Fashion Designer** - designs and makes new clothing lines either for a client outré couture or for a label e.g. Diesel, Fred Bloggs.
- **Manufacturer** - is responsible for getting many of the products made and ready for sale.
- **Retailer** – owns a shop or website and will market (advertise) and sell the product to a consumer.
- **Consumer** – a person who buys the product.
- **User** – sometimes the consumer is also the user but sometimes not. The user is the person who eventually uses the product.