



Sixth Form Handbook
Product Design

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About the course

Qualification aims and objectives

The aims and objectives of this qualification are to enable students 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
- Be open to taking design risks, showing innovation and enterprise while considering their role as responsible designers and citizens
- 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
- Gain an insight into the creative, engineering and/or manufacturing industries
- Develop the capacity to think creatively, innovatively and critically through focused research and exploration of design opportunities arising from the needs, wants and values of clients/end users
- 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
- Develop the ability to draw on and apply a range of skills and knowledge from other subject areas, including the use of mathematics and science for analysis and informing decisions in design.

How you will be assessed

A Level (First and Second year)

Exam: 2.5hrs, 120 marks, 50% of the A Level

Topic 1: Materials

Topic 2: Performance characteristics of materials

Topic 3: Processes and techniques

Topic 4: Digital technologies

Topic 5: Factors influencing the development of products

Topic 6: Effects of technological developments

Topic 7: Potential hazards and risk assessment

Topic 8: Features of manufacturing industries

Topic 9: Designing for maintenance and the cleaner environment

Topic 10: Current legislation

Topic 11: Information handling, Modelling and forward planning

Topic 12: Further processes and techniques.

NEA (Non Examined Assessment): 120 marks, 50% of the A Level

Assessment overview

- The investigation report is internally assessed and externally moderated.
- Students will produce a substantial design, make and evaluate project which consists of a portfolio and a prototype
- The portfolio will contain approximately 40 sides of A3 paper (or electronic equivalent)
- 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

Course Reading List & Materials

Books

- Handbook The Sustainability Handbook for D&T Teachers — Produced by Practical Action in collaboration with the centre for Alternative Technology and Loughborough University. Funded by the European Community and the Countryside Council for Wales.
- Reference books Attwood J, Lambert B, Neal P, Hancock G – Edexcel A Level Design and Technology – Product Design: Resistant Materials Technology, Third Edition (Pearson Education, 2009) ISBN 9780435757786
- Lambert B – Edexcel GCSE Design and Technology Resistant Materials Student Book (Pearson Education, 2010) ISBN 9781846907555
- Cresswell L — Understanding Industrial Practices in Product Design (Nelson Thornes, 2005) ISBN 0748790233
- Mayor J — Understanding Industrial Practices in Resistant Materials Technology (Nelson Thornes, 2004) ISBN 0748790217
- Reference books Attwood J and Hancock G – Edexcel A Level Design and Technology – Product Design: Graphic Products, Third Edition (Pearson Education, 2008) ISBN 9780435757793
- Attwood J – Edexcel GCSE Design and Technology Graphic Products Student Book (Pearson Education, 2010) ISBN 9781846907548
- Cresswell L — Understanding Industrial Practices in Product Design (Nelson Thornes, 2005) ISBN 0748790233
- Denison E and Cawthray R – The Big Book of Packaging Prototypes (Rotovision, 2010) ISBN 9782888930983
- Mayor J — Understanding Industrial Practices in Graphic Products (Nelson Thornes, 2005) ISBN 0748790225
- Roth L and Wybenga G — The Packaging Designer's Book of Patterns, Fourth Edition (John Wiley and Sons, 2012) ISBN 9781118134153

Useful websites

- www.biothinking.com - Bio thinking Information on developing new ecology derived techniques.
- www.bsigroup.co.uk - The British Standards Institution Information on CE Marking, Kitemark etc.
- www.cat.org.uk - Centre for Alternative Technology (CAT) Information on globally sustainable, whole and ecologically sound technologies and ways of life.
- www.data.org.uk - The Design and Technology Association List of resources for design and technology.
- www.hse.gov.uk - Health and Safety Executive Information on risk assessment. www.stepin.org Sustainable Technology Education Project Information on raising awareness of sustainable technology.
- www.nationalstemcentre.org.uk/tep - Technology Enhancement Programme (TEP) Programme aimed at supporting and improving the teaching and learning of technology in schools and colleges.
- www.bpf.co.uk British Plastics Federation Information on plastics.
- www.diecasting.org/faq North American Die Casting Association Information on die-casting. www.ssina.com The Specialty Steel Industry of North America Information on stainless steel.
- www.designtechnology.org Design Technology Department General information plus links to other sites

Tasks before September

Theory Knowledge – Materials fundamentals and Polymer Processing Methods.

Within the first two weeks of September you will have a test of your GCSE level materials knowledge and polymer processing methods. You will be expected to revise the following for the test:

- Timbers
 - Categories
 - Specific named examples of timbers.
 - Uses of timbers
 - Reasons for the uses.
- Metals
 - Categories
 - Specific named examples of timbers.
 - Uses of timbers
 - Reasons for the uses.
- Polymers
 - Categories
 - Specific named examples of timbers.
 - Uses of timbers
 - Reasons for the uses.
- Smart and Modern materials
- Composites
- Injection moulding
- Blow moulding
- Extrusion
- Rotational moulding
- Vacuum forming.

Design Task

This task should be presented as a 3 to 4 A3 sheet folio; either hand produces or word-processed. The presentation of your work is a key feature, as is the concise nature of your written content.

Task 1 – Product Analysis. Perform a critical analysis of a common household product; products such as games console control pads, mobile phones, hand held gadgets, alarm clocks, and kitchen utensils are ideal. For your chosen product, you must present a hand drawn, isometric, and fully rendered image of the product on an A3 sheet and then analyse the following areas:

- Aesthetics
- Ergonomics
- Materials
- Manufacturing method
- Design features.

Task 2 – Technology Push design task. As A-Level Product Design students you will be potentially designing future products that are based upon innovative technology that many people do not know is available. For example 10 years ago the concept of a personal VR devise seemed like science fiction, yet many people now have these devices in their homes.

A) Research into a new cutting edge technology and present your findings on A3 page. You should use websites like –

- <http://www.t3.com/>
- <http://www.popsoci.com/>
- <https://www.technologyreview.com/>
- <https://eandt.theiet.org/>
- <http://www.technologist.eu/print-magazine/>

Present your research with a summary of the article and an analysis of how this technology could be used to improve an existing product, or to inspire a new and currently imaginary product.

An example from Engineering and Technology Magazine discusses how Beetle shells are inspiring a new Nanotechnology that changes colour.

<https://eandt.theiet.org/content/articles/2017/06/beetle-shells-inspire-colour-changing-nanoparticles/>.

The article itself suggests that the new technology could be used for “anti-tampering tags and microelectrodes for easier-to-read sensors”

B) Using the findings of your research design a new, not yet produced that uses the technology you have identified. Your design should be drawn in freehand isometric, fully colour rendered with the design well presented with rendering and shading techniques, and with thorough annotation explaining how the product uses the new technology, you have researched. This sheet is a presentation sheet that you will be expected to discuss with the rest of the class.

Who can I contact for help?

Mrs L Hart – Head of Design and Technology

Mr RLD Janes – Teacher of Product Design and Engineering

Mr A Bousfield – Teacher of Product Design