

The Big Picture—INTENT

Design and Technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others’ needs, wants and values. Students acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens.

Our Year 10 Curriculum is designed to build on the knowledge and skills learnt across the material areas of Paper and Boards, Timbers, Polymers, Metals and Textiles in KS33. They will develop their communication skills graphically and through prototyping their ideas. They will become confident in practical skills in the workshop, and in the theory knowledge that underpins the Design and Technology curriculum. Our learners will become well equipped to complete the NEA and written exams aspects of their AQA GCSE in Design and Technology in year 11.

Implementation

- Students have 5 lessons over 2 weeks. Each week, one lesson will be dedicated to a PG Online theory unit. Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of solving real and relevant problems within a variety of contexts.
- Students should purchase the PG Online revision guide, which links directly to the theory studied in lessons. Students are encouraged to make notes in their revision guide during theory lessons, and refer back to these throughout year 10 and year 11 to revise and complete homework tasks.
- WAGOLL—Watching teacher step by step demonstrations.
- Practical skills—Use workshop machinery safely and accurately. Practical work is recorded using photographs.
- Recall—Questions will be set as a quiz on Satchel One following each theory lesson.
- Homework is set that links theory and exam practise to the current practical project.
- Literacy is developed through students reading theory text, and relevant current news articles.

Key Summative Assessments:

- Sketchbook – all assessment and subject work is recorded in lessons. Feedback in sketchbook.
- Retrieval homework, live marking and low stakes testing.
- PG Online Written tests are used to assess progress throughout the 7 theory units. Theses are written in a style that reflects the GCSE written paper.

Term 1

Practical Work assessment—Laminated Lamp
 Prototype Model
 Mock Exam Section AB (1 hour, 50 marks)

Term 2

CAD skills
 NEA Section ABC
 Mock Exam Section C (1 hour, 50 marks)

Term 3

Mock NEA Section DEF
 Full Mock Exam (2 hours)

Impact: High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation. Students will know more and remember more. There will be an increase in attainment through regular, formal and interleaved assessments.

Students will be well prepared with the skills and knowledge to be successful in their AQA GCSE Design and Technology qualification. They will be prepared to demonstrated their design and manufacture abilities in their NEA, and their theory knowledge in their written exam in year 11.

PRODUCT DESIGN

| Content | Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge | Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning | Prior Learning (Yr. 9) | Future Learning (Yr. 11) |
|--|---|--|---|--|
| <p>FPT – Timbers Puzzle</p> <p>Laminated USB Lamp</p> <p>Theory Unit 3.2 Timbers</p> <p>Theory Unit 5 Timber based materials</p> <p>Theory Unit 1 New & Emerging Technologies</p> <ul style="list-style-type: none"> • Industry and Enterprise • Sustainability and the Environment • People, Culture and Society • Production Techniques and Systems • Informing Design Decisions | <p>Students will make a USB powered lamp, using the process of lamination, in order to embed knowledge of the theory.</p> <p>Students will be secure in their ability to work safety in the workshop, selecting and using correct PPE.</p> <p>Students will be able to skilfully solder to produce a working electronic circuit.</p> <p>Wastage processes, such as cutting and punching, sawing, drilling and turning. Addition, such as adhesion and laminating, joining. Deforming and reforming.</p> | <p>Students will gain a more in depth understanding of timbers and their categories, finishes, and related manufacturing processes.</p> <p>Health and Safety in the Workshop</p> <p>Lamination of Timbers</p> <p>Use of moulds, formers and templates for repeatability and accuracy in manufacture.</p> | <p>Students learn about Hardwoods and Softwoods, as well as the environmental impact of using woods and ensuring sustainability.</p> <p>Workshop Skills</p> <p>Students are introduced to soldering and electronic components in their year 8 electronics project.</p> | <p>Section E—Manufacture</p> <p>Section F—Evaluation</p> <p>Unit 5 Timber based materials,</p> |
| <p>Prototype Modelling</p> <p>Prototype Development</p> <p>Theory Unit 2 Energy and Systems</p> <ul style="list-style-type: none"> • Energy Generation • Energy Storage • Modern Materials • Smart Materials • Composite Materials and Technical Textiles • Systems Approach to Designing • Electronic Systems • Mechanical Devices | <p>Deigning thinking and communication— sketching using isometric, including rendering and detailed annotations.</p> <p>Prototyping, through the use of craft knives, glue guns and considering a range of card construction techniques.</p> <p>Awareness of how international companies use this technique—Dyson.</p> <p>Development of ideas, clear recording of outcomes</p> | <p>Knowledge of Iterative Design, the importance of further iterations to develop an increasingly successful product.</p> <p>Work of Others and designing in the style of - the work of past and present professionals and companies in the area of Design and Technology.</p> | <p>Students were introduced to simple card construction techniques in year 9 Graphics to be able to model their ideas in 3D.</p> <p>Students became familiar with the work of several designers throughout their product design and textiles studies in ks3. They have designed in the style of a designer that they have researched, observing shape, colour, pattern and style.</p> | <p>Section C—Design Ideas</p> <p>Section D—Design Development</p> |

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|--|---|---|---|---|
| <p>2D CAD/CAM</p> <p>3D CAD/CAM</p> <p>Theory Unit 3 Materials</p> <ul style="list-style-type: none"> • Papers and Boards • Timbers • Metals and Alloys • Polymers • Textiles <p>Theory Unit 4 Technical Principles</p> <ul style="list-style-type: none"> • Forces and Stress • Improving Functionality • Ecological and Social Footprint • The 6R's • Scales of Production | <p>CAD drawing skills</p> <p>Image creation and manipulation software—some students will use their procreate skills learnt in GCSE Art. digital manufacture.</p> <p>Interpretation of plans, elevations of 3D models</p> | <p>CAD—2D Design Tools, 3D Onshape</p> <p>The use of 2D and 3D digital technology and tools are used to present, model, design and manufacture solutions, such as 3D printed work., laser cut products.</p> | <p>2D CAD—2D Design Tools</p> <p>3D CAD—Onshape</p> <p>2D CAM—laser, vinyl cutter</p> <p>3D CAM—CNC Milling Machine</p> | <p>Section A—Research</p> <p>Section B—Design Brief and Specification</p> <p>Section C—Design Ideas</p> |
| <p>Mock NEA</p> <p>Research & Brief/Specification</p> <p>Design Ideas</p> <p>Theory Unit 6 Designing Principles</p> <ul style="list-style-type: none"> • Investigation, Primary Secondary Research • The Work of Others • Design strategies • Design Communication | <p>Explore and analyse the context.</p> <p>Client Investigation through primary research.</p> <p>Include ongoing relevant research</p> <p>Skilfully justify decisions made, using research undertaken in section A.</p> <p>Quality 3D Sketching, Rendering, Annotation. Could be by hand and/or using procreate on an iPad.</p> <p>Generating design ideas, and providing detailed annotation to explain design thinking.</p> | <p>Students know how to write a comprehensive brief and specification based on a given task.</p> <p>Communication of Design Ideas</p> <p>Detailed Annotation</p> | <p>Using a given brief and specification</p> <p>Design ideas, in the style of a designer</p> <p>Design Ideas for textiles</p> | <p>Section A—Research</p> <p>Section B—Design Brief and Specification</p> <p>Section C—Design Ideas</p> |

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|--|--|--|---|---|
| <p>Mock NEA</p> <p>Design Development</p> <p>Manufacture, Evaluation</p> <p>Theory Unit 7 Making Principles</p> <ul style="list-style-type: none"> • Selection of Materials and Components • Tolerances • Material Management • Tools, equipment and finishes • Surface Treatments and Finishes | <p>Select and use appropriate tools and equipment</p> <p>Analyse</p> <p>Be able to test, critically analyse and evaluate their design solutions against the identified stakeholder requirements, design opportunities and constraints in order to refine and improve future iterations</p> | <p>Designs will be developed further into final product designs using models and technical diagrams.</p> <p>Design Development—card modelling and CAD/CAM modelling</p> <p>Iterative design, making various iterations of a design in response to client feedback, before deciding on a viable solution.</p> <p>Students will plan to select appropriate tools and equipment. They will give step by step information on how they intend to manufacture their product, including health and safety points.</p> <p>Students will manufacture their final product idea independently in the workshop, from their technical drawings.</p> <p>Confident use of addition and Wastage techniques and surface Finishes</p> <p>Evaluation</p> <p>Full and critical evaluations with focused reflection on requirements and feedback.</p> <p>Ongoing, clear and comprehensive reviews to identify problems and next-steps for future iterations to effectively and consistently support design progression.</p> | <p>Workshop skills—tools and equipment</p> | <p>Section D—Developing Design Ideas</p> <p>Section E—Realising Potential</p> <p>Section F—Testing and Evaluation</p> |
| <p>Real NEA—Live Brief from AQA</p> <ul style="list-style-type: none"> • Investigation • Research | <p>Explore Context</p> <p>Client Investigation through primary research.</p> | <p>Full and objective consideration of primary user and other stakeholders needs and wants. A range of comprehensive requirements are identified that offer scope to support the design process.</p> | <p>Using a given brief and specification</p> <p>Design ideas, in the style of a designer</p> <p>Design Ideas for textiles</p> | <p>Section A—Identifying and investigating design possibilities</p> <p>Section B—Design Brief and Specification</p> |

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Design and Technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. Students acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens.

In year 11, our learners use the knowledge and skills gained so far in Design and Technology to complete work on their Non-Exam Assessment (NEA). This is teacher assessed, and externally moderated, and goes towards 50% of their final grade. Students revisit the theory content for the AQA GCSE D&T qualification by following the PG Online units of work. Students use Seneca to help secure their knowledge. They use previous exam papers to practise their exam technique. The exam paper is worth 50% of their final grade.

Students are facilitated to demonstrate their knowledge and skills by completing the NEA. This covers Sections A Investigation, Section B Brief and Specification, Section C Design Ideas, Section D Design Development, Section E Manufacture, Section F Evaluation.

Students revise the theory content of the AQA GCSE Design and Technology course. They sit a 2 hour written paper at the end of year 11.

Implementation

- Work on the NEA will take place throughout Term 1 and Term 2.
- In Term 3, students will go through all the PG Online theory units, regularly using practical tasks to support with revision of subject content.
- Independence—students are required to work independently. They should select and use appropriate materials, and tools and equipment.
- Practical skills—Use workshop machinery safely and accurately. Practical work is recorded using photographs
- Seneca will be used for recall of the theory content throughout year 11,
- Students will be provided with personal learning checklists prior to their mock exams.
- WAGOLL—used to look at structure of questions
- Session 6 will be used throughout the year, and adapted to the needs and requirements of the students.
- Literacy is developed through students reading theory text, and relevant current news articles.

Key Summative Assessments:

Term 1

Mock Exam (1 hour)

NEA Section ABC - teacher assessed, externally moderated.

Term 2

Mock Exam (1 hour)

NEA Section DEF —teacher assessed, externally moderated.

Term 3

GCSE Written Exam in May/June.

Impact: High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation. Students will know more and remember more. There will be an increase in attainment through regular, formal and interleaved assessments.

Students will be equipped with the knowledge and skills to make the right product choices in their day to day lives. They will know how to consider social and environmental impact as customers and consumers of products and services. Our year 11 students will be well prepared to follow a pathway into studying KS5 courses and apprenticeships involving Design and Technology and Engineering.

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|---|---|--|--|---|
| NEA Section A Identifying and Investigating Design Possibilities | Analyse the context. Include ongoing relevant research | Investigation and Research of the design context. Students can select their preferred brief, as issued by AQA. | Designer Research Unit 6—Designing Principles | Detailed product study |
| NEA Section B Produce a design brief and specification | Skilfully justify decisions made, using research undertaken in section A. | Students know how to write a comprehensive brief and specification based on a selected task. | Mock NEA—Brief and Specification | Design Methods |
| NEA Section C Generating Design Ideas | Quality 3D Sketching, Rendering, Annotation. Could be by hand and/or using procreate on an iPad. | Communication of Design Ideas Detailed Annotation | Sketching and annotation skills, detailing annotations of function and materials for design ideas. | Detailed design ideas Design Communication |
| NEA Section D Developing Design Ideas | Developments based on client feedback Use of CAD/CAM to create 3D virtual model, assembly, exploded view diagrams, orthographic dimensioned drawings | Designs will be developed further into final product designs using models and technical diagrams. Design Development—card modelling and CAD/CAM modelling Iterative design, making various iterations of a design in response to client feedback, before deciding on a viable solution. | Sketching and modelling project CAD/CAM project, where students learn parts, assemblies, exploded views and technical drawings. Knowledge of materials, to enable correct selection of suitable materials | A Level Product Design—Designing and Making Principles Prototype Development CAD in Industry Digital Design and Manufacture |
| NEA Section E Realising Potential | Use tools and equipment to achieve high quality of finish | Students will plan to select appropriate tools and equipment. They will give step by step information on how they intend to manufacture their product, including health and safety points. Students will manufacture their final product idea independently in the workshop, from their technical drawings. | Addition and Waste processes through completion of the Laminated USB Lamp project. Mock NEA manufacture, selecting appropriate materials, tools and equipment. Knowledge of tools and equipment, to enable correct selection of appropriate tools and equipment. | Performance characteristics of materials Enhancement of materials Accuracy in design and manufacture Forming and Addition processes Adhesives, fixings and finishes |
| NEA Section F Analysing and Evaluating | Analyse Be able to test, critically analyse and evaluate their design solutions against the identified stakeholder requirements, design opportunities and constraints in order to refine and improve future iterations | Evaluation Full and critical evaluations with focused reflection on requirements and feedback. Ongoing, clear and comprehensive reviews to identify problems and next-steps for future iterations to effectively and consistently support design progression. | Mock NEA evaluation | Critical analysis and evaluation |
| Theory Revision Lessons Written Exam Technique Theory—Seneca | Exam Technique PEE (Point, Example, Explain) | PG Online Units 1 to 7 All Seneca Units for AQA D&T | Theory units 1-7 throughout year 10 | A Level Product Design—Technical Principles Responsible design Modern and Industrial Practise Enterprise and Marketing |