

The curriculum and assessment of students at this stage of education has been carefully designed to promote deep learning of design and technology and develop students into innovative problem solvers which prepares them for the wider world. The year 10 course will prepare students for year 11 whereby they will gain an in-depth knowledge of a wide range of materials and their properties with the ability to differentiate between aesthetics, form and function providing pupils with a strong foundation in iterative design. By the end of the year, students will be able to demonstrate through designing and making how the 'real world' works. Students will have the opportunities to learn about different cultures, materials, sustainability and where resources come from. Students will explore a rich curriculum through a number of ways: using different design challenges, tailoring students' designs to suit a number of different target audiences, (such as gender, race, age, disability). Students will be well prepared for further studies in design and technology at A level in a broad range of specialisms and build strong foundations for a career in fashion design, architecture, engineering, graphics illustration.

HALF TERM 1 KEY IDEAS IN DESIGN AND TECHNOLOGY

All students will know:

Students will understand manufacturing technology, including production systems of computer-aided design and computer-aided manufacturing. Students will understand the greater need for sustainable products and how product design impacts society. Students will also build on their knowledge of 'powering systems' including finite and renewable energy sources.

Skills developing through project work:

Variety of drawing skills from freehand sketches to third angle orthographic projection.

All students will be assessed:

Low stakes quizzes. End of unit assessment quiz. Half term assessment on recall.

Questioning do now activities.

- » Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call.
- » MOCK NEA - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Basic comprehension of design briefs, analysis of pre-existing products, specification constraints. Skimming of material to find research facts. Reading for instructional understanding (processes). Intensive and extensive reading.

Key vocabulary:

Computer aided design, computer aided manufacture, sustainability, carbon footprint, life cycle assessment, market pull, technology push, finite, renewable energy. Primary research, Secondary research, Innovation, Design Brief, Specification.

HALF TERM 2 AN INTRODUCTION TO MATERIALS AND SYSTEMS

All students will know:

Students will understand the different principles of materials and their properties. This section of teaching and learning will focus on types of materials including: - paper, board, timber, metals, alloys, polymers, textiles, manufactured boards, electronic systems, mechanical systems, and developments in new materials.

Skills developing through project work:

Metal working skills including brazing and casting, enameling and hand working tools and use of machine equipment.

All students will be assessed:

Low stakes quizzes. End of unit assessment quiz. Half term assessment on recall.

Questioning do now activities.

- » Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call.
- » MOCK NEA - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics. Skimming and scanning of material to ascertain key facts. Reading for instructional comprehension. Reading for vocabulary comprehension of key topics.

Key vocabulary:

Alloy, softwood, hardwood, duplex board, thermosetting, thermoforming, ferrous, non-ferrous, natural fibers, synthetic, woven, knitted, non-woven, blending, mixing, bonded, felted, graphene, nanomaterials, smart materials, technical textiles, composites. Imaginative, Creative risks, Rapid prototyping, Iterative.

HALF TERM 3 MORE ABOUT MATERIALS

All students will know:

Students will understand how to select materials for end use based on properties and suitability. Students will understand forces and stress, including reinforcing materials to improve properties. Students will develop an understanding of scales of production and quality control linked to tolerance, testing and production aids. Students will also investigate the sources of materials and how they are produced in a usable resource.

MOCK NEA - to develop their design to a user centered brief with focus on inclusion. Using research skills to gather primary and secondary research to influence their own design and manufacture project.

All students will be assessed:

Low stakes quizzes. End of unit assessment quiz. Half term assessment on recall.

Questioning do now activities.

- » Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call.
- » MOCK NEA - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics. Skimming and scanning of material to ascertain key facts. Reading for instructional comprehension. Reading for vocabulary comprehension of key topics.

Key vocabulary:

Functionality, aesthetics, compression, torsion, shear, bending, tension, interfacing, webbing, lamination, one-off, batch, mass, continuous production, tolerance, templates, jigs, casting, cellulose, crude oil, environments. Prototyping, Modelling, CAD (Computer Aided Design), Rendering, Technical drawing.

HALF TERM 4 PAPER AND BOARD

All students will know:

Students will recall and build on their understanding of the properties of paper and board, including understanding equipment typically used when working with such materials. Students will also investigate the pre-manufactured 'standard components' used frequently with or alongside paper and board. Students will develop an understanding of printing techniques and finishes that can be applied to these specific materials.

'Wood, metals, and polymers' - students will also recall and build on their understanding of the end uses of wood, metals and polymers including stock forms and standard components relating to wood, metals, and polymers.

MOCK NEA - how to realise their design ideas into viable products. Students will use specialist machinery to create a final prototype which realises their client and user needs, applying quality controls to ensure the product meets the design brief and specification written.

And how to evaluate their ideas in relation to the given design context throughout their NEA and summarising their findings retrospectively through market testing. Students will make improvements to their work following client and user feedback, making adaptation in response.

All students will be assessed:

Low stakes quizzes. End of unit assessment quiz.
Half term assessment on recall.

Questioning do now activities.

- » Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call.
- » MOCK NEA - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics. Skimming and scanning of material to ascertain key facts. Reading for instructional comprehension. Reading for vocabulary comprehension of key topics.

Key vocabulary:

Corrugated, pre-manufactured, bindings, seals, tape and adhesive, guillotine, laser cutter, knives, scoring, die cutting, nets, lithography, flexography, gravure, screen printing, digital printing, print finishes, embossing, foil application, varnishing, malleable, seasoning, stabilisers, stock forms, fastenings, rivets, hinge, knock down fittings. Tolerance, Prototype, Specification, Computer Aided Manufacture.

HALF TERM 5 WOODS, METALS AND POLYMERS CONTINUED

All students will know:

Students will build on their understanding of wood, metal, and polymer properties by learning how these materials can be shaped.

Students will apply health and safety whilst demonstrating how to use power and machine tools.

Students will investigate Moulding and joining techniques and identify appropriate treatments and finishes to these materials.

'Textiles' - Pupils will recall and build upon their understanding of fabrics and their properties, as well as learning how these products can be shaped. Students will apply health and safety, whilst demonstrating how to use tools. Students will develop an understanding of printing methods that can be applied to fabrics as well as how fabrics can be dyed.

All students will be assessed:

Low stakes quizzes. End of unit assessment quiz.
Half term assessment on recall.

Questioning do now activities.

- » Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call.
- » MOCK NEA - Students will be teacher, self, and peers assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics. Skimming and scanning of material to ascertain key facts. Reading for instructional comprehension. Reading for vocabulary comprehension of key topics.

Key vocabulary:

Saws, chisel, planes, files, drills, safety, power tools, routers, jigsaws, sanders, band saw, pillar drill, saw bench, sanding disc, milling machines, lathes, 3d printing, casting, line bending, vacuum forming, blow moulding, injection moulding, extrusion, drape forming, soldering, welding, paint, grain, tanalising, galvanising, cool dipping, fastenings, pinning, tacking, overlocker, computer aided manufacture, seam, pleats, gathers, quilting, batch dyeing, batik, tie-dye, flat bed screen printing, rotary screen printing. Iterations, Market Testing.

HALF TERM 6 DESIGNING AND MAKING

All students will know:

Non-Examination Assessment - How to investigate and identify design possibilities through the exploration of a given design context. Students will learn how to use primary and secondary research to broaden their understanding of real-life design problems and consider innovative ways technology can solve them. How to use research from contextual and client investigation to create an informed design brief and specification, drawing conclusions of essential and desired design requisites.

Core theory - '**Designing and making**' - Students will investigate the work of designers. They will recall and build upon their knowledge of user needs and how to write a design brief and specification in preparation for their controlled assessment.

All students will be assessed:

Low stakes quizzes. End of unit assessment quiz. Half term assessment on recall.

Questioning do now activities.

- » Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call.

NEA - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics. Skimming and scanning of material to ascertain key facts. Reading for instructional comprehension. Reading for vocabulary comprehension of key topics.

Key vocabulary:

Ergonomics, anthropometric data, design brief, specification, market research, product analysis, primary, secondary, target market, questionnaires, function, sustainability, social impacts, fair trade.

HOW STUDENTS CAN BE SUPPORTED AT HOME

Satchel One, Seneca learning platforms, POD learning platform. GCSE AQA Design and Technology revision guide.

HOW THIS LEARNING WILL BE EMBEDDED ELSEWHERE IN THE CURRICULUM

As a STEM subject, technology is embedded in mathematics and science.

YEAR 11 | DESIGN TECHNOLOGY

»

The curriculum and assessment of the students in year 11 starts with students working with guidance to create their own independent project that meets the brief given to the students in year 10 summer term. The continuation of this project follows the exam board specification for the Non-Examination Assessment section of the work which takes up the first term and a half.

Following on from the completion of the Non-Examination Assessment the students will practice and develop their knowledge in preparation for summer examinations through a series of focused practical's and exploration of in-depth knowledge into many areas of the Design and Technology curriculum.

HALF TERM 1 NON-EXAMINATION ASSESSMENT

All students will know:

- Students will continue to investigate and identify design possibilities through the exploration of a given design context. Students will learn how to use primary and secondary research to broaden their understanding of real-life design problems and consider innovative ways technology can solve them. How to use research from contextual and client investigation to create an informed design brief and specification, drawing conclusions of essential and desired design requisites. From this student will generate a range of ideas in response to their contextual challenge, drawing from their prior research and understanding of client and user needs. Students will be imaginative in their approach and learn how to take creative risks.
- Core theory - 'Key ideas in design and technology'- Students will gain an understanding of technology in manufacturing; this includes production systems of computer aided design and computer aided manufacturing. Students will understand about the greater need for sustainable products and how product design impacts society. Students will also build on their knowledge of 'powering systems' including finite and renewable energy sources.

All students will be assessed:

Low stakes quizzes. End of unit assessment quiz. Half term assessment on recall.

Questioning do now activities.

Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call

NEA (NON-EXAMINED ASSESSMENT) - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Basic comprehension of design briefs, analysis of pre-existing products, specification constraints.

Skimming of material to find research facts.

Reading for instructional understanding (processes). Intensive and extensive reading. **Key Vocabulary:**

Computer aided design, computer aided manufacture, sustainability, carbon footprint, life cycle assessment, market pull, technology push, finite, renewable energy. Ergonomics, anthropometric data, design brief, specification, market research, product analysis, primary, secondary, target market, questionnaires, function, sustainability, social impacts, fair trade, Primary research, Secondary research, Innovation, Design Brief, Specification

HALF TERM 2

All students will know:

- How to develop their design ideas through a range of prototyping and modelling techniques. Students will have access to Computer Aided Design programs to model their ideas digitally as well as practical opportunities to further refine and develop their ideas in relation to their original context and intention.
- Core theory - 'An introduction to materials and systems' - Students will gain an understanding of the different principles of materials and their properties. This section of teaching and learning will focus on types of materials including: - paper, board, timber, metals, alloys, polymers, textiles, manufactured boards, electronic systems, mechanical systems, and developments in new materials.
- 'textiles' - Pupils will recall and build upon their understanding of fabrics and their properties, as well as learning how these products can be shaped. Students will apply health and safety, whilst demonstrating how to use tools. Students will develop an understanding of printing methods that can be applied to fabrics as well as how fabrics can be dyed.

All students will be assessed:

- Low stakes quizzes. End of unit assessment quiz. Half term assessment on recall.
Questioning do now activities.
- Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call
- MOCK NEA - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics.
Skimming and scanning of material to ascertain key facts.
Reading for instructional comprehension.
Reading for vocabulary comprehension of key topics.

Key vocabulary:

Subject Specific:

Alloy, softwood, hardwood, duplex board, thermosetting, thermoforming, ferrous, non-ferrous, natural fibers, synthetic, woven, knitted, non-woven, blending, mixing, bonded, felted, graphene, nanomaterials, smart materials, technical textiles, composites, Imaginative, Creative risks, Rapid prototyping, Iterative, Prototyping, Modelling, CAD, Rendering, Technical Drawing

HALF TERM 3

All students will know:

- How to realise their design ideas into viable products. Students will use specialist machinery and equipment including computer aided manufacturing to create a final prototype which realises their client and user needs, applying quality controls to ensure the product meets the design brief and specification written.
- Core theory - 'more about materials' Students will gain an understanding of how to select materials for end use based on properties and suitability. Students will gain an understanding of forces and stress including reinforcing materials to improve properties. Students will develop an understanding of scales of production and quality control linking to tolerance, testing and production aids. Students will also investigate the sources of materials and how they are produced in a usable resource.

All students will be assessed:

- Low stakes quizzes. End of unit assessment quiz. Half term assessment on recall.
Questioning do now activities.
- Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call
- MOCK NEA - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics. Skimming and scanning of material to ascertain key facts. Reading for instructional comprehension. Reading for vocabulary comprehension of key topics.

Key vocabulary:

Functionality, aesthetics, compression, torsion, shear, bending, tension, interfacing, webbing, lamination, one-off, batch, mass, continuous production, tolerance, templates, jigs, casting, cellulose, crude oil, environments, Tolerances, Prototype, Specification, Computer Aided Manufacture

HALF TERM 4

All students will know:

how to evaluate their ideas in relation to the given design context throughout their NEA and summarising their findings retrospectively through market testing. Students will make improvements to their work following client and user feedback, making adaptation in response.
Core theory - 'paper and board'- Students will recall and build on their understanding of the properties of paper and board, including understanding equipment typically used when working with such materials. Students will also investigate the pre-manufactured 'standard components' used frequently with or alongside paper and board. Students will develop an understanding of printing techniques and finishes that can be applied to these specific materials.
'Wood, metals, and polymers' - students will also recall and build on their understanding of the end uses of wood, metals and polymers including stock forms and standard components relating to wood, metals, and polymers.

All students will be assessed:

- Low stakes quizzes. End of unit assessment quiz. Half term assessment on recall.
Questioning do now activities.
- Low-stakes formative and interleaving present throughout - knowledge and understanding quizzes, questioning, cold call
- MOCK NEA - Students will be teacher, self, and peer assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics. Skimming and scanning of material to ascertain key facts. Reading for instructional comprehension. Reading for vocabulary comprehension of key topics.

Key vocabulary:

Corrugated, pre-manufactured, bindings, seals, tape and adhesive, guillotine, laser cutter, knives, scoring, die cutting, nets, lithography, flexography, gravure, screen printing, digital printing, print finishes, embossing, foil application, varnishing, malleable, seasoning, stabilisers, stock forms, fastenings, rivets, hinge, knock down fittings, Tolerances

Prototype, Specification, Computer Aided Manufacture

HALF TERM 5

All students will know:

Core theory - **'woods, metals and polymers continued'**-

Students will build on their understanding of wood, metal, and polymer properties by learning how these materials can be shaped. Students will apply health and safety whilst demonstrating how to use power and machine tools. Students will investigate moulding and joining techniques as well as being able to identify appropriate treatments and finishes to these materials.

All students will be assessed:

» **All students will be assessed:**

Low stakes quizzes. End of unit assessment quiz.
Half term assessment on recall.
Questioning do now activities.

- Low-stakes formative and interleaving present throughout – knowledge and understanding quizzes, questioning, cold call
- MOCK NEA - Students will be teacher, self, and peers assessed against the AQA grade descriptors and use examples to improve work in line with the grade boundaries present.

Reading skills needed for this unit:

Comprehension of intensive and extensive texts on key topics.
Skimming and scanning of material to ascertain key facts.
Reading for instructional comprehension.
Reading for vocabulary comprehension of key topics.

Key vocabulary:

Saws, chisel, planes, files, drills, safety, power tools, routers, jigsaws, sanders, band saw, pillar drill, saw bench, sanding disc, milling machines, lathes, 3d printing, casting, line bending, vacuum forming, blow moulding, injection moulding, extrusion, drape forming, soldering, welding, paint, grain, tantalising, galvanising, cool dipping, fastenings, pinning, tacking, overlocker, computer aided manufacture, seam, pleats, gathers, quilting. batch dyeing, batik, tie-dye, flat bed screen printing, rotary screen printing. Iterations, Market Testing

ENRICHMENT OPPORTUNITIES

- Trips
- Guest speaker- visiting artists/designers/engineers
- Chef of the year
- Cookery Club
- Textile Club
- Design and Technology Club

HOW STUDENTS CAN BESUPPORTED AT HOME

Satchel: one,
Seneca learning platforms,
POD learning platform.
GCSE AQA Design and Technology revision guide,
BBC Bitesize Design and Technology AQA
Technologystudent.com

HOW THIS LEARNING WILL BE EMBEDDED ELSEWHEREIN THE CURRICULUM

Design and Technology is a STEM subject, therefore is embedded in mathematics and science curriculums.

- Art: Past and present artists/designers. Communication of design ideas, rendering skills, observational drawing, perspective drawing, 3D modelling techniques
- Maths: 3D and mathematical modelling, costings. Units and measurements. Calculations, Time. Use of geometry and angles in mathematics.
- Geography: Sustainability.
- RS: Diverse cultures
- English: Reading subject specific text, instructions, analysis, and evaluation. Verbal and written communication
- Science: appropriate use of scientific terms. Mechanical systems, material properties
- Business Studies: Enterprise
- IT: CAD (Computer Aided Design) designing, 2D Design software, Google SketchUp modelling