Subject Curriculum Map: GCSE Design and Technology

Year Groups: 10 -11 – September 2023

Exam Board & Code: AQA (8552)

Assessment:

Component 1: 50% (100 marks) – Paper 1 (2 hours)

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

Component 2: 50% (100 marks) – Non-exam Assessment (NEA) – Coursework Portfolio

- *Identifying and investigating design possibilities*
- *Producing a design brief and specification*
- *Generating design ideas*
- *Developing design ideas*
- *Realising design ideas*
- *Analysing & evaluating*

Curriculum Intent:

This GCSE Design & Technology qualification requires students to follow a specific curriculum content:

- actively engage in the creative process of designing and making in order to develop as effective and independent learners, and as critical and reflective thinkers with enquiring minds
- develop creative, imaginative and intuitive capabilities when exploring and making products in a range of materials
- become confident in taking risks and learn from experience when exploring and experimenting with designs, manufacturing processes, materials and techniques
- develop critical understanding through investigative, analytical, experimental, practical, technical and expressive skills
- develop and refine ideas and proposals, personal outcomes or solutions with increasing independence
- develop knowledge and understanding of past and present design movements
- make effective design choices students will need a breadth of core technical knowledge and understanding that consists of; new and emerging technologies, energy generation and storage, developments in new materials, systems approach to designing, mechanical devices and materials and their working properties

- develop an in-depth knowledge and understanding of the following specialist technical principles; selection of materials or components, forces and stresses, ecological and social footprint, sources and origins, using and working with materials, stock forms, scales of production, specialist techniques and processes and surface treatments and finishes.
- demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas; investigation, primary and secondary data, environmental, social and economic challenge, the work of others, design strategies, communication of design ideas, prototype development, selection of materials and components, tolerances, material management, specialist tools and equipment and specialist techniques and processes.

Curriculum Implementation:

AQA **Design and Technology is made up of 2 mandatory Components**

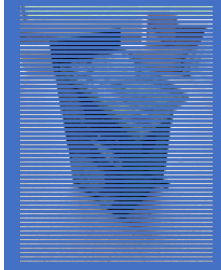
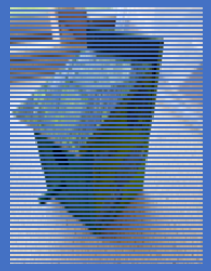
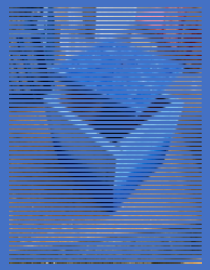
Component 1 – Paper 1 - Students have a percentage of their lessons over a fortnight dedicated to preparing/ studying for paper 1 - 50% (100 marks)

Component 2 – Non-exam Assessment (NEA) – Year 10/11 Students - The NEA will be released by the exam board on the 1st June each year and given to students. The NEA project in its entirety should take between 30–35 hours to complete and consist of a working prototype and a concise portfolio of approximately 20 pages of A3 paper, equivalent A4 paper or the digital equivalent - 50% (100 marks).

Curriculum Impact:

Each of the 2 components of the AQA **Design & Technology course** has been designed so that knowledge, skills and understanding are developed through tasks that have many of the characteristics of real industrial practice.

- The creation, selection, manipulation and application of a range of materials such as; papers and boards, timbers, metals, polymers, textiles and electronic and mechanical systems.
- Designers work in multi-disciplinary ways to create ideas, materials and techniques for different applications.
- Designers also play an important role in the world of technological advances, fashion trends, graphic design and engineering developments.
- Students will also understand that designers may work within a team environment in a large commercial manufacturing company, on a single aspect of the design or making process or work as freelance practitioners on commissions or self-directed projects.
- They will need good communication skills in order to liaise with clients and to promote themselves as designers or engineers.

Year 9 KS3 Design & Technology 2024	Half Term 1	Half Term 2
Themes, Concepts & Ideas   	Health & Safety in the workshop Common workshop tools & machinery. Saws and uses. Fret saw, disc sander. Practical skills. Other tools tri square etc. **Bird & Trinket Box Project** **Practical lessons in workshop** Wood joints and PVA glue Finishes – Varnish, paint wax etc Paper & boards Softwood & Hardwoods Ferrous metals and non-ferrous metals Alloys and composite materials Polymers and plastics. Thermosetting v's Thermo forming CAD / CAM Processing involved in manufacturing materials	**Drawing Project** Single point perspective Two- and three-point perspective. Orthographic drawing – 3rd angle projection. Exploded drawings Sustainability forestry and sustainable design. Processing involved in manufacturing materials Templates and jigs Uses of workshop equipment. Laser cutter. 3D printer. Smart materials. The 6 R's ACCESSFM – sketching and designing techniques. Modelling a design – Cardboard and glue guns. **Practical lessons in workshop – modelling in cardboard**

Knowledge & Understanding	Understand papers/boards, woods, metals, plastics, textiles and their working properties. Understand terminology such as toughness, hardness, strength, durability, elasticity and be able to match with materials. Students will understand ferrous/non-ferrous metals, alloys. Also thermoplastics, thermoset plastics, natural plastics, hard woods, soft woods, manufactured boards. Understand basic properties associated with materials Use of CAD/ CAM to mark plywood boards. Identifying the raw materials used to manufacture woods, metals, plastics and paper/ board.	Students develop their freehand sketching skills. Understand the importance of health and safety within the workshop environment, the correct/ safe use of hand tools/ machinery and risk assessments. Understand sustainable forestry and the positive impact on the environment. Identify common workshop tools/ equipment and be able to label the appropriate parts of workshop machines. The correct/ safe use of common workshop tools/ equipment. Finishing the boxes using wood filler. Choose of varnish and paint to finish box.	Understand developments in new materials. Identify where the following might be used: modern, smart, composite, technical textiles. Understand when and where they might be used with confidence. BIRD BOX & TRINKET BOX PROJECT. Students will develop their skills working with a wide range of hand tools and appropriate machines, including; the pillar drill, disc sander and jigsaw Involves design, cutting and shaping of wooden base (including suitable wood joints) 6 pieces made in workshop all fitting together. Gluing together, use of fret saw and disc sanders. Pillar and hand drill for holes and dowel in birdbox.	6 pieces made in workshop all fitting together. Gluing together, use of fret saw and disc sanders. Pillar and hand drill for holes and dowel in birdbox. Students will be taught how to use isometric and perspective drawing to communicate their design ideas. Understand and be able to recognise specific tools and materials and how to use this knowledge to create a prototype model for the students design. Students will apply their knowledge of CAD CAM and develop their skills using a 3D printer and laser cutter.	Students should understand how to evaluate prototypes and be able to reflect critically, responding to feedback when evaluating their own prototypes, suggest Students will learn ACCESSFM and how to develop design ideas. Students will recognise the importance of the 6'R when designing and the environment. Students will produce orthographic pictures and understand 3rd angle projection. Students to understand modelling will cardboard and analysis and evaluation of iterative design.	

SMSC	**Spiritual** • Use imagination and creativity, to explore ideas and express their individuality through works of Design and Technology activities. • Researching the work of famous designers/ engineers and their concepts, as contextual reference for their own development in each project. • Appreciate the achievements of other designers both contemporary and historic. • Development of respect for their peers' work, through the level of progress achieved by others. • Students will reflect on their experiences in Design and Technology and apply their skills in a range of creative activities. **Moral** • Talk about how artists and designers represent moral issues through their work. • Conveying moral messages or questions through personal responses/artwork. • Demonstrating mutual respect and consideration for others' work. • Students accept responsibility for their behaviour and show initiative towards their own self-development. • Positive and negative impacts new products have on the environment: - continuous improvement - efficient working - pollution - global warming. **Social** • How technology push/market pull affects choice. • Changing job roles due to the emergence of new ways of working driven by technological change. • Working collaboratively requiring cooperation and communication. • Respect each other's ideas and opinions when talking about the design of products and including the work of others in the class. • Recognise the need to consider the views of others. • Students work is celebrated and is displayed within the classroom. • How products are designed and made to avoid having a negative impact on others; - design for disabled - elderly - different religious groups. **Cultural** • Students will reflect on the ways in which culture influences and inspires works in design and technology. • Opportunities are given for students to appreciate their own creative culture, the creative cultures of others and develop an understanding of the world. • Students will be encouraged to respond positively to artistic and cultural works. • Changes in fashion and trends in relation to new and emergent technologies. • Respecting people of different faiths and beliefs.

Skills for Life	Development of transferable skills – students will learn to: • apply a creative approach to problem solving. • consider and develop original ideas from initiation to realisation. • analyse critically their own work and the work of others. • express individual thoughts and choices confidently. • take risks, experiment and learn from mistakes.
Fundamental British Values (FBV)	**Democracy** Team working. Equal opportunities to fully partake in all activities and tasks. **The rule of law-** Classroom rules. Health and safety within a practical working environment. **Individual Liberty** Individual's right to learn in an educational environment. Freedom to explore individual ideas both academic and creative – demonstration of practical and academic skills through a range of classroom activities. **Mutual Respect** Providing the opportunity for students to express their views in a safe environment, within the context of written responses and class discussions. **Tolerance** Value differences in faith and cultural influences within Design and Technology and the wider society. Appreciate and understand social development in Design and Technology.
Stretch & challenge Literacy	Knowledge, understanding, and skills are in-depth, perceptive and accomplished throughout all learning objectives. All more able students will be able to demonstrate the following: **AO1: Identifying and investigating design possibilities** Design possibilities identified and thoroughly explored. A user/client has been clearly identified and is entirely relevant in all aspects to the contextual challenge and student has undertaken a comprehensive investigation of their needs and wants. Comprehensive investigation into the work of others that clearly informs ideas. Excellent design focus and full understanding of the impact on society including; economic and social effects. **AO1: Producing a design brief and specification** Comprehensive design brief which clearly justifies how they have considered their user/client's needs and wants. Comprehensive design specification with very high level of justification linking to the needs and wants of the client/user. **AO2: Generating design ideas**

	Imaginative and innovative ideas have been generated, fully avoiding design fixation. Ideas have been generated, that take full account of on-going investigation that is both fully relevant and focused. Imaginative use of different design strategies for different purposes and as part of a fully integrated approach to designing. **AO2: Developing design ideas** Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Excellent modelling, using a wide variety of methods to test their design ideas. Fully appropriate materials/components selected with extensive research into their working properties and availability. A detailed manufacturing specification is produced. **AO2: Realising design ideas** The correct tools, materials and equipment (including CAM where appropriate) have been consistently used or operated safely. A high level of quality control is evident to ensure the prototype is accurate by consistently applying very close tolerances. Prototype shows a high level of making/finishing skills that are fully consistent and appropriate to the desired outcome. An exceptionally high quality prototype that has the potential to be commercially viable has been produced. **AO3: Analysing & evaluating** Extensive evidence that various iterations are as a direct result of considerations linked to testing, including well considered feedback from third parties. Comprehensive testing of all aspects of the final prototype against the design brief and specification. Fully detailed and justified reference is made to any modifications both proposed and undertaken. Excellent analysis and evaluation evident throughout the project that clearly influences the design brief and the design and manufacturing specifications.					
Key assessment focus, suggested assessments	½ term monitoring & ATL. Assessment of practical work – Birdbox or Trinket box assessed - STAR	1 term monitoring & ATL. Self-assessment of Drawing pieces – Single point – 2 point and orthographic assessed - STAR	Spring 1 – Catering Assessment of food practical's and bookwork theory etc.	½ term monitoring & ATL. Self-assessment of practical work – Through annotation within design folders. Design folders assessed - STAR	Textiles – full assessment of all 3 topics **Year 9 Mock - STAR**	½ term monitoring & ATL. Self-assessment of practical work – Through annotation within design folders. Design folders assessed - STAR
Visits/extra-curricular	Open evening – (Year 8) – Autumn 1 STEM Club					
Homework/Independent Learning	Homework set to enhance and consolidate learning in lessons – homework topics will follow scheme of work. Homework tasks/ independent study: Set tasks will vary in format and length (extended pieces of work). NB: Students will need a copy of the **Collins AQA GCSE 9-1 Design & Technology (Complete Revision & Practice)** to complete a number of the homework tasks and preparation for mock examinations.					

Year 10 GCSE Product Design	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Themes, Concepts & Ideas	Modern/New Materials Smart Materials Material Properties Polymers Metals Timber Smart Modern Lamp design **Project 1 – Lamp - modelling**	Project 1 – Lamp - soldering People, Society, Culture Sustainability and the environment Renewable and non-renewable resources Energy storage systems	**Project 2 – Lamp - lathe** Systems and control Types of Motions Robotics and Industry Automated production techniques Enterprise Market Pull/Technology Push	**Project 2 – Acrylic Lamp** The six Rs Stock Forms and Sizes Manufacturing Specifications/Working Drawings Tools, equipment, processes Quality Control	**Project 3 – NEA COURSEWORK PROJECT** Surface treatments and finishes Forces and Stresses Investigate the work of others Design Factors	**Project 3 – continuing NEA COURSEWORK PROJECT** Generating Designs/Drawings Specialist Material Knowledge Tools and Safety Commercial Processes

Knowledge & Understanding	Advantages/disadvantages in use of robotics Understand CAD/CAM, Lean manufacturing, Just in time, Batch, Mass etc. New and emerging technologies and marketing such as virtual marketing (crowd funding, cooperatives and their advantages/disadvantages) METAL RACING CAR PROJECT involves students designing a 2D car, hand cutting from steel bar, hand shaping, machine drilling, lathe turning,	Students understand target audience (age, gender), inclusive and exclusive design Planned obsolescence, Design for maintenance, Use of sustainable materials, finite and non finite resources, pollution, global warming, carbon footprint, understand product lifecycle and its effect upon the environment. Highlight advantages/disadvantages of solar, wind, tidal,	Inputs/processes/outputs and understand basics such as burglar alarms etc Understand a systems diagram Understand mechanical devices, levers, pulleys, calculate positions/angles of such. Understand Linear, reciprocal, rotary etc. movements. Changing one motion to another Understand developments in new materials. Identify where	Revisit sustainability as students consider their ongoing non-exam assessment. Reduce, recycle, re-use, repair, recycle, re-think. Think again about social and ecological footprints Calculate areas of sheets, planks, advantages of stock sizes, scales of production and why we have them. Apply them to different material categories such as MDF=sheet form. Create accurate specification for own NEA.	Students understand how surface treatments and finishes can improve/enhance both the look s and function of a material/product. Consider woods, metals and printing techniques for papers/boards. Consider how we manipulate materials to work with forces and stresses. Students think about bridges	Students have studied the following, but this is an opportunity to revisit isometric and perspective drawing, exploded drawings, third angle drawings, modelling, CAD based drawings such as 2D Design. Photo manipulation programmes such as photoshop and also 3D rendering programmes such as ProDesktop.

	facing, drilling, chamfering. Thread cutting, brazing, applying finish.	hydro-electrical, biomass, then coal, gas and oil. Nuclear energy, kinetic energy, alkaline vs rechargeable batteries METAL RACING CAR PROJECT involves students designing a 2D car, hand cutting from steel bar, hand shaping, machine drilling, lathe turning, facing, drilling, chamfering. Thread cutting, brazing, applying finish.	the following might be used: modern, smart, composite, technical textiles. Understand when and where they might be used with confidence. Understand papers/boards, woods, metals, plastics, textiles and their working properties. Understand terminology such as toughness, hardness, strength, durability, elasticity and be able to match with materials. Students will understand ferrous/non-ferrous metals, alloys. Also thermoplastics, thermoset plastics, natural plastics, hard woods, soft woods, manufactured boards. Natural and man-made fibres, weaves. They will understand why products are made from each as they gain a deep understanding of the material properties.	Understand why we include various spec. points. Recap on be able to read working drawings (third angle/isometric/exploded). Understand the need for primary and secondary research and how to apply to NEA. Understand and be able to recognise specific tools and materials and how to use this knowledge to create a prototype model for NEA. Understand marking out, tolerance etc. Students must understand the need for tolerance (maths links). Quality Control and the need for this in manufacturing and in their own NEA. How can they assess quality control? How can their projects be improved? LAMP PROJECT involves design, cutting and shaping of wooden base, CAD design of lamp and CAM production from	and skyscrapers and how we reinforce materials. Also consider cars and even textiles where we manipulate to change properties. Recap on adding elastine to cotton to make stretch jeans. Investigate, analyse and evaluate the work of other designers. Be able to recognise the work of a number of designers as seen in the revision guide and discussed in class. Design factors can influence design and these include anthropometrics (human factors), ergonomics, aesthetics, materials, manufacturing techniques, materials, budget. Market research, surveys, interviews. Understand percentiles.	Be able to choose specific materials for NEA project based on previous knowledge and understanding of materials/processes. Understand costing and functionality as well as availability for NEA prototype. Be able to identify a wide range of tools used in the various manufacturing processes and to understand the need for safety and how to use the appropriate tools safely and accurately when completing prototype for NEA. Look again at scales of production. Oneoff, batch, mass, continuous/flow. Understand the need for specialist techniques such as spot varnishing, machine varnishing, embossing, diecutting etc. when

			LAMP PROJECT involves design, cutting and shaping of wooden base,	both acrylic and polyethylene.		

SMSC	**Spiritual** • Use imagination and creativity, to explore ideas and express their individuality through works of Design and Technology activities. • Researching the work of famous designers/ engineers and their concepts, as contextual reference for their own development in each project. • Appreciate the achievements of other designers both contemporary and historic. • Development of respect for their peers' work, through the level of progress achieved by others. • Students will reflect on their experiences in Design and Technology and apply their skills in a range of creative activities. **Moral** • Talk about how artists and designers represent moral issues through their work. • Conveying moral messages or questions through personal responses/artwork. • Demonstrating mutual respect and consideration for others' work. • Students accept responsibility for their behaviour and show initiative towards their own self-development. • Positive and negative impacts new products have on the environment: - continuous improvement - efficient working - pollution - global warming. **Social** • How technology push/market pull affects choice. • Changing job roles due to the emergence of new ways of working driven by technological change. • Working collaboratively requiring cooperation and communication. • Respect each other's ideas and opinions when talking about the design of products and including the work of others in the class. • Recognise the need to consider the views of others. • Students work is celebrated and is displayed within the classroom. • How products are designed and made to avoid having a negative impact on others; - design for disabled - elderly - different religious groups. **Cultural** • Students will reflect on the ways in which culture influences and inspires works in design and technology. • Opportunities are given for students to appreciate their own creative culture, the creative cultures of others and develop an understanding of the world. • Students will be encouraged to respond positively to artistic and cultural works. • Changes in fashion and trends in relation to new and emergent technologies. • Respecting people of different faiths and beliefs.

Skills for Life	Development of transferable skills – students will learn to: • apply a creative approach to problem solving. • consider and develop original ideas from initiation to realisation. • analyse critically their own work and the work of others. • express individual thoughts and choices confidently. • take risks, experiment and learn from mistakes.
Fundamental British Values (FBV)	**Democracy** Team working. Equal opportunities to fully partake in all activities and tasks. **The rule of law-** Classroom rules. Health and safety within a practical working environment. **Individual Liberty** Individual's right to learn in an educational environment. Freedom to explore individual ideas both academic and creative – demonstration of practical and academic skills through a range of classroom activities. **Mutual Respect** Providing the opportunity for students to express their views in a safe environment, within the context of written responses and class discussions. **Tolerance** Value differences in faith and cultural influences within Design and Technology and the wider society. Appreciate and understand social development in Design and Technology.
Stretch & challenge Literacy	Knowledge, understanding, and skills are in-depth, perceptive and accomplished throughout all learning objectives. All more able students will be able to demonstrate the following: **AO1: Identifying and investigating design possibilities** Design possibilities identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities. A user/client has been clearly identified and is entirely relevant in all aspects to the contextual challenge and student has undertaken a comprehensive investigation of their needs and wants, with a clear explanation and justification of all aspects of these. Comprehensive investigation into the work of others that clearly informs ideas. Excellent design focus and full understanding of the impact on society including; economic and social effects. Extensive evidence that investigation of design possibilities has taken place throughout the project with excellent justification and understanding of possibilities identified. **AO1: Producing a design brief and specification** Comprehensive design brief which clearly justifies how they have considered their user/client's needs and wants and links directly to the context selected. Comprehensive design specification with very high level of justification linking to the needs and wants of the client/user. Fully informs subsequent design stages. **AO2: Generating design ideas** Imaginative, creative and innovative ideas have been generated, fully avoiding design fixation and with full consideration of functionality, aesthetics and innovation. Ideas have been generated, that take full account of on-going investigation that is both fully relevant and focused. Extensive experimentation and excellent communication is evident, using a wide range of techniques. Imaginative use of different design strategies for different purposes and as part of a fully integrated approach to designing.

	AO2: Developing design ideas Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Excellent modelling, using a wide variety of methods to test their design ideas, fully meeting all requirements. Fully appropriate materials/components selected with extensive research into their working properties and availability. Fully detailed manufacturing specification is produced with comprehensive justification to inform manufacture. **AO2: Realising design ideas** The correct tools, materials and equipment (including CAM where appropriate) have been consistently used or operated safely with an exceptionally high level of skill. A high level of quality control is evident to ensure the prototype is accurate by consistently applying very close tolerances. Prototype shows an exceptionally high level of making/finishing skills that are fully consistent and appropriate to the desired outcome. An exceptionally high quality prototype that has the potential to be commercially viable has been produced and fully meets the needs of the client/user. **AO3: Analysing & evaluating** Extensive evidence that various iterations are as a direct result of considerations linked to testing, analysis and evaluation of the prototype, including well considered feedback from third parties. Comprehensive testing of all aspects of the final prototype against the design brief and specification. Fully detailed and justified reference is made to any modifications both proposed and undertaken. Excellent ongoing analysis and evaluation evident throughout the project that clearly influences the design brief and the design and manufacturing specifications.					
Key assessment focus, suggested assessments	½ term monitoring & ATL. Self-assessment of practical work – Through annotation within design folders. Design folders assessed - STAR	½ term monitoring & ATL. Self-assessment of practical work – Through annotation within design folders. Design folders assessed - STAR	½ term monitoring & ATL. Self-assessment of practical work – Through annotation within design folders. Design folders assessed - STAR	½ term monitoring & ATL. Self-assessment of practical work – Through annotation within design folders. Design folders assessed - STAR	½ term monitoring & ATL. Self-assessment of practical work – Through annotation within design folders. Design folders assessed – STAR **Self -assessment Mock results – STAR. Setting personal target.**	½ term monitoring & ATL. Self-assessment of practical work – Through annotation within design folders. Design folders assessed - STAR
Visits/extra-curricular	Open evening (Year 8) – Autumn 1 Young Engineer of the Year Club STEM Club D&T coursework club (Day/ time TBC)					
	Homework set to enhance and consolidate learning in lessons – homework topics will follow scheme of work. Homework tasks/ independent study: Set tasks will vary in format and length (extended pieces of work). NB: Students will need a copy of the **Collins AQA GCSE 9-1 Design & Technology (Complete Revision & Practice)** to complete a number of the homework tasks and preparation for mock examinations.					

Year 11 Product Design/Engineering	AUT 1	AUT 2	SPRING 1	SPRING 2	SUM 1	SUM 2 N/A
Themes, Concepts, Ideas	(**UNIT R105** external exam preparation, continuing from Year 10)… LO1: Understand The Design Cycle and the relationship between Design Briefs and Design Specifications LO2: Understand Design Specifications in the creation of a new product LO3: Understand wider influences on the design of new products **R107 Developing and presenting engineering designs** LO1: be able to generate design proposals using a range of techniques	Continuing **R107 Developing and presenting engineering designs** LO2: Know how to develop designs using engineering drawing techniques and annotation LO3: be able to use CAD software and techniques to produce and communicate design proposals Last two weeks of Autumn 2 students will review Unit **R105**/revision in preparation for January external exam.	**R108 3D Design Realisation** LO1: Know how to plan making a prototype LO2: Understand safe working practices used when making a prototype LO3: Be able to produce a prototype	Continuing **R108 3D Design Realisation** LO3: Be able to produce a prototype LO4: be able to evaluate the success of a prototype **R106: Product Analysis and research** **LO1: Know how commercial production methods, quality and legislation impact on the design of products and components**	**Continuing R106: Product Analysis and research** **LO2: Be able to research existing products** **LO3: be able to analyse an existing product through disassembly** Those students who require a second attempt at the exam have an opportunity to sit in this half term and as such, lesson time will be given to revise. **UNIT R105** external exam	

Knowledge and Understanding	The design cycle – Identity phase, brief, research, process planning.	3D Engineering drawings (Isometric, exploded views, assembly drawings	**R108 3D Design Realisation**	Be able to select and use appropriate materials, be able to mark out materials	Research methods such as primary and secondary, physical analysis of products,	

	The Design phase- specification, design, manufacturing plans. Optimise Phase – models and prototypes, error proofing. The Validate Phase – testing and evaluation of prototypes. Identification of design needs – Design briefs from client, design situations, needs of client, purpose and functions of product, market research, strengths and weaknesses of products, materials, budget, production processes. The relationship between a des brief and des spec – client briefs, client liaison, budget, further research, specifications as a result of all of above. Aesthetics, ergonomics, anthropometrics,	2D Engineering drawings (3rd angle orthographic, scale, dimensions, materials, parts list, sectional drawings. CAD using ProDesktop and show how to render drawings in a variety of materials etc. Virtual modelling using CAD	Interpret a product specification Understand processes for making a prototype model Use of planning tools (flow chart, gant chart) Understand correct resources for making a prototype (materials, components, cutting list, health and safety implications, time requirements) Planning stages – process testing and evaluation of prototype in reality and against spec. Understand risks involved in manufacturing process and be able to produce a risk assessment, Be able to assess hazards when using tools and equipment, Use tools and machinery safely and with confidence, use of personal protective equipment, safe working procedures	accurately, understand the use of CAD/CAM in manufacturing a prototype (if this is decided), and be able to make a production diary. Know how to evaluate your prototype and critically analyse its features, function, materials choice, aesthetics, ergonomics, modelling process used, time management, planning and preparation, precision and accuracy and quality of outcome. **R106: Product Analysis and research** Understand production methods –batch, one off, mass, automation Impact of manufacturing processes such as moulding, pressing/forming,	surveying potential users, online resources for research, Be able to identify strengths and weaknesses of existing products inc aesthetics, ergonomics, meeting user needs, life cycle, energy use etc. Be able to communicate research outcomes using charts, diagrams and tables, digital evidence, sketches with annotations. Understand disassembly, be able to follow structured procedures for same. Be able to use appropriate tools for disassembly Analyse existing products through disassembly and identify components assembly methods, materials, production methods and maintenance considerations.	

SMSC	**Spiritual** • Use imagination and creativity, to explore ideas and express their individuality through works of Design and Technology activities. • Researching the work of famous designers/ engineers and their concepts, as contextual reference for their own development in each project. • Appreciate the achievements of other designers both contemporary and historic. • Development of respect for their peers' work, through the level of progress achieved by others. • Students will reflect on their experiences in Design and Technology and apply their skills in a range of creative activities. **Moral** • Talk about how artists and designers represent moral issues through their work. • Conveying moral messages or questions through personal responses/artwork. • Demonstrating mutual respect and consideration for others' work. • Students accept responsibility for their behaviour and show initiative towards their own self-development. • Positive and negative impacts new products have on the environment: - continuous improvement - efficient working - pollution - global warming. **Social** • How technology push/market pull affects choice. • Changing job roles due to the emergence of new ways of working driven by technological change. • Working collaboratively requiring cooperation and communication. • Respect each other's ideas and opinions when talking about the design of products and including the work of others in the class. • Recognise the need to consider the views of others. • Students work is celebrated and is displayed within the classroom. • How products are designed and made to avoid having a negative impact on others; - design for disabled - elderly - different religious groups. **Cultural** • Students will reflect on the ways in which culture influences and inspires works in design and technology. • Opportunities are given for students to appreciate their own creative culture, the creative cultures of others and develop an understanding of the world. • Students will be encouraged to respond positively to artistic and cultural works. • Changes in fashion and trends in relation to new and emergent technologies. Respecting people of different faiths and beliefs.

Skills for Life	Development of transferable skills – students will learn to: • apply a creative approach to problem solving. • consider and develop original ideas from initiation to realisation. • analyse critically their own work and the work of others. • express individual thoughts and choices confidently. • take risks, experiment and learn from mistakes.
Fundamental British Values (FBV)	**Democracy** Team working. Equal opportunities to fully partake in all activities and tasks. **The rule of law-** Classroom rules. Health and safety within a practical working environment. **Individual Liberty** Individual's right to learn in an educational environment. Freedom to explore individual ideas both academic and creative – demonstration of practical and academic skills through a range of classroom activities. **Mutual Respect** Providing the opportunity for students to express their views in a safe environment, within the context of written responses and class discussions. **Tolerance** Value differences in faith and cultural influences within Design and Technology and the wider society. Appreciate and understand social development in Design and Technology.
Stretch & challenge Literacy	Knowledge, understanding, and skills are in-depth, perceptive and accomplished throughout all learning objectives. All more able students will be able to demonstrate the following: **AO1: Identifying and investigating design possibilities** Design possibilities identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities. A user/client has been clearly identified and is entirely relevant in all aspects to the contextual challenge and student has undertaken a comprehensive investigation of their needs and wants, with a clear explanation and justification of all aspects of these. Comprehensive investigation into the work of others that clearly informs ideas. Excellent design focus and full understanding of the impact on society including; economic and social effects. Extensive evidence that investigation of design possibilities has taken place throughout the project with excellent justification and understanding of possibilities identified. **AO1: Producing a design brief and specification** Comprehensive design brief which clearly justifies how they have considered their user/client's needs and wants and links directly to the context selected. Comprehensive design specification with very high level of justification linking to the needs and wants of the client/user. Fully informs subsequent design stages. **AO2: Generating design ideas** Imaginative, creative and innovative ideas have been generated, fully avoiding design fixation and with full consideration of functionality, aesthetics and innovation. Ideas have been generated, that take full account of on-going investigation that is both fully relevant and

	focused. Extensive experimentation and excellent communication is evident, using a wide range of techniques. Imaginative use of different design strategies for different purposes and as part of a fully integrated approach to designing. **AO2: Developing design ideas** Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Excellent modelling, using a wide variety of methods to test their design ideas, fully meeting all requirements. Fully appropriate materials/components selected with extensive research into their working properties and availability. Fully detailed manufacturing specification is produced with comprehensive justification to inform manufacture. **AO2: Realising design ideas** The correct tools, materials and equipment (including CAM where appropriate) have been consistently used or operated safely with an exceptionally high level of skill. A high level of quality control is evident to ensure the prototype is accurate by consistently applying very close tolerances. Prototype shows an exceptionally high level of making/finishing skills that are fully consistent and appropriate to the desired outcome. An exceptionally high quality prototype that has the potential to be commercially viable has been produced and fully meets the needs of the client/user. **AO3: Analysing & evaluating** Extensive evidence that various iterations are as a direct result of considerations linked to testing, analysis and evaluation of the prototype, including well considered feedback from third parties. Comprehensive testing of all aspects of the final prototype against the design brief and specification. Fully detailed and justified reference is made to any modifications both proposed and undertaken. Excellent ongoing analysis and evaluation evident throughout the project that clearly influences the design brief and the design and manufacturing specifications.					
Key assessment focus, suggested assessments	½ term monitoring ATL & Grade Self-assessment of practical work – using annotation in design folders. Design folders and coursework PowerPoints assessed – STAR.	½ term monitoring ATL & Grade Self-assessment of practical work – using annotation in design folders. Design folders and coursework PowerPoints assessed – STAR. **Self -assessment Mock results – STAR. Setting personal target.**	½ term monitoring ATL & Grade Self-assessment of practical work – using annotation in design folders. Design folders and coursework PowerPoints assessed – STAR.	½ term monitoring ATL & Grade Self-assessment of practical work – using annotation in design folders. Design folders and coursework PowerPoints assessed – STAR.	**NEA Submission (Date TBC)**	

Visits/extra-curricular	Open evening (Year 8) – Autumn 1 STEM Club D&T coursework club (Day/ time TBC)
Homework/Independent Learning	Homework set to enhance and consolidate learning in lessons – homework topics will follow scheme of work. Homework tasks/ independent study: Set tasks will vary in format and length (extended pieces of work). NB: Students will need a copy of the **Collins AQA GCSE 9-1 Design & Technology (Complete Revision & Practice)** to complete a number of the homework tasks and preparation for mock examinations.