Rutlish School

CURRICULUM MAP

Subject	**Design Technology**
Head of Department	**Ms N Bhaga**

SCHOOL INTENT

Rutlish School: Curriculum Intent

Rutlish School provides a meaningful, broad and balanced curriculum which is accessible to all, as well as supports and challenges all students. Through all we do, we prepare students for opportunities, responsibilities and experiences later in life for them to be aware of their responsibilities and feel confident to participate and contribute to society. We aim to inspire, enable and facilitate lifelong learners that build on their individual strengths and capabilities and achieve their ambitions. We seek to support our students in becoming healthy, happy, successful modern people young adults, who are knowledgeable, kind, aware, confident, capable and skilful members of society.

The school aims to:

- ensure that the curriculum is designed for every student of every ability and every background to be supported in making the best possible progress and attainment from their starting point; all students can access the curriculum offer, with planning and teaching that support, stretch and challenge all learners across a full range of abilities, and making any reasonable adjustments required where particular needs are identified;
- provide a curriculum that is sequenced to build skills and knowledge throughout students' time at Rutlish School, to promote a deeper understanding of the world outside the classroom and equip them for their next steps in education, careers and in life;
- ensure that our curriculum offer support different educational and career pathways, including EBACC and vocational;
- ensure our curriculum consistently promotes high moral standards, social and self-awareness and allows students to formulate informed opinions on social issues such as, equality, diversity and inclusivity as well as the practical aspects of society;
- enrich the curriculum and provide opportunities for students to build cultural capital, enhance a wide range of skills and knowledge beyond requirements of the national curriculum, and personalise and apply learning in other contexts;
- provide students with the skills and knowledge necessary to becoming independent, analytical, critical, and innovative thinkers and encourage students' curiosity, creativity, self-expression, resilience, and confidence;
- provide consistent opportunities for students to develop and enhance their reading skills, and support is provided to ensure all students are able to access he curriculum.

DEPARTMENT INTENT

At Rutlish School, students receive a design and technology curriculum, which allows them to exercise their creativity through designing and making. The students are taught to combine their designing and making skills with knowledge and understanding in order to design and make a product. Skills are taught progressively to ensure that all students are able to learn and practice in order to develop as they move through the school. Evaluation is an integral part of the design process and allows students to adapt and improve their product, this is a key skill which they need throughout their life. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art.

Students interests are captured through theme learning, ensuring that links are made in a cross curricular way, giving students motivation and meaning for their learning. Students will also learn basic cooking skills.

Students learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology lessons, make an essential contribution to the creativity, culture, wealth and well-being of the nation.

Design and technology at Rutlish school is an inspiring, rigorous and practical subject. Using creativity and imagination, our students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. Our whole curriculum is shaped by our school vision which aims to enable all students, regardless of background, ability, additional needs, to flourish to become the very best version of themselves they can possibly be. We teach the National Curriculum, supported by a clear skills and knowledge progression. This ensures that skills and knowledge are built on year by year and sequenced appropriately to maximise learning for all students.

KEY STAGE 3 RATIONALE/ INTENT

Involves a variety of creative and practical activities. Students will be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. Students will work in a range of domestic and local contexts (for example, different designers, inclusive designing, and social, moral and cultural issues), and industrial contexts (for example, engineering, manufacturing, construction, food, energy, architecture).

Enrichment/life and work skills: Practical problem solving and recognising failure can be beneficial. In KS3, learning is embedded through practical application or design and make activities. Discussions on User Centred Design and recognising cost and financial impacts of products. Cultural influences and social impacts of design explored in a basic format with videos and discussions on environmental impact of designs and materials. Recognising others views and preferences/empathy Understanding the importance of risk taking with a programme to support student leadership skills.

Design Technology: - Design Aspect

- To research and exploration, such as the study of different cultures, to identify and understand user needs identify and solve their own design problems and understand how to reformulate problems given to them
- Develop specifications, to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- Use a variety of approaches (for example, biomimicry and user-centred design), to generate creative ideas and avoid stereotypical responses
- Develop and communicate design ideas, using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools

Design Technology: - Make Aspect

- Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture
- Select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties

Design Technology: - Evaluate

- Analyse the work of past and present professionals and others to develop and broaden their understanding
- Investigate new and emerging technologies
- Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups
- Understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists

Design Technology: - Technical Knowledge

- Understand and use the properties of materials and the performance of structural elements, to achieve functioning solutions

- Understand how more advanced mechanical systems used in their products, enable changes in movement and force
- Understand how more advanced electrical and electronic systems can be powered and used in their products (for example, circuits with heat, light, sound and movement; as inputs and outputs)
- Apply computing and use electronics to embed intelligence in products that respond to inputs (for example, LED's), and control outputs (for example, actuators)

KEY STAGE 4 RATIONALE/ INTENT

GCSE Design and Technology at Rutlish School will prepare students to participate confidently and successfully in an increasingly technological world. Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise.
Includes the use of a broad range of knowledge, skills, and understanding, and prompts engagement in a wide variety of activities. Students design and make products that solve real and relevant problems within a variety of contexts. Through evaluation of past and present Design and Technology, they develop a critical understanding of its impact on daily life and the wider world. We will do this by supporting, guiding and inspiring our students, through excellent teaching practices.

Rutlish GCSE Design Technology allows students to study core technical and designing and making principles, including a broad range of design processes, materials techniques and equipment. They will also have the opportunity to study specialist technical principles in greater depth.

The subject content has been split into three sections as follows:

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

Core Technical Principles: -
Making effective design choices, where 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
- materials and their working properties.

Specialist technical principles: -
In addition to the core technical principles, all students will 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, types and sizes
- scales of production
- specialist techniques and processes
- surface treatments and finishes.

Designing and making principles: -
Students will understand that all design and technology activities take place within a wide range of contexts.
They will also understand how the prototypes they develop must satisfy wants or needs and be fit for their intended use. For example, the home, school, work or leisure.
They will need to 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
- specialist techniques and processes.

Rutlish GCSE Design Technology (new specification) with technological disciplines based on Resistant Materials, Graphic Products, Electronics and Textiles. In Year 10 and Year 11, there are three main areas of learning; Core Technical Principles, Specialist Technical Principles and Designing and Making Principles. They build on from their GCSE Foundation year at the end of KS3. We encourage students to develop their research skills in order to stimulate innovative designs. Students use workshop equipment and ICT (including CAD/CAM) facilities to create products that are suitable for batch and mass manufacture. Products range from electronic to storage facilities, from shop displays to games prototypes and children's toys. They learn modern computer graphic design software and produce creative solutions to design briefs.

All teaching of DT should follow the design, make and evaluate cycle. Each stage should be rooted in technical knowledge. The design process should be rooted in real life, relevant contexts to give meaning to learning. While making, students should be given choice and a range of tools to choose freely from. To evaluate, students should be able to evaluate their own products against a design criterion. Each of these steps should be rooted in technical knowledge and vocabulary.

Rutlish School

Rutlish School

YEAR 7

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1 and summer 2
KNOWLEDGE: Design, Evaluate & Technical Knowledge HOW DO WE BUILD ON SKILLS AND KNOWLEDGE?	**UNIT OF WORK: Year 7 Graphics- Introduction to Design make: Pop-Up book Project.**	**UNIT OF WORK: Resistant Materials- Mechanical toy Project**	**UNIT OF WORK: Year 7 Food Technology**	**UNIT OF WORK: Year 7 Graphics- Imaginary Worlds Project**	**UNIT OF WORK: Resistant Materials- Major Project: Desk Tidy project**
	. To enable pupils to develop their **graphical skills** . To increase students **drawing, sketching** and **presentation skills** . To develop knowledge and understanding **of materials** including **paper, card and printing processes.** . Select and use a range of **tools, equipment** and processes safely and accurately. . Understand how to take account of working **characteristics of materials** and restrictions imposed by tools and equipment . **Accurately measure, mark out, cut, fold and waste material.** High quality finished produced. . **To evaluate** work throughout the manufacturing process. . To develop knowledge about **Robert Sabuda** and the skills to enable achievement of high quality finish in practical work. . **Creatively design** cards leading to a story to be presented along with the images. . Develop skills in a range of **shading and rendering skills** . Students will be introduced to some of the key skills used in graphics. . The students begin by looking at different ways of making **card mechanisms.** . They perform **product analysis** on existing products before	The project is aimed at developing pupil knowledge of **Mechanisms, linkages, Cams and gears.** . Students will understand **Health & Safety** rules in the workshop & **Risk Assessment** . To understand how to **recognise** different types of **motion** . To develop **research** skills- **Mind mapping** . To develop **designing** skills- sketching & shade . To understand how to **construct** a working **mechanical toy**. . To develop **workshop skills- cutting**, **filing & shaping** . To develop **knowledge** of **different shaped Cams.** . Applying knowledge of **materials** and **production processes** to design products and think about **practical solutions** that are relevant and **fit for purpose.** K**nowledge and understanding that will be needed or acquired** . **Health and safety** with a particular focus on **wood, adhesives and equipment.** **. Marking out techniques**, the use of equipment and accuracy. . Understanding of **wood joining techniques** and materials. . Students will also gain .knowledge or **the working characteristics** and properties of a range of **different woods.**	In year 7 students are introduced to **safe practices** in the food room; to a **basic range of tools, cooking techniques and food types.** This KS3 Food SOW seeks to provide a brief yet coherent introduction to both the theory and practice of designing and making a range of dishes that are mainly savoury. . **Muffins (Chocolate Chip)** **. Vegetable soup with homemade bread rolls** **. Pizza including the base** **. Butter chicken with Rice** **. Veggie burger and potato wedges** **. Cottage Pie** As part of their work with food, pupils should be taught how to **cook and apply** the principles of **nutrition and healthy eating.** . Pupils will understand and apply the **principles of nutrition and health** . Cook a repertoire of predominantly **savoury dishes** so that they are able to feed themselves and others . A healthy and **varied diet** become competent in a **range of cooking techniques** for example, selecting and preparing ingredients; using **utensils** and **electrical equipment**; **applying heat in different ways**; using **awareness of taste, texture and smell** to decide how to **season** dishes and combine ingredients; adapting and using their own recipes . Understand the **source, seasonality and characteristics** of a broad range of ingredients.	In this project the pupils will be designing your own cityscape/**imaginary world** using **2D design software** and use the background for an **animation.** Pupils will understand how to **research** different cityscapes and **analyse** different designs. Using 2D Design, pupils will understand how to create their own **cityscape**. Pupils will gain knowledge of how to create **unusual shaped buildings and cityscapes** for your background of your future **Animation** Pupils learn how to use the basics of **2D design** including: . How to **setup** a drawing page . Understanding each **icon** Understanding how to **colour and fill** . Understanding how to **copy and delete.** Pupils will understand the important of **secondary Research**- To understand 2D Design- Setup drawing page **Icons** **Layout** **How to draw simple shapes** **How to use text**	**Knowledge and understanding that will be needed or acquired:** **Health and safety** with a particular focus on **wood, plastic and metal work.** **Marking out techniques**, the use of **equipment** and accuracy. Understanding of **wood & plastic, joining techniques** and materials. Gain knowledge or the working **characteristics** and **properties** of a range of **different woods**. **Designing: - Understanding contexts, Users and purpose.** Pupils will develop detailed design specifications to guide their thinking use research including the study of different cultures, to identify and understand user needs identify and solve their own design problems. **Generating Ideas: - Developing, modelling and communicating ideas.** use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations combine ideas from a variety of sources design, to generate creative ideas and avoid stereotypical responses use a variety of approaches, for example biomimicry and user-centred design, to generate creative ideas and avoid stereotypical responses decide which design criteria clash and determine which should take priority develop and communicate design ideas using annotated sketches

	. developing their **typography & drawing techniques** working towards making a pop-up book with featuring dynamic mechanisms and **literacy skills.**		Pupils will be encouraged to enjoy designing and making in food	Pupils will learn how to write a **design Brief** and **Specification** . To develop **research** skills- Mind mapping & product Analysis . To develop an understanding of how to use **2D design** and how to create an **animation** . Understand the **difference** between **cityscapes** and **skylines**	produce 3D models to develop and communicate ideas use mathematical modelling to indicate likely performance before using **Planning, sequencing and schedules for manufacturing** Selecting from specialists tools, techniques, processes & equipment
KEY SKILLS	INTENT- Core areas covered: • Design processes covered – Research and investigation, idea generation and development. • Material properties: recycled materials (cardboard, plastic tubs, bottles etc.) • Modelling processes: using items safely (craft knife, scissors, safety rulers, cutting mats) • Understanding, evaluating and applying accuracy within design. • Finishing stages and applying a suitable finish	Understand **Health & Safety** rules in the workshop & **Risk Assessment** To understand how to **recognise** different types of **motion** To develop **research** skills- **Mind mapping** To develop **designing** skills- sketching & shade To understand how to **construct** a working **mechanical toy**. To develop **workshop skills- cutting**, **filing & shaping** To develop **knowledge** of **different shaped Cams**	To understand the **H & S rules** of the food room. . To identify **potential hazards** in the food room and understand most risks. . To succeed in using **food hand tools** and equipment safely . Be involved in making a **range of dishes** . Be able to write up and **evaluate practical activities** . Students able to apply knowledge and skill learned; manage time and resources and design and make a simple dish. . Work well in **small teams**	**Develop ideas** by drawing on and using various sources of information **Develop ideas** through 2D design software, drawing, adding colour and using shapes and dimensions, showing understanding of aesthetics **Learning how** to write a design Brief and Specification **To develop research skills**- Mind mapping & product Analysis **To develop** an understanding of how to use 2D design and how to create an animation Understand the difference between cityscapes and skylines	**Students draw on and use** a range of sources of information, and show that they understand the form and function of familiar products as they develop and model ideas. **They respond creatively to briefs**, exploring and testing their design thinking. **They develop** detailed criteria for their products and use these to explore proposals. **They apply their knowledge and understanding by** responding to several aspects of the problem. **They recognise the significance of others' designing** and modify their approaches accordingly. **They produce plans that outline alternative methods of** making progress. **They work with a range of** tools, materials, equipment, components and processes, showing that they understand their characteristics. **They check their work as it develops and solve** technical problems by modifying their approach in the light of progress. They evaluate how effectively they have used information sources, using the results of their research to inform their judgements when developing products. **They evaluate their products as they are being used, and identify ways of improving them.**
LINKS TO THE WORLD **i.e. links to careers; equality: gender, class, ethnicity etc.; different subjects**	**SMSC-** Explore beliefs and experience; Recognise right and wrong; Use a range of societal trends to influence designs; links to local community requirements; appreciate diverse viewpoints; acknowledge inclusivity within designs; engage with the 'British values' of democracy, the rule of law, liberty, respect and tolerance. Appreciate cultural influences within design styles. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.	**Using creativity and imagination,** students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. **They acquire a broad range of** subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. **They learn how to take risks**, becoming resourceful, innovative, enterprising and capable citizens. **Through the evaluation of past and present design** and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential	**Enrichment/life and work skills:** The project will equip students with a good knowledge of balanced diet and healthy eating, highlighting some of the main dangers young people face Practical lessons will equip them with **skills to cook healthy and nutritious meals in future.** The project will increase student's exposure to **different cultures** from **around the world**, and also introduce special diets such as Halal diets and Vegan preferences The project has a strong **cross curricular** link with **Science**, focussing on aspects of the body and energy & Nutrition.	**SMSC-** Explore beliefs and experience; Recognise right and wrong; Use a range of societal trends to influence designs; links to local community requirements; appreciate diverse viewpoints; acknowledge inclusivity within designs; engage with the 'British values' of democracy, the rule of law, liberty, respect and tolerance. Appreciate cultural influences within design styles. Students will demonstrate **mathematical, ICT and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.	**Enrichment/life and work skills**: Practical problem solving and recognising failure can be beneficial. In the KS3 years, learning is embedded through practical application or design and make activities. Discussions on User Centred Design and recognising cost and financial impacts of products. Cultural influences and social impacts of design explored in a basic format with focused activities and discussions on environmental impact of designs and materials. Recognising others views and preferences/empathy Understanding the importance of risk taking with a programme to support student leadership skills. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.

		contribution to the creativity, culture, wealth and wellbeing of the nation.			
ASSESSMENTS Summative and Formative as applicable	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam
FEEDBACK SUPPORTS LEARNING	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓
SPECIALIST VOCABULARY	Demonstrate Inclusive Target Market Illustration Discriminate Outline Reproduce				
QUALITY FIRST TEACHING	✓ Strategies to learn more, remember more (metacognition) used in lessons e.g. retrieval, elaboration, interleaving, dual coding, etc. ✓ Differentiation and reasonable adjustments for students with SEND, EAL, etc. such as scaffolding, visual aids, audio, physical resources, planned questioning, etc. ✓ Opportunities for Literacy, Numeracy and Oracy, including a focus on reading ✓ Opportunities to apply key concepts and address misconceptions				

Rutlish School

YEAR 8

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1 and summer 2
	UNIT OF WORK: Resistant Materials- Cam Car Project	**UNIT OF WORK: Resistant Materials- Cam Car Project**	**UNIT OF WORK: Year 8 Food Technology**	**UNIT OF WORK: Year 8 Graphics- Video Games Cover Project**	**UNIT OF WORK: Resistant Materials- Location Indicator Project**
KNOWLEDGE: Design, Evaluate & Technical Knowledge HOW DO WE BUILD ON SKILLS AND KNOWLEDGE?	CULTURAL UNDERSTANDING **Research the Task** • research and understand the form and function of the product • product analysis explained and how the product functions (works) • Using a range of sources of information CREATIVITY, DESIGNING & MAKING **Generate, Model & Develop Ideas** • sketched ideas based on the given brief, in a creative way i.e. tried to be different • testing ideas by asking others their opinion • Using their experience from other projects to help you develop your new ideas • explaining how other designers have helped develop the final idea DESIGNING & MAKING **Specification** • safety notes for each task, where necessary • A schedule checked before you started to make your product • Any modifications and changes DESIGNING & MAKING **High Quality Making Using Tools, Equipment and Processes** • worked with a range of tools, materials, equipment, components and processes, showing understanding why and how they are used CRITICAL EVALUATION **Evaluation**	CULTURAL UNDERSTANDING **Research the Task** • research and understand the form and function of the product • product analysis explained and how the product functions (works) • Using a range of sources of information CREATIVITY, DESIGNING & MAKING **Generate, Model & Develop Ideas** • sketched ideas based on the given brief, in a creative way i.e. tried to be different • testing ideas by asking others their opinion • Using their experience from other projects to help you develop your new ideas • explaining how other designers have helped develop the final idea DESIGNING & MAKING **Specification** • safety notes for each task, where necessary • A schedule checked before you started to make your product • Any modifications and changes DESIGNING & MAKING **High Quality Making Using Tools, Equipment and Processes** • worked with a range of tools, materials, equipment, components and processes, showing understanding why and how they are used CRITICAL EVALUATION **Evaluation**	In **year 8** this **safe working** is further emphasised, a further variety of cooking and food types are introduced and **hygiene, energy and nutrition** are studied in depth. This compliments work ongoing in year 8 science. Due to the nature of this theory, students are provided with pupil workbooks that contain many of the notes they need to reflect on the lessons taught. This KS3 Food SOW seeks to provide ongoing theory and practice of designing and making a range of dishes that are mainly savoury. **. Poached fish, steamed potatoes and peas.** **. Vegetable soup with homemade bread rolls** **. Pasta Salad** **. Vegetarian Spaghetti Bolognese** **. Macaroni Cheese.** **. Orange Chicken with Rice** . **Consolidation- Ready, Steady, Cook!** **Students understand how food provides us with energy** - To define energy and explain why it is needed. To identify sources of energy in the diet. To understand how energy needs, change throughout life. To understand the energy needs of different levels of physical activity. To define energy balance and understand the consequences of imbalance A healthy and **varied diet** become competent in a **range of cooking techniques** for example, selecting and preparing ingredients; using **utensils** and **electrical equipment**; **applying heat in different ways**; using **awareness of taste, texture and smell** to decide how to **season** dishes and combine ingredients; adapting and using their own recipes . Understand the **source, seasonality and characteristics** of a broad range of ingredients.	Learning how to write a **design Brief** and **Specification** To develop **research** skills- **Mind mapping**, **Questionnaire** and **Product Analysis** To gain further knowledge of using **2D design** and **Photoshop** software Understanding the concepts of **Social, Moral & Cultural** issues when designing. To understand Typography & Font Styles **Developing Skills:** **Writing-** Taking a creative route into writing a review **Thinking-** Reflecting on interests and preferences **Reading-** Learning about, and evaluating, presentation and language. In this project the students will be designing their own video games cover, using **2D design and Photoshop software.** students will understand how to **research** different covers and **analyse** different designs. cover Students enhance their knowledge of **2D design** including: . How to **setup** a drawing page . Understanding each **icon** Understanding how to **colour and fill** . Understanding how to **copy and delete.** Pupils will understand the important of **secondary Research**- To understand 2D Design- Setup drawing page **Icons** **Layout** **How to draw simple shapes** **How to use text**	In this project **year 8** students design and make a Location device that can show positions on a map. **Understand Health & Safety** rules in the workshop & Risk Assessment • **To develop skills** in writing a Design Brief and Specification • **To develop organisational skills**, construct a finished product. • **To develop planning skills**, plan a schedule of tasks and follow them. • **Learning how to mark out on Wood** To develop workshop skills- cutting and Drilling • **To develop knowledge of Wood, Metal and Simple Electronic Circuits** To understand that electrons flow in a circuit DESIGNING & MAKING **High Quality Making Using Tools, Equipment and Processes** The importance of working accurately in wood if joints are to be strong. That joints help to hold wood together partly by increased mechanical strength but also because of the increased surface area that is glued. That good finishing enhances the appearance of the work. That safe working in the workshop is essential. • To solder. • The makeup of solder. • That metals conduct electricity • The purpose of flux. • The importance of clean metal surfaces. • The need to heat both parts to be soldered. • Input Process and Outputs • Inputs processes and outputs can be interchanged. • To identify the polarity sensitive components as appropriate. • Ohms' Law • Resistors in series and parallel as relevant. • How to use a breadboard for prototypes? • That current is different to voltage. • Input devices may need to be matched to Process. • Outputs may need to be matched to a process. • Ohms' Law • Resistors in series and parallel as relevant. • How to use a breadboard for prototypes? • That current is different to voltage. • Input devices may need to be matched to Process. • Outputs may need to be matched to a process.

	• Have you explained how successful your research was in helping you to produce your product? • How have you evaluated your product as it has been used? • Have you explained the modifications or improvements you have made	• Have you explained how successful your research was in helping you to produce your product? • How have you evaluated your product as it has been used? • Have you explained the modifications or improvements you have made			
KEY SKILLS	Understand **Health & Safety** rules in the workshop & **Risk Assessment** To understand how to **recognise** different types of **motion** To develop **research** skills- **Mind mapping** To develop **designing** skills- sketching & shade To understand how to **construct** a working **mechanical toy**. To develop **workshop skills- cutting**, **filing & shaping** To develop **knowledge** of **different shaped Cams**	Understand **Health & Safety** rules in the workshop & **Risk Assessment** To understand how to **recognise** different types of **motion** To develop **research** skills- **Mind mapping** To develop **designing** skills- sketching & shade To understand how to **construct** a working **mechanical toy**. To develop **workshop skills- cutting**, **filing & shaping** To develop **knowledge** of **different shaped Cams**	To understand the **H & S rules** of the food room. . To identify **potential hazards** in the food room and understand most risks. . To succeed in using **food hand tools** and equipment safely . Be involved in making a **range of dishes** . Be able to write up and **evaluate practical activities** . Students able to apply knowledge and skill learned; manage time and resources and design and make a simple dish. . Work well in **small teams**	using various sources of information **Develop ideas** through 2D design and Photoshop software, drawing, adding colour and using shapes and dimensions, showing understanding of aesthetics **Learning how** to write a design Brief and Specification **To develop research skills**- Mind mapping & product Analysis **To develop** an understanding of how to use 2D design and how to create a cover for a video game	• To solder. • The makeup of solder. • That metals conduct electricity • The purpose of flux. • The importance of clean metal surfaces. • The need to heat both parts to be soldered. • Input Process and Outputs • Inputs processes and outputs can be interchanged. • To identify the polarity sensitive components as appropriate. • Ohms' Law • Resistors in series and parallel as relevant. • How to use a breadboard for prototypes. • That current is different to voltage. • Input devices may need to be matched to Process. • Outputs may need to be matched to a process. • Ohms' Law • Resistors in series and parallel as relevant. • How to use a breadboard for prototypes. • That current is different to voltage. • Input devices may need to be matched to Process. • Outputs may need to be matched to a process.
LINKS TO THE WORLD **i.e. links to careers; equality: gender, class, ethnicity, etc.; different subjects**	Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They 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. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. Students will demonstrate **mathematical and scientific** knowledge and understanding, in	Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They 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. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. Students will demonstrate **mathematical and scientific** knowledge and understanding, in	**Enrichment/life and work skills:** The project will equip students with a good knowledge of balanced diet and healthy eating, highlighting some of the main dangers young people face Practical lessons will equip them with **skills to cook healthy and nutritious meals in future.** The project will increase student's exposure to **different cultures** from **around the world**, and also introduce special diets such as Halal diets and Vegan preferences The project has a strong **cross curricular** link with **Science**, focussing on aspects of the body and energy & Nutrition. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.	Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They 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. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. Students will demonstrate **mathematical and scientific** knowledge and understanding, in	Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They 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. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and wellbeing of the nation. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.

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ASSESSMENTS Summative and Formative as applicable	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam
FEEDBACK SUPPORTS LEARNING	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓
SPECIALIST VOCABULARY	Aesthetic Durable Interpolate Evaluation analysis				
QUALITY FIRST TEACHING	✓ Strategies to learn more, remember more (metacognition) used in lessons e.g. retrieval, elaboration, interleaving, dual coding, etc. ✓ Differentiation and reasonable adjustments for students with SEND, EAL, etc. such as scaffolding, visual aids, audio, physical resources, planned questioning, etc. ✓ Opportunities for Literacy, Numeracy and Oracy, including a focus on reading ✓ Opportunities to apply key concepts and address misconceptions				

Rutlish School

YEAR 9

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
	UNIT OF WORK: Year 9 Resistant Materials- Structures Project	**UNIT OF WORK: Year 9 Graphics Drawing Skills Project**	**UNIT OF WORK: Year 9 Food Technology**	**UNIT OF WORK: Year 9 Graphics- Packaging Project**	**UNIT OF WORK: Year 9 Resistant Materials & Graphics- Board Game Project**
KNOWLEDGE: Design, Evaluate & Technical Knowledge HOW DO WE BUILD ON SKILLS AND KNOWLEDGE?	In year 9, the students will learn about structures. They will explain: • what structures do, list types of structure, list causes of structural failure. • explaining the similarities between frame structures, list how to make frame structures rigid. • explaining the different types of force that a frame structure can be subjected too. • sketching 4 designs, evaluate and select the best design. • drawing a final design which shows at least 2 views (front and side) neatly laid out. • creating a parts list and work out the number of art straws needed to make the bridge. • Appropriate tools and equipment correctly and safely to make the bridge. • appropriate tools and equipment correctly, skilfully and safely to test the bridge. Creating a results table. • some aspects of the bridge evaluated against the design task and some improvements suggested. • explain the principle of moments and use it to solve simple design problem	The main aim of this project is to develop pupils understanding of designing using drawing techniques. The project allows pupils to understand basic principles of different drawing techniques. The project builds upon design skills previously learnt. In this project the main aim is to identify different drawing techniques To know the advantages and disadvantages using different drawing techniques To be able to apply different drawing techniques: these techniques include: • Oblique • Scale drawings • 1-point perspective • 2-point perspective • Orthographic • Isometric • Exploded drawings **These drawing techniques are part of the GCSE AQA specification in design and making principles.** • The ability to identify different drawing techniques • To know the advantages and disadvantages using different drawing techniques • To be able to apply different drawing techniques:	In **year 9** the emphasis on **safe working** is maintained whilst pupils follow a **mainly practical course**. Students are asked to cook more challenging dishes and are introduced to a more complete range of cooking techniques. By year 9 pupil practical evaluations must reflect the content of year 7 and 8 as well as year 9. For example, they should be able to comment in detail on the **nutritional value, safe making, and choice of cooking technique** as a design tool; appropriately name and use **hand tools** in the kitchen and be able to design and make **complex dishes of their own invention**. This KS3 Food SOW seeks to provide ongoing theory and practice of designing and making a range of dishes that are mainly savoury. **. Vegetarian Chilli Con Carne** **. Chicken kebab** **. Vegetarian Samosa** **. Chicken Fajita** **. Vegetable curry** **Consolidation -Ready steady cook:** Project brief Research and design stage Understand in depth the theory of energy, nutrition and hygiene **Different cooking techniques** (boiling, frying, steaming, roasting etc. and different cookers (electric, gas, microwave, induction, etc.: which do you use, when and how	The main aim of this project is to develop pupils understanding of designing and manufacture. The project allows pupils to understand basic principles of net design, fonts, colour styles and semantics. The project builds upon design and making skills previously learnt to be used in a graphics based project. Pupils will also be introduced to other areas of design including: mood boards, cultural research and design and packaging. • Research, analysis and planning of making. • Design ideas and Development. • Evaluations, testing and modifications/ improvements. Production of effectiveness of outcome (level of accuracy and finish) • To enable pupils to develop their practical skills. • To increase awareness of sustainability in packaging design. • To develop knowledge and understanding of materials, tools, processes, symbols and net design • Select and use a range of tools, equipment and processes safely and accurately. • Understand how to take account of working characteristics of materials and components and restrictions imposed by tools and equipment. Research of Printing Processes and Techniques. • Accurately measure, mark out, cut and waste material. High quality finishes produced. • Use of computer-aided design and manufacture, as an integral part of designing and making. • To evaluate work throughout the manufacturing process. • To develop knowledge/ skills to enable achievement of a high quality finish in practical work.	In this topic, students will explore the central themes of improvisation and modification by exploring a range of materials properties of materials and use these creatively to develop a creative game for a target market of their choice. **Exploring Idea and the task** Develop design criteria to satisfy the design brief Identify constraints imposed by the task and/or resources and acknowledge them when formulating criteria. Use existing, familiar products and systems to inform their design thinking **Generating Ideas** Make connections and see relationships between form and function of exiting products and possible design proposals. Use a range of strategies to produce, communicate, record initial ideas to assist self-reflection and to describe their ideas and thinking to others. Develop the capacity to build images in the mind's eye. **Developing and modelling ideas** Work out, and reflect on, the technical details of their ideas by modelling them though drawing, discussion, ICT and in 3-D. Appraise ideas by continual reference to the design criteria Explore and experiment with and then select appropriate materials and process. **Planning** Predict and manage the time needed to complete a short task. **Evaluating** **(Own)** Evaluate their design ideas and products by comparing them against the original design criteria and suggest improvements. **(Others)** Identify that products are made from a variety of different materials Examine, describe and evaluate similar products to gain useful technical information Understand the need that a product is intended to serve and judge how well it meets that need.

KEY SKILLS	**Design** use a variety of approaches [for example, biomimicry and user-centered design], to generate creative ideas and avoid stereotypical responses develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools **Make** select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties **Evaluate** test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups **Technical knowledge** understand and use the properties of materials and the performance of structural elements to achieve functioning solutions.	To be able to apply different drawing techniques: these techniques include: • Oblique • Scale drawings • 1-point perspective • 2-point perspective • Orthographic • Isometric • Exploded drawings 1. To enable pupils to develop their practical drawing skills. 2. To develop knowledge and understanding of different drawing techniques. 3. Select the appropriate drawing technique for a task. 4. To evaluate the outcome of using various drawing techniques. 5. To develop knowledge/ skills to enable achievement of a high quality hand drawings using various techniques.	To understand the **H & S rules** of the food room. . To identify **potential hazards** in the food room and understand most risks. . To succeed in using **food hand tools** and equipment safely . Be involved in making a **range of dishes** . Be able to write up and **evaluate practical activities** . Students able to apply knowledge and skill learned; manage time and resources and design and make a simple dish. . Work well in **small teams**	• To enable pupils to develop their practical skills. • To increase awareness of sustainability in packaging design. • To develop knowledge and understanding of materials, tools, processes, symbols and net design • Select and use a range of tools, equipment and processes safely and accurately. • Understand how to take account of working characteristics of materials and components and restrictions imposed by tools and equipment. Research of Printing Processes and Techniques. • Accurately measure, mark out, cut and waste material. High quality finishes produced. • Use of computer-aided design and manufacture, as an integral part of designing and making. • To evaluate work throughout the manufacturing process. • To develop knowledge/ skills to enable achievement of a high quality finish in practical work.	Prepare an ordered sequence for managing a task. Take account of the type and quality of materials and components that are available Identify alternative methods of proceeding if first attempts should fail. Share decisions about the task with teachers and/or others. • Understand the importance of existing product research. • Begin to understand the different types of board games. • Understand the importance of following rules when playing a game. • board games rules, playing methods, times and scoring methods. • How to plan board games as a source of research ready to design their board games. • Evaluation • What have we learnt regarding rules, play time, scoring methods etc, could we offer areas for improvements for each game.
LINKS TO THE WORLD **i.e. links to careers; equality: gender, class, ethnicity, etc.; different subjects**	Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They 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. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and wellbeing of the nation. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will	Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They 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. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and wellbeing of the nation. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At	**Enrichment/life and work skills:** The project will equip students with a good knowledge of balanced diet and healthy eating, highlighting some of the main dangers young people face Practical lessons will equip them with **skills to cook healthy and nutritious meals in future.** The project will increase student's exposure to **different cultures** from **around the world**, and also introduce special diets such as Halal diets and Vegan preferences The project has a strong **cross curricular** link with **Science**, focussing on aspects of the body and energy & Nutrition. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology.	Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They 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. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and wellbeing of the nation. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess	Using creativity and imagination, students design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They 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. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and wellbeing of the nation. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.

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ASSESSMENTS Summative and Formative as applicable	• Self and peer assessment. • Plenary activities- Q&A quiz • Questions and Answer session on H&S in the workshop. • End of topic test/assessment • End of year exam				
FEEDBACK SUPPORTS LEARNING	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓	**Opportunity for students to reflect on learning, respond to feedback, improve work, etc.** ✓
SPECIALIST VOCABULARY	Specification Design Brief Extrapolate Exemplify Duplicate				
QUALITY FIRST TEACHING	✓ Strategies to learn more, remember more (metacognition) used in lessons e.g. retrieval, elaboration, interleaving, dual coding, etc. ✓ Differentiation and reasonable adjustments for students with SEND, EAL, etc. such as scaffolding, visual aids, audio, physical resources, planned questioning, etc. ✓ Opportunities for Literacy, Numeracy and Oracy, including a focus on reading ✓ Opportunities to apply key concepts and address misconceptions				

Rutlish School

YEAR 10

GCSE Design Technology 8552- Core , Specialist & Designing & Making Technical Principles
HOW DO WE BUILD ON SKILLS AND KNOWLEDGE?

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	UNIT OF WORK: Core Technical Principles: Section 1	**UNIT OF WORK: Core Technical Principles Section 2**	**UNIT OF WORK: Core Technical Principles Section 2 and Section 3**	**UNIT OF WORK: Specialist Technical Principles Section 3 and Section 4 Common Specialist Technical Principles**	**UNIT OF WORK: Designing & Making Principles Section 6**	**UNIT OF WORK: NEA-AQA CONTEXTUAL CHALLENGES: AO1- Section A & Section B:** Identifying and investigating design possibilities and Producing a design brief & specification
	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 • materials and their working properties** **SECTION 1-Chapter 1: New and Emerging Technologies - Automation, Robotics, Product & Technical development.** Chapter 1: New and Emerging Technologies - Crowd funding, virtual marketing & retail co-operatives. Chapter 2: Sustainability & the Environment - Finite & non- finite resources, Factors effecting the planet Chapter 3: Sustainability & the Environment - Positive and negative impact on technology & Carbon offsetting. Chapter 4: Product techniques and System - Lean manufacturing, Just in Time manufacture and techniques. Chapter 5: Informing Design Decisions- Upgrading, Function, technology push and fashion trends.	**SECTION 2-Chapter 6: Energy, Materials, Systems & Devices- Turbines, generators, Fossil Fuels & Shale Gas** Chapter 7: Energy, Materials, Systems & Devices- Renewable energy: Hydroelectric power, Biofuel, Nuclear Power Chapter 8: Energy storage- Batteries: Alkaline cells, Rechargeable batteries and disposal of batteries. Chapter 9: Modern Materials- Fibre Optics, Graphene, LCD and Nanomaterials. Chapter 10: Smart Materials- Thermochromics pigments, Photochromic pigments and Photochromic particles. Chapter 11: Piezoelectric material and Litmus paper. Chapter 12: Composite materials & Technical textiles- Materials and their properties, Composite materials & GRP. Chapter 13: Composite materials & Technical textiles- Fire resistant fabrics, Microfibers & Microencapsulation Chapter 14: Mechanical systems & movements- Gearing up and down, pulleys, belts, block & tackle.	**SECTION 2-** Chapter 15: Mechanical systems & movements- Linear, Rotary, Reciprocating and Oscillating motion & Linkages, Levers, Classes of Levers Chapter 16: Systems approach to designing- Open and close loop systems, Input and output components & LDR Chapter 17: Electronic systems processing- Monostable devices, Astable devices & Counters. **SECTION 3-Chapter 18: Materials & their working properties- Paper & Boards; Material properties.** Chapter 18: Materials & their working properties- Physical properties, common Papers and Boards. Chapter 19: Natural & Manufactured Timbers- Natural woods, Hardwoods and Softwoods.	**SECTION 3-** Chapter 20: Natural & Manufactured Timbers- Manufactured Boards. Chapter 21: Polymers- Thermosetting plastics Chapter 22: Textiles- **SECTION 4- Common specialist technical principles: Chapter 19- Forces & stresses on materials and objects: Tension, Compression, Torsion, Bending & Shear.** Chapter 20- Improving Functionality: Fabric interfacing, Folding & bending and Nets Chapter 21- Ecological & Social Footprint- Carbon Footprint, Social Footprint and safe working conditions. Chapter 22- The Six Rs- Refuse, Rethink, Reduce, Reuse, Repair & Recycle. Chapter 23- Scales of Production: One-Off, Batch, Mass and Continuous production.	**SECTION 6-Chapter 42: Designing Principles-** Investigation for research data- iterative design Chapter 42: Designing Principles- Market Research: Interview and questionnaire, Product Analysis. Chapter 42: Designing Principles- Market Research: Environmental, Social and Economic challenges. Chapter 43: The Work of Others- Researching & writing an investigation Chapter 44: Design Strategies- Avoiding design fixation, Exploring Iterative design and sketching. Chapter 45: Communication of design ideas & Prototype development- 2D,3D sketching's and Oblique and Isometric projection. Chapter 45: Communication of design ideas & Prototype development- Model construction, developing a prototype.	**NEA-AQA CONTEXTUAL CHALLENGES- Students to explore contextual briefs.** NEA- Students to research the Contextual Briefs given by AQA and research products and design ideas within those contextual challenges. NEA- Students to begin NEA-Task Analysis; selecting and acquiring relevant research & explore, in depth, the task they have chosen to do. NEA-Students to identify the potential client/target market, justify design problem/solution, Questionnaire and specification points. NEA- Analytical research of Existing Products identified from the chosen Contextual challenge NEA- Secondary research of creating a Mood board in relation to the chosen Contextual challenge. NEA- Students to write their specification using ACCESSFM and also include additional specification points.

KEY SKILLS	In order to 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 materials and their working properties.	Classification of the types and properties of a range of materials. Physical properties of materials related to use and knowledge applied when designing and making. Scientific vocabulary eg metals/non-metals and physical and chemical differences between them eg types and properties across a range of materials. Using materials eg composition of some important alloys eg selection of an alloy for enhanced durability in a particular design situation.	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, types and sizes • scales of production • specialist techniques and processes • surface treatments and finishes. Each specialist technical principle should be delivered through at least one material category or system. Not all of the principles outlined above relate to every material category or system, but all must be taught. The categories through which the principles can be delivered are: • papers and boards • timber based materials • metal based materials • polymers • textile based materials • electronic and mechanical systems.	Functionality: application of use, ease of working. Aesthetics: surface finish, texture and colour. Environmental factors: recyclable or reused materials. Availability: ease of sourcing and purchase. Cost: bulk buying. Social factors: social responsibility. Cultural factors: sensitive to cultural influences. Ethical factors: purchased from ethical sources such as FSC.	Students should know and understand that all design and technology activities take place within a wide range of contexts. They should also understand how the prototypes they develop must satisfy wants or needs and be fit for their intended use. For example, the home, school, work or leisure. They will need to 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 • specialist techniques and processes.	Design and develop prototypes in response to client wants and needs. Note the term prototype can be used to describe either a product or system. How the development of prototypes: • satisfy the requirements of the brief • respond to client wants and needs • demonstrate innovation • are functional • consider aesthetics • are potentially marketable. Students should know and understand how to evaluate prototypes and be able to: • reflect critically, responding to feedback when evaluating their own prototypes • suggest modifications to improve them through inception and manufacture • assess if prototypes are fit for purpose.
LINKS TO THE WORLD i.e. links to careers; equality: gender, class, ethnicity, etc.; different subjects	GCSE Design and Technology will prepare students to participate confidently and successfully in an increasingly technological world. Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.	**Students will develop social-emotional learning (SEL)** skills by engaging in projects with group work to plan, create and learn about the products for the future. Students would understand how to leverage technology and have the right digital skills that will prepare for a variety of work environments, whether physical or virtual. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.	GCSE Design and Technology will prepare students to participate confidently and successfully in an increasingly technological world. Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.	**Students will develop social-emotional learning (SEL)** skills by engaging in projects with group work to plan, create and learn about the products for the future. Students would understand how to leverage technology and have the right digital skills that will prepare for a variety of work environments, whether physical or virtual. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.	GCSE Design and Technology will prepare students to participate confidently and successfully in an increasingly technological world. Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.	**Students will develop social-emotional learning (SEL)** skills by engaging in projects with group work to plan, create and learn about the products for the future. Students would understand how to leverage technology and have the right digital skills that will prepare for a variety of work environments, whether physical or virtual. Students will demonstrate **mathematical and scientific** knowledge and understanding, in relation to design and technology. At least 15% of the exam will assess maths and at least 10% will assess science.

ASSESSMENTS Summative and Formative as applicable	• End of chapter mini assessments • End of unit tests • Mock Exam **Questions Section A – Core technical principles (20 marks)** A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding. **Section B – Specialist technical principles (30 marks)** Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles. **Section C – Designing and making principles (50 marks)** A mixture of short answer and extended response questions	• End of chapter mini assessments • End of unit tests • Mock Exam **Questions Section A – Core technical principles (20 marks)** A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding. **Section B – Specialist technical principles (30 marks)** Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles. **Section C – Designing and making principles (50 marks)** A mixture of short answer and extended response questions	• End of chapter mini assessments • End of unit tests • Mock Exam **Questions Section A – Core technical principles (20 marks)** A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding. **Section B – Specialist technical principles (30 marks)** Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles. **Section C – Designing and making principles (50 marks)** A mixture of short answer and extended response questions	• End of chapter mini assessments • End of unit tests • Mock Exam **Questions Section A – Core technical principles (20 marks)** A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding. **Section B – Specialist technical principles (30 marks)** Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles. **Section C – Designing and making principles (50 marks)** A mixture of short answer and extended response questions	• End of chapter mini assessments • End of unit tests • Mock Exam **Questions Section A – Core technical principles (20 marks)** A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding. **Section B – Specialist technical principles (30 marks)** Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles. **Section C – Designing and making principles (50 marks)** A mixture of short answer and extended response questions	• End of chapter mini assessments • End of unit tests • Mock Exam **Questions Section A – Core technical principles (20 marks)** A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding. **Section B – Specialist technical principles (30 marks)** Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles. **Section C – Designing and making principles (50 marks)** A mixture of short answer and extended response questions
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SPECIALIST VOCABULARY	Anthropometric Ergonomics Iterative Industry Disassembly					
QUALITY FIRST TEACHING	✓ Strategies to learn more, remember more (metacognition) used in lessons e.g. retrieval, elaboration, interleaving, dual coding, etc. ✓ Differentiation and reasonable adjustments for students with SEND, EAL, etc. such as scaffolding, visual aids, audio, physical resources, planned questioning, etc. ✓ Opportunities for Literacy, Numeracy and Oracy, including a focus on reading ✓ Opportunities to apply key concepts and address misconceptions					

Rutlish School

YEAR 11	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	UNIT OF WORK: NEA-AQA CONTEXTUAL CHALLENGES: **AO2- Section C:** Generating design ideas **Section D:** Developing design ideas	**UNIT OF WORK: NEA-AQA CONTEXTUAL CHALLENGES:** **AO2- Section D:** Developing design ideas **Section E**: Realising design ideas	**UNIT OF WORK: Specialist Technical Principles Section 5** **NEA-AQA CONTEXTUAL CHALLENGES: AO3- Section E**: Realising design ideas	**UNIT OF WORK: Specialist Technical Principles Section 5** **NEA-AQA CONTEXTUAL CHALLENGES: AO3- Section F** Analysing & Evaluating	**UNIT OF WORK: Specialist Technical Principles Section 5** **NEA-AQA CONTEXTUAL CHALLENGES: AO3 Section F** Analysing & Evaluating	**UNIT OF WORK: Specialist Technical Principles Section 5** **NEA-AQA CONTEXTUAL CHALLENGES: AO3 Section F** Analysing & Evaluating
GCSE Design Technology 8552- Core , Specialist & Designing & Making Technical Principles **HOW DO WE BUILD ON SKILLS AND KNOWLEDGE?**	**Students should explore** a range of possible ideas linking to the contextual challenge selected. **These design ideas** should demonstrate flair and originality and students are encouraged to take risks with their designs. Students may wish to use a variety of techniques to communicate **Imaginative, creative and innovative ideas** Design Concept- Initial ideas: Including CAD drawings for each initial idea & models. **NEA- SECTION 3: Design Concept-** Detailed development of selected idea- including features and functions. **Students will develop and refine design ideas**. This may include, formal and informal 2D/3D drawing including CAD, systems and schematic diagrams, models and schedules. Students will develop at least one model, however marks will be awarded for the suitability of the model(s) and not the quantity produced.	**NEA- SECTION 3: Design Concept-** Detailed development of selected idea- including features and functions. Students will work with a range of appropriate **materials/components** to produce prototypes that are accurate and within close tolerances. **This will involve using specialist tools and equipment**, which may include hand tools, machines or CAM/CNC. The prototypes will be constructed through a range of techniques, which may involve shaping, fabrication, construction and assembly. The prototypes will have suitable finish with functional and aesthetic qualities **The correct tools, materials and equipment (including CAM where appropriate**) have been used or operated safely with a good level, of skill. Detailed quality control is evident to ensure the prototype is mostly accurate through partial application of tolerances. **Prototype shows a good level of making/finishing skills** that are largely consistent and appropriate to the desired outcome. A good quality prototype that may have potential to be commercially viable has been produced which mostly meets the needs of the client/user	**Specialist Technical Principles Section 5** Each specialist technical principle should be delivered through at least one material category or system Not all of the principles outlined above relate to every material category or system, but all must be taught. The categories through which the principles can be delivered are: • papers and boards • timber based materials • metal based materials • polymers • textile based materials • electronic and mechanical systems. **In relation to at least one material category or system, students should be able to select materials and components** **Functionality:** application of use, ease of working. **Aesthetics:** surface finish, texture and colour. **Environmental factors:** recyclable or reused materials. **Availability:** ease of sourcing and purchase. **Cost:** bulk buying. Social factors: social responsibility. **Cultural factors:** sensitive to cultural influences. **Ethical factors:** purchased from ethical sources such as FSC. **Within these iterative design process students are expected to** continuously analyse and evaluate their work, using their decisions to improve outcomes.	**Specialist Technical Principles Section 5** Each specialist technical principle should be delivered through at least one material category or system Not all of the principles outlined above relate to every material category or system, but all must be taught. 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			This should include defining requirements, analysing the design brief and specifications along with the testing and evaluating of ideas produced during the generation and development stages. Their final prototype(s) will also undergo a range of tests on which the final evaluation will be formulated. This should include market testing and a detailed analysis of the prototype(s).	testing and evaluating of ideas produced during the generation and development stages. Their final prototype(s) will also undergo a range of tests on which the final evaluation will be formulated. This should include market testing and a detailed analysis of the prototype(s).	testing and evaluating of ideas produced during the generation and development stages. Their final prototype(s) will also undergo a range of tests on which the final evaluation will be formulated. This should include market testing and a detailed analysis of the prototype(s).	testing and evaluating of ideas produced during the generation and development stages. Their final prototype(s) will also undergo a range of tests on which the final evaluation will be formulated. This should include market testing and a detailed analysis of the prototype(s).
KEY SKILLS	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, types and sizes • scales of production • specialist techniques and processes • surface treatments and finishes. Each specialist technical principle should be delivered through at least one material category or system. Not all of the principles outlined above relate to every material category or system, but all must be taught. The categories through which the principles can be delivered are: • papers and boards • timber based materials • metal based materials • polymers • textile based materials • electronic and mechanical systems.	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, types and sizes • scales of production • specialist techniques and processes • surface treatments and finishes. Each specialist technical principle should be delivered through at least one material category or system. Not all of the principles outlined above relate to every material category or system, but all must be taught. The categories through which the principles can be delivered are: • papers and boards • timber based materials • metal based materials • polymers • textile based materials • electronic and mechanical systems.	Functionality: application of use, ease of working. Aesthetics: surface finish, texture and colour. Environmental factors: recyclable or reused materials. Availability: ease of sourcing and purchase. Cost: bulk buying. Social factors: social responsibility. Cultural factors: sensitive to cultural influences. Ethical factors: purchased from ethical sources such as FSC.	Design and develop prototypes in response to client wants and needs. Note the term prototype can be used to describe either a product or system. How the development of prototypes: • satisfy the requirements of the brief • respond to client wants and needs • demonstrate innovation • are functional • consider aesthetics • are potentially marketable. Students should know and understand how to evaluate prototypes and be able to: • reflect critically, responding to feedback when evaluating their own prototypes • suggest modifications to improve them through inception and manufacture • assess if prototypes are fit for purpose.	Design and develop prototypes in response to client wants and needs. Note the term prototype can be used to describe either a product or system. How the development of prototypes: • satisfy the requirements of the brief • respond to client wants and needs • demonstrate innovation • are functional • consider aesthetics • are potentially marketable. Students should know and understand how to evaluate prototypes and be able to: • reflect critically, responding to feedback when evaluating their own prototypes • suggest modifications to improve them through inception and manufacture • assess if prototypes are fit for purpose.	Design and develop prototypes in response to client wants and needs. Note the term prototype can be used to describe either a product or system. How the development of prototypes: • satisfy the requirements of the brief • respond to client wants and needs • demonstrate innovation • are functional • consider aesthetics • are potentially marketable. Students should know and understand how to evaluate prototypes and be able to: • reflect critically, responding to feedback when evaluating their own prototypes • suggest modifications to improve them through inception and manufacture • assess if prototypes are fit for purpose.
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SPECIALIST VOCABULARY

Anthropometric
Ergonomics
Iterative
Industry
Disassembly

QUALITY FIRST TEACHING

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