Progression Grid 2024-25: Design Engineering Technology

Pre Year 7						
Design, Engineering and Technology is studied in primary school as part of the curriculum and through project/topic areas, however time spent on this can be limited and varies between schools. However, pupils will have an experience of designing, making, using different material and equipment's and presenting ideas. All off this supports the curriculum in year 7, with year 7 developing and building on these basic skills and knowledge.						
Year 7						
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Topic/Focus	**Design and Make project: Aerodynamics and Biomimicry – Water Transport** For most students this is their first experience of a DT workshop and making products using tools and machinery. The project introduces students to a design challenge that looks at producing a creative outcome that is strongly link to our maritime curriculum. Using a variety of materials and being influence by aerodynamics and biomimicry, students will design make and test a water vehicle. A basic framework for the design will be given to students but students have flexibility to be creative and develop their design ideas. Students learn through a variety of techniques such as brain storming, class discussions, idea development and modelling. They will have templates to follow and a structured plan of manufacture. Written work is recorded in an exercise book. Their work will be assessed by practical observations of the skills they have learnt and recorded in their books and their practical outcome. *Students will also learn the fundamentals of health and safety in the workshop and will build on these throughout the three years as they develop skills and have access to more tools and machines.*					
Sequencing	**Focus - Introduce** Brief, analysis, understanding of the topic What is a specification? Who does it impact? Identifying key information Initial discussions	**Focus - Explore** Research Understanding Developing knowledge Inform decisions	**Focus - Create** Design ideas Problem solving Sketching Developing ideas	**Focus - Model** Sketch modelling Prototyping Practical skills Materials Tools Equipment Health and safety Development	**Focus - Combine** Testing Did it meet the brief? Development Improvement Reflection Expansion Evaluation Revisiting	**Extend** Keyring fob design inspired by nature Onshape TechSoft 2D Homework
Extended Learning	Investigation Task – Health and safety quiz and challenge. After school STEM club – boat building Working with local companies	Investigation task – how to write a specification	Investigation task – how do I finish my product?	How is my product aerodynamic? How is my product inspired by biomimicry?	How does my project meet the brief?	**<u>Homework schedule</u>** 1.Local boat building industry and 'where you live'
Formal Assessment	End of Project Review - Including practical skills assessment and presentation of work, knowledge assessment.					
Project Length	8-10 weeks					

Progression Grid 2024-25: Design Engineering Technology

Year 8						
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Topic/Focus	Design and Make Project – Sea Plastics and lighting Students return in Year 8 to develop their skills and learn a new range of skills through another design and make project with a strong maritime link. Again, students will create a product in response to a challenging and relevant design brief. Using sea plastic as a focus for the design outcome, student will design and make a piece of lighting that will combine different materials and practical understanding. It will develop and expand on their knowledge from year 7 and introduce new materials and electronics. They will build cross curricular knowledge when looking at sea plastic and its impact on their local and global environment. They will understand the potential of turning plastic waste in to useable products and Students will also be introduced to graphic design using the latest technology and learn how to bring their ideas to life using illustrator and the laser cutter. Students will also be introduced to metalwork through a short two lesson project where they will create a name tag. They will explore a range of metals and how to cut and shape metal. Their work will be assessed by practical observations of the skills they have learnt and recorded in their books. Key ideas – research, design, oracy (whole class discussions and analysis), development, CAD/CAM, H&S, finishing techniques. *Students will develop their understanding of health and safety in the workshop and will build on these throughout the three years as they develop skills and have access to more tools and machines.*					
Sequencing	**Focus - Introduce** Brief, analysis, understanding of the topic What is a specification? Who does it impact? Identifying key information Initial discussions	**Focus - Explore** Research Understanding Developing knowledge Inform decisions	**Focus - Create** Design ideas Problem solving Sketching Developing ideas	**Focus - Model** Sketch modelling Prototyping Practical skills Materials Tools Equipment Health and safety Evaluation Development	**Focus - Combine** Testing Did it meet the brief? Development Improvement Reflection Expansion Evaluation Revisiting	**Extension Activity** Homework They will explore a range of tools and machinery to build skills ready for year 9, developing understanding ready for year 9.
Extended Learning	Global impact – how can we help the bigger problem? Links to local companies Bottle lid drive	What does the future look like? What will we do without plastics?	How many plastics have I used today?	One thing I could do differently challenge?	Alternative materials.	**Homework schedule** The impact of sea plastics on our local environment.
Formal Assessment	End of Project Review - Practical skills assessment and presentation of work, knowledge assessment.					
Project Length	8-10 weeks					

Progression Grid 2024-25: Design Engineering Technology

Year 9						
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Topic/Focus	**Design and Make Project – Sound and Amplification. Producing a speaker. Coastal warning systems, how sound travels through different environments** Students return in Year 9 to create a product around the theme of sound and amplification, with a specific focus on the maritime industry and how sound is used. In year 9 students have more freedom to explore design and engineering, they will develop a basic brief and have the option to select their own materials to create their design solution. Students will develop theory electronics skills learnt in year 8. .longside this they will learn how to amplify sound and create a sound system based on their knowledge and understanding. Case studies will look at how the maritime industries use sound for rescues and warning systems. Workshop machines and tools will be explored further, with health and safety underpinning students learning. This experience will enrich students experience of the subject and give student the knowledge of what to pick at KS4 and what engineering and design can offer. This project continues to develop students understanding to of CAD & CAM and builds directly to the understanding of working with materials and processes. It makes students think about whether they are wanting to continue with design and engineering in year 10 and wide range of resources they have access to. *Students will develop their understanding of health and safety in the workshop and will build on these throughout the three years as they develop skills and have access to more tools and machines.*					
Sequencing	**Focus - Introduce** Brief, analysis, understanding of the topic What is a specification? Who does it impact? Identifying key information Initial discussions	**Focus - Explore** Research Understanding Developing knowledge Inform decisions	**Focus - Create** Design ideas Problem solving Sketching Developing ideas Sketch Modelling	**Focus - Model** Sketch modelling Prototyping Practical skills Materials Tools Equipment Health and safety Evaluation Development	**Focus - Consolidate** Testing Did it meet the brief? Development Improvement Reflection Expansion Evaluation Revisiting	**Extension Activity** Onshape TechSoft 2D 3D printing parts Vacuum forming parts
Extended Learning	How do we find people that are lost?	How does sound travel through water?	CAD drawing – Onshape/Techsoft 2D/ Illustrator	Range of materials, exploring smart materials. Combing materials New processes (vacuum, forming, line bender)	Testing the sound, different materials, different amplification, different ways to make sound travel (eg different holes drilled in materials, different sizes)	**<u>Homework schedule</u>** 1. How is sound used at sea?
Formal Assessment	End of Project Review - Practical skills assessment and presentation of work, knowledge assessment.					
Project Length	8-10 weeks					

Cliff Park ORMISTON ACADEMY

Progression Grid 2024-25: Design Engineering Technology

Year 10										
Qualification	WJEC L1/2 Award in Engineering									
½ Term	1	1	2	2	3	3	4	4	5	6
Topic	**Processes** **WJEC** 3.3 Tools Machines Engineering processes and methods	**Processes** **WJEC** 3.3 Engineering processes and methods	**Materials** **WJEC** 3.2 Engineering materials Properties Applications	**Materials** **WJEC** 3.2 Engineering materials Metals Polymers Smart materials	**Solving problems** **WJEC** 3.4 Solving engineering problems	**Solving problems** **WJEC** 3.4 Solving engineering problems	**Engineered World** **WJEC** 3.1 Engineering Achievements	**Engineered World** **WJEC** 3.1 Engineering Achievements	**Unit 1** Coursework Start 20 hours of unit 1/prep	**Unit 1** Coursework Start 20 hours of unit 1/prep
H&S	Health and Safety - Under pins all learning									
Practical Focus	**Workshop skills - Reset** Basic Skills (toolbox) Metal work (TAG) Tool Making	**Developing Metalwork skills** Tag Tool making Cutting Shaping Measuring	**Developing Metalwork skills** Metal work (Machining) Lathe work Lamp Project	**Developing Metalwork skills** Metal work (Machining) Milling Lamp project	**CAD/CAM** Laser cutting, 3D printing Onshape	**CAD/CAM** Laser cutting, 3D printing Onshape	**Mock coursework** Previous brief	**Mock Coursework** Previous brief	**Unit 1** Coursework Start 20 hours of unit 1/prep	**Unit 1** Coursework Start 20 hours of unit 1/prep
Sequencing	**Focus -** Basic skills, developing skills Foundations of theory	**Focus -** Applying Skills Demonstrating in depth knowledge	**Focus** Basic skills (machining) Foundations of engineering processes	**Focus –** Applying Skills Demonstrating in depth knowledge	**Focus –** Basic CAD/CAM skills Learning the fundamentals of CAD/CAM Solving Problems	**Focus –** Applying skills Demonstrating in depth knowledge solving problems	**Focus –** Application of 3.2, 3.3 and 3.4 Basic knowledge of engineering achievements.	**Focus –** Independent application of 3.2, 3.3 and 3.4 Demonstration of in-depth knowledge of **3.1.**	**Focus –** Mock coursework following mark scheme Application of knowledge/skills	**Focus –** Mock coursework following mark scheme Application of knowledge/skills
Extended Learning	Physical testing of materials	Range of tools Smart materials	Higher level maths	Extension of skills CNC machines	3D Printing and laser cutting	3D Printing and laser cutting	Complex circuits Programming	Complex circuits Programming	Coursework linked tasks (exploring different ways)	Coursework linked tasks (exploring different ways)
Formal Assessment	EoT test or	EoT test or	EoT test or	EoT test or	EoT test or	Mock exam Unit 3	EoT test or	EoT test or Assessment mat	Exam Unit 3	Coursework marked

Progression Grid 2024-25: Design Engineering Technology

	Assessment mat Skills test	Assessment mat Skills test	Assessment mat Skills test	Assessment mat Skills test	Assessment mat Skills test		Assessment mat Skills test	Skills test		

Year 11							
Qualification	**WJEC L1/2 Award in Engineering**						
Term (half terms)	**1**	**2**	**3**	**4**	**5**		
Theory topic	3.2 Engineering materials	3.3 Engineering processes and methods	3.4 Solving engineering problems	3.1 Engineering Achievements	Recap – revision/past exam papers		
Coursework	Unit 1 (Submit Dec)	Unit 1	Unit 2 (Submit May)	Unit 2	***submitted***		
Sequencing	3.2.1 Understanding materials 3.2.2 Material properties 3.2.3 Testing materials ***Supports unit 2***	3.3.1 Engineering Processes 3.3.2 Application of processes 3.3.3 Safe working practices ***Supports unit 2***	3.4.1 Mathematical techniques for solving problems 3.4.2 Understand and produce engineering drawings	3.1.1 Engineering developments 3.1.2 Engineering achievements 3.1.3 Environmental issues affecting engineering applications.	3.1, 3.2, 3.3, 3.4		
Extended Learning	After school club /Period 6 Development of knowledge organisers Work experience, trips, maritime curriculum opportunities Homework Revision Cards						
Formal Assessment	Unit 2 – Internally assessed. EoT test	Unit 2 – Internally assessed. EoT test/mock	Unit 1 – Internally assessed. EoT Test	Unit 1 – Internally assessed Mock	Past exam questions	Past exam questions	Resit unit 3

Post Year 11		
Further Education/training in: Engineering L3 or Apprenticeship		Employment in: Engineering sector

Progression Grid 2024-25: Design Engineering Technology

Year 10										
Qualification	GCSE Art and Design 3D Design Eduqas This course is designed to provide an engaging, challenging and meaningful learning experience that is flexible to suit the needs of all students who select it as an GCSE option and focuses on the development of creative practice. This course is a more creative subject for students follow rather the than the engineering route. The programme of study aims to develop students' imagination and technical skills, creativity and promotes personal and social development. Students are assessed on a portfolio of work and a 10 hour practical assessment. Students can study 1 or more of the following areas as part of their portfolio and practical outcomes Architectural design • Interior design • Product design • Exhibition design • Environmental/landscape design • Sculpture • Design for theatre, film and television • Jewellery and body adornment • Ceramics.									
½ Term	1	1	2	2	3	3	4	4	5	6
Topic	**Introduction** Design and practical development skills Portfolio 'what is it?' Creative ideas	**Film and TV** Film and TV inspired design project How to annotate	**Film and TV** Completion **Architecture** 'Gorleston Band Stand'	**CAD/CAM** Onshape Illustrator Graphics	**CAD/CAM** Onshape Illustrator Graphics	**Architecture** 'Gorleston Band Stand' **Accessories (metal work)** Natural Forms	**Accessories (metal work)** Natural Forms	**Furniture design** Multifunctional Small spaces	**Furniture design** Multifunctional Small spaces	**Free choice Project completion** **Portfolio selection** Design show
Portfolio	Continuous building of portfolio for submission to exam board.									
H&S	Health and Safety – Under pins all learning									

Cliff Park ORMISTON ACADEMY

Progression Grid 2024-25: Design Engineering Technology

Practical Focus	Storage solution Personalised design Model making	Lighting Cutting Shaping Joining Model making	Lighting Cutting Shaping Joining Electronics Model making	Laser cutting 3D printing 'Elements' Model making	Laser cutting 3D printing Elements Combining materials Model making	Architecture Scale model making	Metal work Natural shapes and forms Working on small scales Model making	Woodwork Combination of all other project skills learnt Model making	Woodwork Combination of all other project skills learnt	Design show preparation Portfolio prep Quality of work produced
Sequencing	Design and practical basics	**Guided briefs and support**	Building CAD/CAM skills for architecture and jewellery topic.	Range of resources that are available Training for independent study and exam.	Range of resources	Career's Combining skills on different scales	**Independent briefs/development**	Free choice Mini Mock	Free choice Mini Mock	Local community Pride in work Showcasing
Extended Learning	Homework Design Skills	Wider world and designer influence	Wider world Careers	Resources Environmental impact	Resources Environmental impact	Design Experience hands on Careers My future	Design Experience hands on Materials	Creative skill development Blue sky thinking	Creative skill development Blue sky thinking	Design Show
Formal Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment Mini Mock	Portfolio Review Practical Skills assessment Design Skills Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment	Portfolio Review Practical Skills assessment Design Skills Assessment

Progression Grid 2024-25: Design Engineering Technology

Year 11							
Qualification	GCSE Art and Design 3D Design Eduqas						
Term (Half terms)	1	2	3	4	5		
Topic	Portfolio development Annotations	Finalise Portfolio Supporting Statements	Release of Exam Briefs Selection prep	Individual study Exam brief Prep	10-hour Exam (over two days when art exam is being taken)		
Portfolio	Continuous building of portfolio for submission to exam board.						
H&S	Health and Safety – Under pins all learning						
Practical focus	Portfolio Completion of practical pieces and design sheets	Portfolio Completion of practical pieces and design sheets	Exam prep Model making	Exam prep Model making	Exam		
Sequencing	Independent study and development of skills/presentation of work	Independent study and development of skills/presentation of work	**Exam prep** Using skills and knowledge from year 10	**Exam prep** Using skills and knowledge from year 10	**Exam**		
Extended Learning	Hands on experiences, careers focus, local environment, photographic skills.						
Formal Assessment	Portfolio (GCSE GRADE 60%)	Portfolio (GCSE GRADE 60%)	Exam (40%)	Exam (40%)	Exam (40%) 10 Hour GCSE exam		