EMMANUEL COLLEGE

THE TECHNOLOGY DEPARTMENT

GCSE Design Technology

Design and Technology		
Year 10	**Autumn, Half-Term 1**	**Autumn, Half-Term 2**
Unit Title	Unit 1: New and emerging technologies	Unit 2: Energy, materials, systems and devices
Key Question (s)?	How do new and emerging technologies affect the workplace, the consumer and the environment?	How is energy generated and stored? How are modern, smart and composite materials selected for specific applications? How do mechanical and electronic systems work?
Threshold Concepts	Technologies which affect the workplace, the consumer and the environment fall into the following categories: • The impact of new and emerging technologies on tools and equipment. • How robotics has affected the workplace. • How co-operative and fair-trade organisations operate. • How new technologies need to be developed and produced in a sustainable way. • The impact that excessive use of certain resources has on the environment. • How technology push and market pull affect consumer choice and employment. • How changes in fashion and trends affect designers and manufacturers. • Contemporary and potential future use of automation, Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM). • How products can be designed to be repaired and recycled.	Energy generation and storage are made up of the following concepts: • How power is generated from oil, gas, coal and nuclear sources. • How renewable energy is generated from a variety of sources. • How to identify mechanical and chemical power and understand how it is stored. • A range of modern, smart and composite materials. • Photochromic particles and pigments. • The unique properties of technical textiles. • That all systems comprise of one or more inputs, processes and outputs. And be able to recognise input, process and output components. • The different types of mechanical movement. • How first, second and third order levers function. • How linkages change the direction of movement. • How to recognise different types of cams and followers. • How the action of gear trains transmits and transform the effects of forces. • That pulleys can change the magnitude of force required to lift mass.

Link to Prior Learning	This unit builds upon students' previous experience of working with electronic components, tools and machines in Year 7. They are introduced to machining, Computer Numerical Control and scales of manufacturing in Year 8. Finally, they are introduced to designers, Computer Aided Design/Computer Aided Manufacture and the environment/sustainable manufacturing in Year 9. This unit also introduces several new concepts including robotics and automation.	This unit builds upon students' previous knowledge of mechanisms, including motion, levers, cams, pulleys and gears in Year 8. Students are also familiar with electronic systems which they are first introduced to in Year 8 and then again in Year 9. This unit also introduces power sources, modern, smart and composite materials.
	Spring, Half-Term 1	**Spring, Half-Term 2**
Unit Title	Unit 3: Materials and their working properties	Unit 4: Common specialist technical principles
Key Question (s)?	How do new and emerging technologies affect the workplace, the consumer and the environment?	How do forces and stresses, ecological and social issues and scales of production affect products?
Threshold Concepts	Students will know about and understand: (Note: Each of the following learning outcomes apply to five key material areas: papers and boards, natural and manufactured timbers, metals and alloys, polymers and textiles.) • Know the primary sources of materials for producing a variety of materials in each of five key material areas. • Be able to characterise different types of materials in each key area and understand how the physical and working properties of a material products affect their performance and selection.	Students will know about and understand: • The different forces and stresses. • How materials have been stiffened or reinforced. • An ecological footprint, including how deforestation, mining, drilling and farming affect our ecology and that carbon dioxide is produced during the manufacture of products and its influence on global warming. • A social footprint and how safe working conditions impact on others. • How products are produced in each of the four main scales of production. • Continuous production – this is used for products in constant demand that require little modification. Primary processing of materials is often suitable for continuous production.
Link to Prior Learning	This unit builds upon students' knowledge gained throughout Years 7, 8 and 9. Students have worked with all the five key material categories throughout the three years more than once. They have been introduced to primary sources of materials and material properties. This unit then deepens this knowledge and considers the effect on performance and application.	This unit builds upon the students' introduction to sustainability, the environment and scales of production received in Year 9. This unit then introduces forces, stresses and reinforcement.
	Summer, Half-Term 1	**Summer, Half-Term 1**

Unit Title	Unit 6: Designing Principles	NEA
Key Question (s)?	How does analysing data and the consideration of the influences of other designers affect a successful design strategy?	Students will be completing their exam, with limited guidance and questioning occurring in lessons, due to JCQ NEA (non-examined assessment) legislation.
Threshold Concepts	Students will know about and understand: • The difference between primary and secondary research. • How to gather anthropometric research and interpret the use of percentiles in anthropometric data, leading to ergonomic design. • The work of at least two designers. • The work of at least two design companies. • How to write an appropriate design brief and specification? • The cycle of iterative designing. • How to avoid design fixation. • How to draw in isometric projection. • The use of exploded drawings. • How to produce a 3rd angle orthographic projection. • How to fully analyse a product's suitability.	Students will be identifying and investigating design possibilities from a given contextual challenge released by the exam board on 1st June.
Link to Prior Learning	This unit build upon students' prior introduction to designers in Year 8. Students have knowledge of design briefs and specifications, which has been covered on several projects throughout Key Stage 3. Students have also practised the skill of drawing in isometric projection and orthographic project several times in Key Stage 3. This unit then introduces market research and the iterative design process.	The NEA will link back to aspects of all the units covered in Year 10.
Knowledge and Sequencing Rationale	The structuring of this course allows students to build upon topics they have been introduced to in Key Stage 3 and deepen this knowledge whilst being introduced to the more complex concepts in each unit. The sequence of this is designed to enable students to have acquired the knowledge they need to apply it using the skills they practice towards the end of the course. This then leads to the Non-Examined Assessment when all of the knowledge and skills will have to be combined independently.	

Design and Technology		
Year 11	**Autumn, Half-Term 1**	**Autumn, Half-Term 2**

Unit Title	NEA	NEA
Key Question (s)?	Students will be completing their exam, with limited guidance and questioning occurring in lessons, due to JCQ NEA (non-examined assessment) legislation,	Students will be completing their exam, with limited guidance and questioning occurring in lessons, due to JCQ NEA (non-examined assessment) legislation,
Threshold Concepts	Producing a design brief and specification and Generating design ideas for their chosen NEA project.	Developing design ideas for their chosen NEA project.
Link to Prior Learning	The NEA will link back to aspects of all the units covered in Year 10.	The NEA will link back to aspects of all the units covered in Year 10.
	Spring, Half-Term 1	**Spring, Half-Term 2**
Unit Title	NEA	NEA
Key Question (s)?	Students will be completing their exam, with limited guidance and questioning occurring in lessons, due to JCQ NEA (non-examined assessment) legislation,	Students will be completing their exam, with limited guidance and questioning occurring in lessons, due to JCQ NEA (non-examined assessment) legislation,
Threshold Concepts	Realising design ideas for their chosen NEA project.	Analysing and evaluating their chosen NEA project.
Link to Prior Learning	The NEA will link back to aspects of all the units covered in Year 10.	The NEA will link back to aspects of all the units covered in Year 10.
	Summer, Half-Term 1	
Unit Title	Revision	
Key Question (s)?	Do you understand the question?	
Threshold Concepts	Revising key knowledge and exam technique.	
Link to Prior Learning	This links to all aspects of GCSE D&T.	
Knowledge and Sequencing Rationale	The knowledge covers everything students have learned in their GCSE course. The sequence is decided by the exam board.	