Acle Academy

Year 11 – Product Design
Design Technology Faculty

Rationale and Context of Unit:	Core curriculum content:	Tier 2 & Tier 3 vocabulary explicitly taught:	
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. Our GCSE 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. Students throughout KS3 have been delivered the main material types for the Product Design GCSE. Students have had the opportunity to select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture. KS4 students are introduced to the in iterative process in more detail through design and make activities such as the child's chair and mirror project. This builds upon prior knowledge and experience gained from KS3. At this point students have experienced the iterative design process to enable them to start their NEA coursework, once released from the exam board.	**AQA Design Technology Specification:** **Identifying and investigating design possibilities** Design possibilities identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems and opportunities. **Producing a design brief and specification** Comprehensive design brief which clearly justifies how they have considered their client's needs and wants and links directly to the context selected. **Generating design ideas** Imaginative, creative and innovative ideas have been generated, fully avoiding design fixation and with full consideration of functionality, aesthetics and innovation. **Developing design ideas** Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. **Realising design ideas** The correct tools, materials and equipment (including CAM where appropriate) have been consistently used or operated safely with an exceptionally high level of skill. **Analysing & evaluating** Extensive evidence that various iterations are as a direct result of considerations linked to testing, analysis and evaluation of the prototype, including well considered feedback from third parties.	**Year 10** *Term 3* Iterative Design Target Market Design Brief Specification Product Analysis Anthropometrics Ergonomics Modelling Stock Forms Quality Control	**Year 11** *Term 1* *Properties* *Elasticity* *Malleability* *Ductility* *Conductivity* *Mechanical* *Linear (motion)* *Reciprocating (motion)* *Oscillating (motion)* *Rotary (motion)*
		Year 11 *Term 2* Softwood Hardwood Seasoning Tanalising Polymer Stabilisers Blow Moulding Injection Moulding Extrusion Drape Forming	**Year 11** *Term 3* Soldering Brazing Welding Milling Lathe Press Forming Casting Galvanising Corrosion Planned Obsolescence

Challenge and Support:	Worldwide learning / links to 21st century:	Cultural capital/ Industry/ Enrichment:
Students are required to undertake a design and make project to produce a portfolio and final prototype based on the context AQA has released. A design brief is produced by the student to inform third parties as to the direction of the design and make project will take. The marking criteria of the course clearly states that students must avoid 'design fixation' so prior clear understanding of the design contexts is essential prior to the NEA taking place. The contexts will change every year and will be released on 1ST June in the year prior to the assessment being submitted. The task must be of an appropriate level of complexity and contain a degree of uncertainty of the outcome so that students can engage in an iterative process of designing, making, testing, improving and evaluating. Students must produce a final prototype based on the design brief that they have developed, along with a written or digital design folder or portfolio. Provided that a student has engaged throughout the KS4 course its structure enables students of all abilities to have access. The main element of challenge is the level of documentation throughout iterative process. Exam theory is still prevalent throughout this SOL and reading materials are covered in detail to ensure students can achieve their full potential in the summer exams.	The UK engineering manufacturing and creative industries sectors are worth 500 billion which equations to 29% of the UK's economy. For young people and their parents thinking about future careers be aware that the creative industries grew three times more than the wider UK economy. Since the introduction of Design and Technology into the National Curriculum there has been a clear correlation in the number of students taking Design Technology going onto further and higher education and going onto engineering and other subjects linked to Design Technology.	By the end of the course students will have developed a good range of ICT. These skills will range from Microsoft office to subject specific CAD programs such as 2D Design, Google Sketch Up and Fusion 360. Having developed these skills students could have access to a range of jobs that require these skills however further development of CAD skills would enable students to access higher skilled vacancies. The skills used in practical activities have direct links to jobs market and these are highlighted throughout to students. These practical skills will also develop student's ability to problem solve which is a much sort after skill. To further enrich our student's links have been made with the following companies and events to further develop the learning experience of our students throughout KS3 and KS4 **Worldwide:** BMW mini plant tour JCB plant tour New Designers **Local:** Maverick Engineering Ltd: Acle Milltech: Norwich U C P Zeller Ssaf Window Films Ltd Ellis Timbers Stratton Strawless A & W Cushions
Historical, Social, Moral, Spiritual, Cultural context:	**Cross curricular links/ literacy/numeracy:**	**Common misconceptions:**
The AQA specification enables students to learn about environmental, social and economic challenges that influence design and making. This is through the design and make projects they have undertaken and being taught constraints that have influenced the design and making process. The three main materials timbers, polymers and metals cover common environmental issues such as deforestation,	**Gatsby Benchmark:** https://www.bbc.co.uk/bitesize/articles/zbkqbdm https://www.bbc.co.uk/bitesize/articles/zbn4hbk https://www.bbc.co.uk/bitesize/articles/zf4y2sg https://www.bbc.co.uk/bitesize/articles/zkw6cqt https://www.bbc.co.uk/bitesize/articles/zddg7nb https://www.bbc.co.uk/bitesize/articles/zkw6cqt	Feedback constraints mean that a teacher cannot give direct feedback throughout the design and make project, although generic feedback can be given. Some students struggle to maintain their own direction for the project and request direction, which cannot be given. Students don't fully understand how primary research is more impactful that secondary feedback. Only once they are some way

mining, drilling and the carbon it produces to source, process and distribution. Throughout KS3 students are taught about the 6R's so that at KS4 they should be able to recall them; Reduce, refuse, re-use, repair, recycle and rethink. Due to globalisation students are made aware of differing working conditions around the world. The range of ICT devices that enable efficient and effective communication to take place within companies and the carbon emissions that these give off. Students enjoy the independence that the practical elements that the subject brings. It enables students to have a sense of achievement when completing their final outcome.	https://www.bbc.co.uk/bitesize/articles/zddg7nb https://www.bbc.co.uk/bitesize/articles/znj9scw **Cross Curricular links:** The department has linked all KS3 schemes of learning with **Maths:** Arithmetic and numerical computation Recognise and use expressions in decimal and standard form. Use ratios, fractions and percentages. Calculate surface area and volume. **Data** Presentation of data, diagrams, bar charts and histograms. **Graphs** Plot, draw and interpret appropriate graphs. Translate information between graphical and numeric form. **Geometry and trigonometry** Use angular measures in degrees. Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects. Calculate areas of triangles and rectangles, surface areas and volumes of cubes. **Science:** Metals and non-metals and the differences between them, on the basis of their characteristic physical and chemical properties. The basic principles in carrying out a lifecycle assessment of a material or product. The physical properties of [materials], how the properties of materials are selected related to their uses. The main energy sources available for use on Earth The action of forces and how levers and gears transmit and transform the effects of forces.	into the iterative process, they realise their design concepts are limited by their own life experiences. The level of detail required in portfolios to be successful is extensive. Students have to fully engage with the iterative design process to involve third parties effectively. This involvement demands excellent communication skills so that it is documented correctly into the design portfolio
Assessment timeline:		
Throughout the NEA students will receive feedback outlined within the specification. This generic feedback will be visible within students A3 portfolios so that alterations to final submissions can be made. NEA feedback is always planned for the subsequent lesson to enable the iterative design process to work effectively.		

Course pedagogy that is continually covered throughout the whole of KS4 and assessed with feedback given once a fortnight. This assessment method enables students to further embed new knowledge covered in year 10 and clearly identifies strengths and weaknesses within each unit for future revision. Theory formative tests are in the form of Google Forms and are tracked throughout KS4 on the student assessment sheet within A4 class folders. At the end of the unit students take a test that amalgamates these tests into one large summative test. This data is recorded onto the front of student folders and informs teachers and students of subject knowledge retained.

Assessment Area: Identifying & investigating design possibilities **10 marks**	**Assessment Area:** Producing a design brief & specification **10 marks**	**Assessment Area:** Generating design ideas **20 marks**
Assessment Area: Developing design ideas **20 marks**	**Assessment Area:** Realising design ideas **20 marks**	**Assessment Area:** Analysing and Evaluating **20 marks**

Home learning

Seneca forms the basis of home learning for students studying Product Design. The platform enables students to compete against each other or simply enable them to track their own progress. Teaching members of staff can track students learning time and the success rate at which they are answering the questions to ensure students are demonstrating a good subject knowledge.

Home learning maybe required for certain sections of the iterative process to enable students to receive primary research which could take the form of photographs, client interviews or client feedback.

Feedback

NEA Assessment:

Throughout students are free to revise and redraft a piece of work before submitting the final piece for assessment. Students can review draft work and be provided with generic feedback to ensure that the work is appropriately focused. When providing generic feedback, it can take the following forms:

- Provide feedback in oral and/or written form
- Explain syntax in general terms
- Advise on resources that could be used
- Remind students of the key sections that should be included in their final folder

When providing generic feedback, it cannot take the following forms:

- correct a student's work
- provide templates, model answers or writing frames
- provide specific guidance
- provide specific feedback to students on how to improve their projects to meet the requirements of the marking criteria
- give examples of how to implement
- provide feedback where a student has produced an incomplete stage and this is sufficient to allow progression to the next stage

A clear distinction is drawn between providing feedback to students as part of work in progress and reviewing work once it has been submitted by the student for final assessment. Once work is submitted for final assessment it cannot be revised.

Exam Theory:

Course pedagogy is still covered throughout the design and make project. This is monitored through Google Forms and Seneca an online learning platform. Direct feedback is permitted to be given in relation to this element of the course and is recorded on student's subject specific assessment sheet based in their A4 folders.