



## Resistant Materials

### Key Stage 4 Framework for Learning

Year 11 2017-2018: I am Creative, Successful and Happy

**Syllabus:**

AQA GCSE Resistant Materials

Specification number 4560

<b>Autumn 1</b>	
<b>Knowledge</b>	<p>During this term students will need to ensure that they have completed all remaining tasks for their Controlled Assessment. These tasks are worth 60% of students final GCSE grading and are to be completed under controlled assessment conditions. Students controlled assessment tasks are taken from the AQA examining body and will be based on a given topic/scenario and design task.</p> <p>Candidates should undertake a single design and make activity which is selected from a range of board-set tasks. Candidates should submit a 3-dimensional outcome (Practical) and a concise design folder and/or appropriate ICT evidence. The design folder should consist of approximately 20 pages of A3 paper or equivalent A4 paper or the ICT equivalent. It is expected that candidates should spend approximately 45 hours on this activity.</p>
<b>Skills</b>	<p>Students use an exam board given context and brief to solve a design problem. The CA task will involve students independent and skilfully following the design process to research and investigate, design, develop designs, manufacture and test and evaluate ideas.</p> <p>Design and Technology encourages students to be inspired, moved and challenged by following a broad, coherent, satisfying and worthwhile course of study and gain an insight into related sectors, such as manufacturing and engineering. It prepares students to make informed decisions about further learning opportunities and career choices.</p> <p>GCSE specifications in Design and Technology enable students to:</p> <ul style="list-style-type: none"> <li>• Actively engage in the processes of design and technology to develop as effective and independent learners make decisions, consider sustainability and combine skills with knowledge and understanding in order to design and make quality products</li> <li>• Explore ways in which aesthetic, technical, economic, environmental, ethical and social dimensions interact to shape designing and making analyse existing products and produce practical solutions to needs, wants and opportunities, recognising their impact on quality of life</li> <li>• Develop decision-making skills through individual and collaborative working understand that designing and making reflect and influence cultures and societies, and that products have an impact on lifestyle</li> </ul> <p>Develop skills of creativity and critical analysis through making links between the principles of good design, existing solutions and technological knowledge.</p>
<b>Assessment</b>	<p>Controlled Assessment tasks are to be marked in line with the examining body's marking criterion which is separated into 5 criterions;</p> <ul style="list-style-type: none"> <li>• Investigating the design context.</li> <li>• Design and Development (Including Modeling)</li> <li>• Making</li> <li>• Testing and Evaluating</li> <li>• Communication</li> </ul> <p><b>Students work will be completed <u>under controlled assessment conditions</u> and where feedback can be provided to students this will be to enable them to develop strengths in these key areas.</b></p> <p><b>Classwork and Exam Practice/Preparation</b>            Summative: Students key pieces of assessed work will include Research, Design, Make and Evaluative pieces of work. Also Home Learning tasks will help to form assessed work.            Formative: Subject teachers to uses AfL to formatively assess students.            Assessment will also fall in line with the schools marking policy where feedback should be given to help improve students' performance.</p>
<b>Cultural enrichment</b>	<p><b>Enrichment</b>            Enrichment opportunities will come in the form of wider experiences and further research opportunities.</p>



<p><b>Character</b></p>	 <p>Q of S Optimism</p> <p><b>Optimism</b> – Teacher feedback, peer assessment and self-assessment tasks will help students aspire to improve their work completed in lessons as well as the encouragement to develop skills and techniques used throughout this unit of work.</p>
<h2>Autumn 2</h2>	
<p><b>Knowledge</b></p>	<p>During this term students will need to ensure that they have completed all remaining tasks for their Controlled Assessment. These tasks are worth 60% of students final GCSE grading and are to be completed under controlled assessment conditions. Students controlled assessment tasks are taken from the AQA examining body and will be based on a given topic/scenario and design task.</p> <p>Candidates should undertake a single design and make activity which is selected from a range of board-set tasks. Candidates should submit a 3-dimensional outcome (Practical) and a concise design folder and/or appropriate ICT evidence. The design folder should consist of approximately 20 pages of A3 paper or equivalent A4 paper or the ICT equivalent. It is expected that candidates should spend approximately 45 hours on this activity.</p>
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<p><b>Assessment</b></p>	<p>Controlled Assessment tasks are to be marked in line with the examining body's marking criterion which is separated into 5 criteria;</p> <ul style="list-style-type: none"> <li>• Investigating the design context.</li> <li>• Design and Development (Including Modeling)</li> <li>• Making</li> <li>• Testing and Evaluating</li> <li>• Communication</li> </ul> <p><b>Students work will be completed under controlled assessment conditions and where feedback can be provided to students this will be to enable them to develop strengths in these key areas.</b></p> <p><b>Classwork and Exam Practice/Preparation</b> Summative: Students key pieces of assessed work will include Research, Design, Make and Evaluative pieces of work. Also Home Learning tasks will help to form assessed work. Formative: Subject teachers to uses AfL to formatively assess students. Assessment will also fall in line with the schools marking policy where feedback should be given to help improve students' performance.</p>
<p><b>Cultural enrichment</b></p>	<p><b>Enrichment</b> Enrichment opportunities will come in the form of wider experiences and further research opportunities.</p>



<p><b>Character</b></p>	 <p>Q of S Empathy <b>Empathy</b> – Empathy can be displayed through the use of new technologies and learning strategies, as learners may at first struggle with concepts and problem solving tasks. Empathy for others will be actively encouraged.</p>
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## Spring 1

<p><b>Knowledge</b></p>	<p><b>Materials and Material types:</b></p> <ul style="list-style-type: none"> <li>• Metals</li> <li>• Timber</li> <li>• Plastics</li> <li>• Composite materials</li> <li>• Smart materials</li> <li>• Nanomaterial's</li> </ul> <p><b>Sources of Material:</b></p> <ul style="list-style-type: none"> <li>• Range of materials</li> <li>• Processing for usage</li> <li>• Recycling materials</li> <li>• Disposing of materials</li> <li>• Environmental consequences</li> </ul> <p><b>Properties of materials:</b></p> <ul style="list-style-type: none"> <li>• Working characteristics</li> <li>• Combinations of wood, metal, plastic, composite and smart materials</li> <li>• Understand the difference between ferrous and non-ferrous metals</li> <li>• Understand how materials can be reactive to heat</li> <li>• Understand the difference between thermoplastics and thermosetting plastics and how this affects the way they are used</li> </ul> <p><b>Components Adhesives and Applied finishes</b></p> <ul style="list-style-type: none"> <li>• Understand about the selection of suitable components, pre-manufactured components adhesives and finishes</li> <li>• Understand about and use appropriate adhesives and finishes for a variety of materials and conditions</li> <li>• Understand about the use and application of a variety of components including fixings</li> </ul> <p><b>Processes and Manufacture</b></p> <ul style="list-style-type: none"> <li>• Understand manufacturing processes and techniques including CAD and CAM. Understand industrial and commercial awareness</li> <li>• Understand the processes involved in manufacturing in quantity</li> <li>• Selection and usage of appropriate tools and equipment, including CAD and CAM, for metal, plastics, wood, smart materials and composites</li> <li>• Understand the importance of preparing materials for use by techniques including degreasing, planning, sawing, cutting etc.</li> <li>• Understand how to mark out with tools, equipment and processes including use of templates; using accuracy and have an understanding of the need to work within tolerance</li> </ul> <p>Understand the use of x, y, z co-ordinates in CAD and CAM systems.</p>
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<p><b>Skills</b></p>	<p><b>Section A:</b> Students will be given a design context for the examination. Students will have time in lessons to advances plan and prepare for this as this will contribute towards approximately 40% of the examination unit grade.</p> <p><b>Section B:</b> This section of the exam paper will allow students to complete a variety of questions which are designed to test students' knowledge and information acquired through the course. This will be a variety of questions which required subject specific information to be used to answer questions.</p> <p>Throughout the course of revision lessons students will revisit key topics covered throughout the course and familiarize themselves with the knowledge required to complete examination questions.</p> <p>Practice exam questions, past papers and mark schemes will be used to allow students to demonstrate their understanding and awareness of the subject in an examined context.</p> <p>Students in the examination are expected to demonstrate skills in:</p>
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	<ul style="list-style-type: none"> <li>• Preparing for an exam with a given context.</li> <li>• Writing specifications and evaluations based on an examined context.</li> <li>• Designing (especially throughout section A)</li> <li>• Producing creative ideas.</li> <li>• Producing manufacturing plans for 1 product or for a small quantity of 10 products.</li> <li>• Complete examination answers which are designed to test students QWC skills (Quality of written communication).</li> <li>• Understanding of how to complete tables and charts which some minimal information given.</li> <li>• Be able to understand the context of an exam question and how to complete tasks suitably.</li> </ul> <p>Support and information will be provided to help students fully explore Technology examinations in preparation for their summer exam.</p>
<b>Assessment</b>	<p><b>Assessment tasks for this half term will solely focus on practice exam questions and marked in line with exam mark schemes which will help support the students prior to the final exam.</b></p> <p>Examination questions and sample questions will be used to help familiarize students with the examination format and the methods of marking used by examiners.</p> <p>Students will unpick the mark schemes as well as possible responses to questions to structure the answers to the marks available.</p> <p>Teachers will also mark and assess work in this time in line with CHS marking policies.</p> <p>Peer Assessment opportunities and self-assessment tasks will help students with the assessment protocols for examinations.</p>
<b>Cultural enrichment</b>	<p><b>Enrichment</b></p> <p>Guest speakers or links to industry experts could be used to help develop enrichment opportunities for students.</p>
<b>Character</b>	<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>Q of S Creativity &amp; Curiosity</p> <p><b>Creativity</b> - Students will develop this quality as they design a product, 3D Souvenir. Creative problem solving, and use of ICT to present work, communicates ideas and research will also be challenged.</p> <p><b>Curiosity</b> – Research and investigation, trying and experimenting with new digital/creative media will help students to test their curiosity skills during this unit.</p>

## Spring 2

<b>Knowledge</b>	<p><b>Design and Market Influences</b></p> <ul style="list-style-type: none"> <li>• Understand how to analyse products and processes</li> <li>• Consider how Design and Technology affect the manufacturer, user and environment, and the importance of health and safety issues</li> <li>• Consider the advantages of working collaboratively as a member of a design team to design and make products</li> </ul> <p><b>Sustainability of design</b></p> <ul style="list-style-type: none"> <li>• How materials and processes impact on the life cycle of products</li> <li>• Social, cultural, moral, environmental, sustainability, economic issues</li> <li>• Social and cultural influences on the consumer market</li> <li>• Understand that designing and making reflect and influence cultures and societies (To recognise that products have an impact on lifestyle)</li> <li>• Understand the sustainability and environmental issues associated with the designing and making of products</li> <li>• 6 Rs: repair, reduce, recycle, reuse, rethink, refuse</li> <li>• Moral, ethical and economic issues</li> </ul> <p><b>Consumer choice</b></p> <ul style="list-style-type: none"> <li>• Understand the factors involved in consumer choice</li> <li>• Understand market research to establish consumer preferences</li> <li>• Understand target market(s) and how to use this information to influence the design</li> <li>• Consumer rights Legislation, Product maintenance and codes of practice</li> </ul>
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	<ul style="list-style-type: none"> <li>• Legal requirements concerning consumer rights and codes of practice relating to safety</li> </ul> <p><b>Health and Safety Issues</b></p> <ul style="list-style-type: none"> <li>• Understand Safety in the working environment</li> <li>• Understand that the safety of the individual is essential</li> <li>• Understand how to minimise hazards and the working environment so it is safe to use</li> <li>• Be aware of health and safety regulations when working with tools, equipment, components and materials including the use of Personal Protective Equipment (PPE)</li> <li>• Safety for the consumer</li> </ul>
<b>Skills</b>	<p><b>Section A:</b> Students will be given a design context for the examination. Students will have time in lessons to advances plan and prepare for this as this will contribute towards approximately 40% of the examination unit grade.</p> <p><b>Section B:</b> This section of the exam paper will allow students to complete a variety of questions which are designed to test students' knowledge and information acquired through the course. This will be a variety of questions which required subject specific information to be used to answer questions.</p> <p>Throughout the course of revision lessons students will revisit key topics covered throughout the course and familiarize themselves with the knowledge required to complete examination questions.</p> <p>Practice exam questions, past papers and mark schemes will be used to allow students to demonstrate their understanding and awareness of the subject in an examined context.</p> <p>Students in the examination are expected to demonstrate skills in:</p> <ul style="list-style-type: none"> <li>• Preparing for an exam with a given context.</li> <li>• Writing specifications and evaluations based on an examined context.</li> <li>• Designing (especially throughout section A)</li> <li>• Producing creative ideas.</li> <li>• Producing manufacturing plans for 1 product or for a small quantity of 10 products.</li> <li>• Complete examination answers which are designed to test students QWC skills (Quality of written communication).</li> <li>• Understanding of how to complete tables and charts which some minimal information given.</li> <li>• Be able to understand the context of an exam question and how to complete tasks suitably.</li> </ul> <p>Support and information will be provided to help students fully explore Technology examinations in preparation for their summer exam.</p>
<b>Assessment</b>	<p><b>Assessment tasks for this half term will solely focus on practice exam questions and marked in line with exam mark schemes which will help support the students prior to the final exam.</b></p> <p>Examination questions and sample questions will be used to help familiarize students with the examination format and the methods of marking used by examiners.</p> <p>Students will unpick the mark schemes as well as possible responses to questions to structure the answers to the marks available.</p> <p>Teachers will also mark and assess work in this time in line with CHS marking policies.</p> <p>Peer Assessment opportunities and self-assessment tasks will help students with the assessment protocols for examinations.</p>
<b>Cultural enrichment</b>	<p><b>Enrichment</b> Students will be encouraged to consider the needs for cultural awareness when designing. These links might be made through regional cuisine, designing products for a particular demographic etc.</p>
<b>Character</b>	<div data-bbox="395 1738 550 1809" data-label="Image"></div> <p>Q of S Responsibility &amp; Reflection</p> <p><b>Responsibility</b> – Students will be taught about responsible use of ICT, Facilities, working to meet deadlines, and being responsible for their own work throughout the unit of work.</p> <p><b>Reflection</b> – Evaluation tasks, reviews of work, analysis and progress checks will lend themselves to students developing reflection skills throughout this unit of work.</p>



<h2>Summer 1</h2>	
<b>Knowledge</b>	<p>Shaping and forming materials</p> <ul style="list-style-type: none"> <li>• Students should understand the techniques and processes for cutting, shaping, forming and bending materials</li> <li>• Students should be aware how to cast and mould materials using appropriate tools and equipment</li> <li>• Students should be aware of joining techniques and how to use both permanent and non-permanent methods of joining materials together</li> </ul> <p>CAM Systems</p> <ul style="list-style-type: none"> <li>• Understand how CAM systems can be used for subtractive and additive processes.</li> </ul> <p>Systems and Control</p> <ul style="list-style-type: none"> <li>• Students should have an understanding of mechanical systems, electrical systems and quality control systems.</li> <li>• Students should be aware of Information and Communication Technology</li> <li>• Students should be aware of the use of CAD for graphical techniques</li> <li>• Understand how CAD is used to present accurate drawings with sizes, using 3D and 3rd angle orthographic projections and consider alternative forms and colours when developing ideas</li> <li>• Students should understand the latest technologies in designing and making products.</li> <li>• Students should understand and recognise the economic importance and benefits of using CAD/CAM in the production of products</li> <li>• Understanding the use of CAM for manufacturing in quantity</li> </ul> <p>Industrial Practices</p> <ul style="list-style-type: none"> <li>• Students should understand suitable manufacturing systems</li> <li>• Understand how products are produced for various markets and the types of production systems used</li> <li>• Understand the difference between one-off, batch and continuous production.</li> <li>• Understand the roles of client, designer, manufacturer and user in the development of products for industrial manufacture.</li> <li>• Understand industrial systems for batch or volume production</li> </ul>
<b>Skills</b>	<p><b>Section A:</b> Students will be given a design context for the examination. Students will have time in lessons to advance plan and prepare for this as this will contribute towards approximately 40% of the examination unit grade.</p> <p><b>Section B:</b> This section of the exam paper will allow students to complete a variety of questions which are designed to test students' knowledge and information acquired through the course. This will be a variety of questions which required subject specific information to be used to answer questions.</p> <p>Throughout the course of revision lessons students will revisit key topics covered throughout the course and familiarize themselves with the knowledge required to complete examination questions.</p> <p>Practice exam questions, past papers and mark schemes will be used to allow students to demonstrate their understanding and awareness of the subject in an examined context.</p> <p>Students in the examination are expected to demonstrate skills in:</p> <ul style="list-style-type: none"> <li>• Preparing for an exam with a given context.</li> <li>• Writing specifications and evaluations based on an examined context.</li> <li>• Designing (especially throughout section A)</li> <li>• Producing creative ideas.</li> <li>• Producing manufacturing plans for 1 product or for a small quantity of 10 products.</li> <li>• Complete examination answers which are designed to test students QWC skills (Quality of written communication).</li> <li>• Understanding of how to complete tables and charts which some minimal information given.</li> <li>• Be able to understand the context of an exam question and how to complete tasks suitably.</li> </ul> <p>Support and information will be provided to help students fully explore Technology examinations in preparation for their summer exam.</p>
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<b>Cultural enrichment</b>	<b>Enrichment</b> Students will be encouraged to consider the impact cultural needs can have on the outcome and design of a product. These links might be made through regional cuisine, designing products for a particular demographic etc.
<b>Character</b>	  Q of S Practice & Resiliency  <b><u>Practice</u></b> - Students will develop this quality as they undertake a series of short focused tasks relating to the basic skills needed for the manufacture of products using CAD/CAM techniques.  <b><u>Resiliency</u></b> - Students will develop this quality as they will have to work for a number of hours on their project. They will need to take criticism of their work from others and use it in a constructive way. They will have to show resiliency to 'keep going' and create the most effective product.