

*Our curriculum should provide an ambitious level of challenge for all students focussing on developing, securing, and applying knowledge, understanding and skills. At Key Stage 4, the curriculum should enable students to apply knowledge, understanding and skills to the new GCSE syllabi.*

Subject: DESIGN & TECHNOLOGY	Year Group: 11	Qualification: GCSE	Ability: Mixed
<b>Department Vision:</b>	<b>To offer every student in Erdington Academy the opportunity to develop their creativity, practical knowledge and skills in preparation for our rapidly changing technological world.</b>		
<p><b>Intent:</b> What should every student know, understand and be able to do by the end of the year?</p> <p>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.</p>	<p>Students will commence work on their Non-exam assessment (NEA): 30-35 hours approx. worth 100 marks. Contextual challenges to be released annually by AQA on 1 June in the year prior to the submission of the NEA. Students will produce a prototype and a portfolio of evidence 50% of GCSE (50% overall mark) that will run from Summer 2 into Spring 1. Students will have to complete Substantial design and make task.</p> <p><b>Assessment criteria:</b></p> <ul style="list-style-type: none"> <li>a) Identifying and investigating design possibilities</li> <li>b) Producing a design brief and specification</li> <li>c) Generating design ideas</li> <li>d) Developing design ideas</li> <li>e) Realising design ideas</li> <li>f) Analysing &amp; Evaluating</li> </ul> <p>Students will develop their skills in using a wide range of materials, tools, techniques and processes. Students will also need to develop their understanding, knowledge and skills in order to be prepared for an external exam based on these principles: How it's assessed- Written exam: 2 hours, 100 marks and its 50% of GCSE.</p> <p><b>3.1 Core technical principles</b></p> <p>In order to make effective design choices students will need a breadth of core technical knowledge and understanding that consists of:</p> <ul style="list-style-type: none"> <li>• <i>new and emerging technologies</i></li> <li>• <i>energy generation and storage</i></li> <li>• <i>developments in new materials</i></li> <li>• <i>systems approach to designing</i></li> <li>• <i>mechanical devices</i></li> <li>• <i>materials and their working properties.</i></li> </ul> <p><b>3.2 Specialist technical principles</b></p> <p>In addition to the core technical principles, all students should develop an in-depth knowledge and understanding of the following specialist technical principles:</p>		

- *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.*

### 3.3 Designing and making principles

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.*
- *at least 10% of the exam will assess science.*

Substantive Knowledge for the year

The assessment criteria for the NEA are split into six sections as follows.

**Section Criteria Maximum marks**

**AO1- Identify, investigate and outline design possibilities**

**A Identifying & investigating design possibilities 10**

	<p><b>B</b> Producing a design brief &amp; specification 10  <b>A02- Design and make prototypes that are fit for purpose</b>  <b>C</b> Generating design ideas 20  <b>D</b> Developing design ideas 20  <b>E</b> Realising design ideas 20  <b>A03- Analyse and Evaluate</b>  <b>F</b> Analysing &amp; evaluating 20</p>
<p>Disciplinary Knowledge for the year</p>	<p><b>4.4.4.1- Students will learn how to:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use 5WH words and ACCESS-FMM to analyse a contextual challenge student will identify design possibilities</li> <li><input type="checkbox"/> Carryout and use a range of research techniques (primary/secondary) in order to draw accurate conclusions.</li> <li><input type="checkbox"/> Investigate client needs and wants and factors including economic and social challenges.</li> <li><input type="checkbox"/> Use the work of others (past and/or present) to help them form ideas.</li> </ul> <p><b>4.4.4.2- Students will learn how to:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Produce a design brief and design specification.</li> </ul> <p><b>4.4.4.3- Students will learn how to:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Free hand sketch and draw refine ideas in 2d &amp; 3d</li> <li><input type="checkbox"/> Explore a range of possible ideas linking to the contextual challenge selected.</li> <li><input type="checkbox"/> Experiment with different ideas and possibilities that avoid design fixation.</li> <li><input type="checkbox"/> Evaluate rough ideas using SWOM and clients view based on their design specs. (star chart/radar chart)</li> </ul> <p><b>4.4.4.4- Students will learn how to:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> develop and refine design ideas. This may include, formal and informal 2D/3D</li> <li><input type="checkbox"/> drawing including CAD via (working drawings- orthographic views, exploded, 3d),</li> <li><input type="checkbox"/> create schematic diagrams,</li> <li><input type="checkbox"/> model using paper, corrugated cardboard</li> <li><input type="checkbox"/> produces manufacturing plans- (flow chart/Gantt chart) and schedules.</li> <li><input type="checkbox"/> Test and select suitable materials and components communicating their decisions</li> <li><input type="checkbox"/> Evaluate their final/best design to see if it meets the design specification.</li> <li><input type="checkbox"/> Produce manufacturing specification providing sufficient accurate information for third party manufacture, using a range of methods ie. measured drawings, patterns, cutting lists.</li> </ul> <p><b>4.4.4.5- Students will learn how to:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances.</li> <li><input type="checkbox"/> Use 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.</li> </ul>

		<ul style="list-style-type: none"> <li>□ Use and apply appropriate and suitable surface finishes functional and aesthetic qualities</li> </ul> <p><b>4.4.4.6- Students will learn how to:</b></p> <ul style="list-style-type: none"> <li>□ Continuously analyse and evaluate their work, using their decisions to improve outcomes.</li> <li>□ Analysing the design brief and specifications along with the testing and evaluating of ideas produced during the generation and development stages.</li> <li>□ Test their final prototype(s) using a range of tests on which the final evaluation will be formulated. This should include market testing</li> </ul>		
Yr:11	Unit Title and number of lessons	Key Substantive Knowledge	Key Disciplinary Knowledge and Skills	Rigorous Assessable outcome(s)
Summer & Autumn Term 1	<p><b>AO1- Identify, investigate and outline design possibilities</b></p> <p><b>A</b> Identifying &amp; investigating design possibilities 10</p> <p><b>B</b> Producing a design brief &amp; specification 10</p> <p><b>9 LESSON</b></p> <p><u>Do now</u></p> <ul style="list-style-type: none"> <li>• <i>new and emerging technologies</i></li> <li>• <i>energy generation and storage</i></li> <li>• <i>ecological and social footprint</i></li> </ul>	<p>4.4.4.1- TO CARRY-OUT PRIMARY AND SECONDARY RESEARCH.</p> <ul style="list-style-type: none"> <li>• Analysis</li> <li>• Evaluate</li> </ul> <p>4.4.4.2 COMPOSE A DESIGN BRIEF &amp; SPECIFICATION</p>	<ul style="list-style-type: none"> <li>□ Use 5WH words and ACCESS-FMM to analyse a contextual challenge student will identify design possibilities</li> <li>□ Carryout and use a range of research techniques (primary/secondary) in order to draw accurate conclusions.</li> <li>□ Investigate client needs and wants and factors including economic and social challenges.</li> <li>□ Use the work of others (past and/or present) to help them form ideas.</li> <li>□ Produce a design brief and design specification.</li> </ul>	<p>Identify, investigate and outline design possibilities NEA marks out of /10</p> <p><b>B</b> Producing a design brief &amp; specification 10 <b>NEA marks out of /10</b></p>





	<b>Revision</b>	<b>3.1 Core technical principles</b>	<ul style="list-style-type: none"> <li>□ new and emerging technologies             <ul style="list-style-type: none"> <li>○ energy generation and storage</li> <li>○ developments in new materials</li> <li>○ systems approach to designing</li> <li>○ mechanical devices</li> </ul> </li> <li>□ • Materials and their working properties.</li> </ul>	<b>Mini quizzes</b> <ul style="list-style-type: none"> <li>• Exit tickets strategy</li> <li>• Do now test 10 mins.</li> <li>• Teach 10 mins then tested 10 mins</li> <li>• SMHW quiz</li> </ul>
Summer Term	<b>Revision</b>	<b>3.2 Specialist technical principles</b>	<ul style="list-style-type: none"> <li>□ selection of materials or components</li> <li>□ forces and stresses</li> <li>□ ecological and social footprint</li> <li>□ sources and origins</li> <li>□ using and working with materials</li> <li>□ stock forms, types and sizes</li> <li>□ scales of production</li> <li>□ specialist techniques and processes</li> <li>□ • surface treatments and finishes.</li> </ul>	<b>Mini quizzes</b> <ul style="list-style-type: none"> <li>• Exit tickets strategy</li> <li>• Do now test 10 mins.</li> <li>• Teach 10 mins then tested 10 mins</li> <li>• SMHW quiz</li> </ul>