

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: 9	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</p>	<p>Students will commence work on a mini Non-exam assessment (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 2.            Students will have to complete 3 substantial design and make tasks:</p> <table border="1" data-bbox="584 647 2080 1366"> <thead> <tr> <th data-bbox="584 647 792 687">YEAR</th> <th data-bbox="792 647 1133 687">Topic / brief</th> <th data-bbox="1133 647 1491 687">Materials</th> <th data-bbox="1491 647 2080 687">NEA skills and KUS focus</th> </tr> </thead> <tbody> <tr> <td data-bbox="584 687 792 874">SUM 2-AUT1 12 lessons</td> <td data-bbox="792 687 1133 874"><i>Materials research</i> <i>Small Toy (ST)</i></td> <td data-bbox="1133 687 1491 874">Wood MDF+ paper+ paint</td> <td data-bbox="1491 687 2080 874">investigate different materials, properties and uses, using wood working tools, production aid, develop surface finishing techniques, making &amp; evaluating. <b>End of unit test</b></td> </tr> <tr> <td data-bbox="584 874 792 1026">AUT1-AUT2 12 lessons</td> <td data-bbox="792 874 1133 1026"><b>Metal engineering metal tool spanner) MT</b></td> <td data-bbox="1133 874 1491 1026">Ferrous metal- mild steel</td> <td data-bbox="1491 874 2080 1026">CAD &amp; CAM, production aid, Metal shaping, processing, machining including, QC adding surface finishes &amp; evaluating. <b>End of unit test</b></td> </tr> <tr> <td data-bbox="584 1026 792 1212">SPR 1- SPR 2 25 lessons</td> <td data-bbox="792 1026 1133 1212"><b>Producing a (SSSU) small scale storage unit</b></td> <td data-bbox="1133 1026 1491 1212">Pine, dowel, PVA, paint, paint brush, varnish, spray paint, acrylic for lid manufactured board-MDF</td> <td data-bbox="1491 1026 2080 1212">Wood shaping, processing, machining including adding surface finishes, creating wood joints, QC, CAD &amp; CAM, design strategies, developing, modelling &amp; evaluating. <b>End of unit test</b></td> </tr> <tr> <td data-bbox="584 1212 792 1366">SPR 2- SUM1 15 lessons</td> <td data-bbox="792 1212 1133 1366"><b>Photo frame (PF) based on designers now or from the past.</b></td> <td data-bbox="1133 1212 1491 1366">Card, corrugated, craft knives, cardboard, hot glue gun. Paint, markers</td> <td data-bbox="1491 1212 2080 1366">Designers from past, cutting card/corrugated cardboard designing strategies, designing, developing, modelling &amp; evaluating. <b>End of unit test</b></td> </tr> </tbody> </table> <p><b>Assessment criteria:</b></p> <ol style="list-style-type: none"> <li>Identifying and investigating design possibilities</li> <li>Producing a design specification</li> </ol>			YEAR	Topic / brief	Materials	NEA skills and KUS focus	SUM 2-AUT1 12 lessons	<i>Materials research</i> <i>Small Toy (ST)</i>	Wood MDF+ paper+ paint	investigate different materials, properties and uses, using wood working tools, production aid, develop surface finishing techniques, making & evaluating. <b>End of unit test</b>	AUT1-AUT2 12 lessons	<b>Metal engineering metal tool spanner) MT</b>	Ferrous metal- mild steel	CAD & CAM, production aid, Metal shaping, processing, machining including, QC adding surface finishes & evaluating. <b>End of unit test</b>	SPR 1- SPR 2 25 lessons	<b>Producing a (SSSU) small scale storage unit</b>	Pine, dowel, PVA, paint, paint brush, varnish, spray paint, acrylic for lid manufactured board-MDF	Wood shaping, processing, machining including adding surface finishes, creating wood joints, QC, CAD & CAM, design strategies, developing, modelling & evaluating. <b>End of unit test</b>	SPR 2- SUM1 15 lessons	<b>Photo frame (PF) based on designers now or from the past.</b>	Card, corrugated, craft knives, cardboard, hot glue gun. Paint, markers	Designers from past, cutting card/corrugated cardboard designing strategies, designing, developing, modelling & evaluating. <b>End of unit test</b>
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(50 marks)

A mixture of short answer and extended response questions.

- c) **Generating design ideas**
- d) **Developing design ideas**
- e) **Realising design ideas**
- f) **Analysing & Evaluating**

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.

### 3.1 Core technical principles

In order to make effective design choices students will need a breadth of core technical knowledge and understanding that consists of:

- *new and emerging technologies- (DO NOW)*
- *energy generation and storage (DO NOW)*
- *systems approach to designing (DELI)*
- *materials and their working properties. (DO NOW/QUIZ/YR 9+10)*

### 3.2 Specialist technical principles

In addition to the core technical principles, all students should develop an in-depth knowledge and understanding of the following specialist technical principles:

- *selection of materials or components (DELI)*
- *ecological and social footprint (DO NOW/QUIZ/YR 9+10)*
- *material sources and origins (DO NOW/QUIZ/YR 9+10)*
- *using and working with materials (DELI)*
- *stock forms, types and sizes (DO NOW/QUIZ/YR 9+10)*
- *scales of production (DO NOW/QUIZ YR 10)*
- *specialist techniques and processes (DELI)*
- *surface treatments and finishes. (DO NOW/QUIZ/YR 9+10) & (DELI)*

### 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.

	<p>They will need to demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas:</p> <ul style="list-style-type: none"> <li>• <i>investigation, primary and secondary data- (DO NOW/QUIZ/YR 9+10) &amp; (DELI)</i></li> <li>• <i>environmental, social and economic challenge- (DO NOW/QUIZ/YR 9+10) &amp; (DELI)</i></li> <li>• <i>the work of others-(DO NOW/QUIZ/YR 9+10) &amp; (DELI)</i></li> <li>• <i>design strategies-(DO NOW/QUIZ/YR 9+10) &amp; (DELI)</i></li> <li>• <i>communication of design ideas-(DO NOW/QUIZ/YR 9+10) &amp; (DELI)</i></li> <li>• <i>prototype development-(DO NOW/QUIZ/YR 9+10) &amp; (DELI)</i></li> <li>• <i>selection of materials and components-(DO NOW/QUIZ/YR 9+10) &amp; (DELI)</i></li> <li>• <i>tolerances- (DELI)</i></li> <li>• <i>material management (DELI)</i></li> <li>• <i>specialist tools and equipment (DELI)</i></li> <li>• <i>specialist techniques and processes. (DELI)</i></li> <li>• <i>at least 10% of the exam will assess science.</i></li> </ul>
<p>Substantive Knowledge for the year</p>	<p>The assessment criteria for the NEA are split into six sections as follows.</p> <p><b>Section Criteria Maximum marks</b></p> <p><b>A01- Identify, investigate and outline design possibilities</b></p> <p>A. Identifying &amp; investigating design possibilities (10)</p> <p>B. Producing a design brief &amp; specification (10)</p> <p><b>A02- Design and make prototypes that are fit for purpose</b></p> <p>C. Generating design ideas (20)</p> <p>D. Developing design ideas (20)</p> <p>E. Realising design ideas (20)</p> <p><b>A03- Analyse and Evaluate</b></p> <p>F. 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>□ 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> </ul> <p><b>4.4.4.2- Students will learn how to:</b></p>

	<ul style="list-style-type: none"> <li>□ 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>□ Free hand sketch and draw refine ideas in 2d &amp; 3d</li> <li>□ Explore a range of possible ideas linking to the contextual challenge selected.</li> <li>□ Experiment with different ideas and possibilities that avoid design fixation.</li> <li>□ 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>□ develop and refine design ideas. This may include, formal and informal 2D/3D</li> <li>□ drawing including CAD via (working drawings- orthographic views, exploded, 3d),</li> <li>□ create schematic diagrams,</li> <li>□ model using paper, corrugated cardboard</li> <li>□ produces manufacturing plans- (flow chart/Gantt chart) and schedules.</li> <li>□ Test and select suitable materials and components communicating their decisions</li> <li>□ Evaluate their final/best design to see if it meets the design specification.</li> <li>□ 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>□ Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances.</li> <li>□ 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> <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:10	Unit Title and number of lessons	Key Substantive Knowledge	Key Disciplinary Knowledge and Skills	Rigorous Assessable outcome(s)

<p>Summer 2 to Autumn Term 1</p>	<p><b>SUM 2-AUT1</b> 12 lessons Materials research Small Toy (ST) Wood MDF+ paper+ paint investigate different materials, properties and uses, using wood working tools, production aid, develop surface finishing techniques, making &amp; evaluating. <b>End of unit test</b> <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><b>3.1 Core technical principles</b> 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>• new and emerging technologies- (DO NOW)</li> <li>• systems approach to designing (DELI)</li> <li>• materials and their working properties. (DO NOW/QUIZ/YR 9+10)</li> </ul> <p><b>3.2 Specialist technical principles</b> In addition to the core technical principles, all students should develop an in-depth knowledge and understanding of the following specialist technical principles:</p> <ul style="list-style-type: none"> <li>• selection of materials or components (DELI)</li> <li>• ecological and social footprint (DO NOW/QUIZ/YR 9+10)</li> <li>• material sources and origins (DO NOW/QUIZ/YR 9+10)</li> <li>• using and working with materials (DELI)</li> <li>• stock forms, types and sizes (DO NOW/QUIZ/YR 9+10)</li> <li>• scales of production (DO NOW/QUIZ YR 10)</li> <li>• specialist techniques and processes (DELI)</li> </ul>	<ul style="list-style-type: none"> <li>□ Carryout and use a range of research techniques secondary in order to draw accurate conclusions.</li> </ul> <p><b>Designing</b></p> <ul style="list-style-type: none"> <li>□ Experiment with different ideas and possibilities that avoid <b>design fixation</b>.</li> </ul> <p><b>Development and modelling</b></p> <ul style="list-style-type: none"> <li>□ Produce manufacturing plans- (flow chart/Gantt chart) and schedules.</li> <li>□ Produce manufacturing specification providing sufficient accurate information for third party manufacture.</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>□ Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances.</li> <li>□ 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>	<p>Identify, investigate and outline design possibilities NEA marks out of /10</p> <p><b>B. Producing a design specification</b> 5 NEA marks out of /5</p> <p><b>C. Generating design ideas</b> 20 NEA marks out of /20</p> <p><b>D. Developing design ideas</b> 20 NEA marks out of /20</p> <p><b>E. Realising design ideas</b> 20 NEA marks out of /20</p> <p><b>F. Analysing &amp; evaluating</b> 20 NEA marks out of /20</p>
<p>Autumn Term 1+ 2</p>				

		<p>• <b>surface treatments and finishes. (DO NOW/QUIZ/YR 9+10) &amp; (DELI)</b></p> <p><b>A02- Design and make prototypes that are fit for purpose</b>  <b>E. Realising design ideas (20)</b></p> <p><b>A03- Analyse and Evaluate</b>  <b>F. Analysing &amp; evaluating (20)</b></p>	<ul style="list-style-type: none"> <li>□ Use and apply appropriate and suitable surface finishes functional and aesthetic qualities</li> </ul> <p><b>Analyse and Evaluate</b></p> <ul style="list-style-type: none"> <li>□ Using a SWOM analysis to explain strengths, weaknesses, write an opinion and suggest modifications that is relevant to enhance a product. Students will use (ACCESS-FMM)</li> <li>□ Test their final prototype(s) using a range of tests on which the final</li> </ul> <p><b>Investigate</b></p> <ul style="list-style-type: none"> <li>□ Carryout and use a range of research techniques (primary/secondary) in order to draw accurate conclusions.</li> <li>□ Produce a questionnaire (open/closed questions)</li> <li>□ Produce a design specification.</li> </ul> <p><b>Designing</b></p> <ul style="list-style-type: none"> <li>□ Experiment with different ideas and possibilities that avoid <b>design fixation</b>.</li> </ul> <p><b>Development and modelling</b></p>	
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			<ul style="list-style-type: none"> <li>□ Develop and refine design ideas. This may include, formal and informal 2D/3D</li> <li>□ Drawing including CAD via (working drawings- orthographic views, exploded, 3d),</li> <li>□ model using paper/card, corrugated cardboard</li> <li>□ Produce manufacturing plans- (Gantt chart) and schedules.</li> <li>□ Evaluate their final/best design to see if it meets the design specification.</li> <li>□ Produce manufacturing specification providing sufficient accurate</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>□ Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances.</li> <li>□ 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> <li>□ Use and apply appropriate and</li> </ul>	
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	<p><b>AUT1-AUT2</b>  <b>12 lessons</b>  <b>Metal engineering metal tool spanner) MT Ferrous metal- mild steel Metal shaping, processing, machining including adding surface finishes and QC</b></p>	<p>The assessment criteria for the NEA are split into six sections as follows.  <b>Section Criteria Maximum marks</b>  <b>A01- Identify, investigate and outline design possibilities</b>  <b>A. Identifying &amp; investigating design possibilities (10)</b>  <b>B. Producing a design brief &amp; specification (10)</b>  <b>A02- Design and make prototypes that are fit for purpose</b>  <b>C. Generating design ideas (20)</b>  <b>D. Developing design ideas (20)</b>  <b>E. Realising design ideas (20)</b>  <b>A03- Analyse and Evaluate</b>  <b>F. Analysing &amp; evaluating (20)</b></p>	<p>suitable surface finishes functional and aesthetic qualities</p> <p><b>Analyse and Evaluate</b></p> <ul style="list-style-type: none"> <li>□ Using a SWOM analysis to explain strengths, weaknesses, write an opinion and suggest modifications that is relevant to enhance a product. Students will use (ACCESS-FMM)</li> <li>□ Test their final prototype(s) using a range of tests on which the final</li> </ul> <p><b>Investigate</b></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>□ Produce a questionnaire (open/closed questions)</li> <li>□ Use the work of others (past and/or present) to help them form ideas. (YR 9 HWK)</li> </ul>	
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		<p><i>using and working with materials (DELI)</i></p> <ul style="list-style-type: none"> <li>• <i>stock forms, types and sizes (DO NOW/QUIZ/YR 9+10)</i></li> <li>• <i>scales of production (DO NOW/QUIZ YR 10)</i></li> <li>• <i>specialist techniques and processes (DELI)</i></li> <li>• <i>surface treatments and finishes. (DO NOW/QUIZ/YR 9+10) &amp; (DELI)</i></li> </ul>	<ul style="list-style-type: none"> <li>□ Produce a design specification.</li> </ul> <p><b>Designing</b></p> <ul style="list-style-type: none"> <li>□ Free hand sketch and draw refine ideas in 2d &amp; 3d</li> <li>□ Explore a range of possible ideas linking to the challenge selected.</li> <li>□ Experiment with different ideas and possibilities that avoid <b>design fixation</b>.</li> <li>□ Evaluate rough ideas using SWOM and clients view based on their design specs. (star chart/radar chart)</li> </ul> <p><b>Development and modelling</b></p> <ul style="list-style-type: none"> <li>□ Develop and refine design ideas. This may include, formal and informal 2D/3D</li> <li>□ Drawing including CAD via (working drawings- orthographic views, exploded, 3d),</li> <li>□ model using paper, corrugated cardboard /card</li> <li>□ Produce manufacturing plans- (flow chart/Gantt chart) and schedules.</li> <li>□ Evaluate their final/best design to see if it meets the design specification.</li> <li>□ Produce manufacturing specification providing sufficient accurate</li> </ul>	
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	<p>SPR 1- SPR 2</p> <p>25 lessons a</p> <p>Producing a</p>	<p>The assessment criteria for the NEA are split into six sections as follows.</p> <p><b>Section Criteria Maximum marks</b></p> <p><b>AO1- Identify, investigate and</b></p>	<p><b>Making</b></p> <ul style="list-style-type: none"> <li>□ Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances.</li> <li>□ 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,</li> <li>□ fabrication, construction and assembly.</li> <li>□ Use and apply appropriate and suitable surface finishes functional and aesthetic qualities</li> </ul> <p><b>Analyse and Evaluate</b></p> <ul style="list-style-type: none"> <li>□ Using a SWOM analysis to explain strengths, weaknesses, write an opinion and suggest modifications that is relevant to enhance a product. Students will use (ACCESS-FMM)</li> <li>□ Test their final prototype(s) using a range of tests on which the final.</li> </ul> <p><b>Investigate</b></p> <ul style="list-style-type: none"> <li>□ Carryout and use a range of research techniques (primary/secondary) in</li> </ul>	
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			<p>specification.</p> <ul style="list-style-type: none"> <li>□ Produce manufacturing specification providing sufficient accurate</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>□ Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances.</li> <li>□ 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,</li> <li>□ fabrication, construction and assembly.</li> <li>□ Use and apply appropriate and suitable surface finishes functional and aesthetic qualities</li> </ul> <p><b>Analyse and Evaluate</b></p> <ul style="list-style-type: none"> <li>□ Using a SWOM analysis to explain strengths, weaknesses, write an opinion and suggest modifications that is relevant to enhance a product. Students will use (ACCESS-FMM)</li> <li>□ Test their final prototype(s) using a range of tests on which the final.</li> </ul>	
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<p>Summer Term 2</p>		<p>3.2 Specialist technical principles</p>	<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>	<p>Mini quizzes</p> <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> <li>• YR 10 MOCK EXAM 2020</li> </ul>