

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: 10	Qualification: GCSE	Ability: Mixed																				
Department Vision:	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.																						
<p>Intent: 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 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="591 580 2080 1070"> <thead> <tr> <th>YEAR</th> <th>Topic / brief</th> <th>Materials</th> <th>NEA skills and KUS</th> </tr> </thead> <tbody> <tr> <td>SUM 2-AUT2 30 lessons</td> <td><i>Ergonomic Kitchenware (EK)</i></td> <td>Polymer + wood+ metal + card</td> <td>focus iterative design strategy designing, developing, modelling & making evaluating</td> </tr> <tr> <td>AUT2-SPR 1 12 lessons</td> <td>Metal engineering metal tool spanner) MT</td> <td>Ferrous metal- mild steel</td> <td>Metal shaping, processing, machining including. adding surface finishes and QC</td> </tr> <tr> <td>SPR 2- SUM 1 30 lessons</td> <td>A high-profile activity or occasion - 2022 Commonwealth games</td> <td>Card/Corrugated cardboard, metal, manufactured board- mdf + pewter</td> <td>Metal forming, processing, machining inc. adding surface finishes, promotion QC design strategies, developing, modelling & making evaluating</td> </tr> <tr> <td>SUM 1 10 lessons</td> <td>3.1 Core technical principles 3.2 Specialist technical principles</td> <td></td> <td></td> </tr> </tbody> </table> <p>Assessment criteria:</p> <ol style="list-style-type: none"> Identifying and investigating design possibilities Producing a design specification Generating design ideas Developing design ideas Realising design ideas Analysing & Evaluating <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>			YEAR	Topic / brief	Materials	NEA skills and KUS	SUM 2-AUT2 30 lessons	<i>Ergonomic Kitchenware (EK)</i>	Polymer + wood+ metal + card	focus iterative design strategy designing, developing, modelling & making evaluating	AUT2-SPR 1 12 lessons	Metal engineering metal tool spanner) MT	Ferrous metal- mild steel	Metal shaping, processing, machining including. adding surface finishes and QC	SPR 2- SUM 1 30 lessons	A high-profile activity or occasion - 2022 Commonwealth games	Card/Corrugated cardboard, metal, manufactured board- mdf + pewter	Metal forming, processing, machining inc. adding surface finishes, promotion QC design strategies, developing, modelling & making evaluating	SUM 1 10 lessons	3.1 Core technical principles 3.2 Specialist technical principles		
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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.

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- (DO NOW/QUIZ/YR 9+10) & (DELI)*
- *environmental, social and economic challenge- (DO NOW/QUIZ/YR 9+10) & (DELI)*
- *the work of others-(DO NOW/QUIZ/YR 9+10) & (DELI)*
- *design strategies-(DO NOW/QUIZ/YR 9+10) & (DELI)*
- *communication of design ideas-(DO NOW/QUIZ/YR 9+10) & (DELI)*
- *prototype development-(DO NOW/QUIZ/YR 9+10) & (DELI)*

	<ul style="list-style-type: none"> • <i>selection of materials and components-(DO NOW/QUIZ/YR 9+10) & (DELI)</i> • <i>tolerances- (DELI)</i> • <i>material management (DELI)</i> • <i>specialist tools and equipment (DELI)</i> • <i>specialist techniques and processes. (DELI)</i> • <i>at least 10% of the exam will assess science.</i>
<p>Substantive Knowledge for the year</p>	<p>The assessment criteria for the NEA are split into six sections as follows.</p> <p>Section Criteria Maximum marks</p> <p>AO1- Identify, investigate and outline design possibilities</p> <p>A. Identifying & investigating design possibilities (10)</p> <p>B. Producing a design brief & specification (10)</p> <p>AO2- Design and make prototypes that are fit for purpose</p> <p>C. Generating design ideas (20)</p> <p>D. Developing design ideas (20)</p> <p>E. Realising design ideas (20)</p> <p>AO3- Analyse and Evaluate</p> <p>F. Analysing & evaluating (20)</p>
<p>Disciplinary Knowledge for the year</p>	<p>4.4.4.1-Students will learn how to:</p> <ul style="list-style-type: none"> □ Use 5WH words and ACCESS-FMM to analyse a contextual challenge student will identify design possibilities □ Carryout and use a range of research techniques (primary/secondary) in order to draw accurate conclusions. □ Investigate client needs and wants and factors including economic and social challenges. □ Use the work of others (past and/or present) to help them form ideas. <p>4.4.4.2- Students will learn how to:</p> <ul style="list-style-type: none"> □ Produce a design brief and design specification. <p>4.4.4.3- Students will learn how to:</p> <ul style="list-style-type: none"> □ Free hand sketch and draw refine ideas in 2d & 3d □ Explore a range of possible ideas linking to the contextual challenge selected. □ Experiment with different ideas and possibilities that avoid design fixation. □ Evaluate rough ideas using SWOM and clients view based on their design specs. (star chart/radar chart) <p>4.4.4.4- Students will learn how to:</p> <ul style="list-style-type: none"> □ develop and refine design ideas. This may include, formal and informal 2D/3D □ drawing including CAD via (working drawings- orthographic views, exploded, 3d), □ create schematic diagrams,

	<ul style="list-style-type: none"> □ model using paper, corrugated cardboard □ produces manufacturing plans- (flow chart/Gantt chart) and schedules. □ Test and select suitable materials and components communicating their decisions □ Evaluate their final/best design to see if it meets the design specification. □ Produce manufacturing specification providing sufficient accurate information for third party manufacture, using a range of methods ie. measured drawings, patterns, cutting lists. <p>4.4.4.5- Students will learn how to:</p> <ul style="list-style-type: none"> □ Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances. □ 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. □ Use and apply appropriate and suitable surface finishes functional and aesthetic qualities <p>4.4.4.6- Students will learn how to:</p> <ul style="list-style-type: none"> □ Continuously analyse and evaluate their work, using their decisions to improve outcomes. □ Analysing the design brief and specifications along with the testing and evaluating of ideas produced during the generation and development stages. □ Test their final prototype(s) using a range of tests on which the final evaluation will be formulated. This should include market testing 			
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>Ergonomic Kitchenware (EK)-Polymer + wood+ metal + card focus iterative design strategy designing, developing, modelling & making evaluating</p> <p>25 LESSON</p> <p><u>Do now</u></p> <ul style="list-style-type: none"> • new and emerging technologies • energy generation and storage 	<p>The assessment criteria for the NEA are split into six sections as follows.</p> <p>Section Criteria Maximum marks</p> <p>AO1- Identify, investigate and outline design possibilities</p> <p>A. Identifying & investigating design possibilities (10)</p> <p>B. Producing a design brief & specification (10)</p> <p>AO2- Design and make prototypes that are fit for purpose</p> <p>C. Generating design ideas (20)</p> <p>D. Developing design ideas (20)</p> <p>E. Realising design ideas (20)</p>	<ul style="list-style-type: none"> □ Use 5WH words and ACCESS-FMM to analyse a contextual challenge student will identify design possibilities □ Carryout and use a range of research techniques (primary/secondary) in order to draw accurate conclusions. □ Investigate client needs and wants and factors including economic and social challenges. □ Produce a questionnaire (open/closed questions) 	<p>Identify, investigate and outline design possibilities NEA marks out of /10</p> <p>B. Producing a design specification 5 NEA marks out of /5</p> <p>C. Generating design ideas 20 NEA marks out of /20</p> <p>D. Developing design ideas 20 NEA marks out of /20</p> <p>E. Realising design ideas 20 NEA marks out of /20</p> <p>F. Analysing & evaluating 20</p>

<p>Autumn Term</p> <p>1+</p> <p>2</p>	<ul style="list-style-type: none"> ecological and social footprint 	<p>A03- Analyse and Evaluate</p> <p>F. Analysing & evaluating (20)</p>	<ul style="list-style-type: none"> Use the work of others (past and/or present) to help them form ideas. (YR 9 HWK) Produce a design specification. <p>Designing</p> <ul style="list-style-type: none"> Free hand sketch and draw refine ideas in 2d & 3d Explore a range of possible ideas linking to the contextual challenge selected. Experiment with different ideas and possibilities that avoid design fixation. Evaluate rough ideas using SWOM and clients view based on their design specs. (star chart/radar chart) <p>Development and modelling</p> <ul style="list-style-type: none"> Develop and refine design ideas. This may include, formal and informal 2D/3D Drawing including CAD via (working drawings- orthographic views, exploded, 3d), model using paper, corrugated cardboard Produce manufacturing plans- (flow chart/Gantt chart) and schedules. Evaluate their final/best design to see if it meets the design 	<p>NEA marks out of /20</p> <p>Full Report Oct DT end of unit test</p>
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			<p>specification.</p> <ul style="list-style-type: none"> □ Produce manufacturing specification providing sufficient accurate information for third party manufacture. <p>Making</p> <ul style="list-style-type: none"> □ Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances. □ 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. □ Use and apply appropriate and suitable surface finishes functional and aesthetic qualities <p>Analyse and Evaluate</p> <ul style="list-style-type: none"> □ Continuously analyse and evaluate their work, using their decisions to improve outcomes. □ Using a SWOM analysis to explain strengths, weaknesses, write an opinion and suggest modifications that is relevant to enhance a 	
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	<p>AUT2-SPR 1 12 lessons Metal engineering metal tool spanner) MT Ferrous metal- mild steel Metal shaping, processing, machining including. adding surface finishes and QC</p>	<p>The assessment criteria for the NEA are split into six sections as follows. Section Criteria Maximum marks A01- Identify, investigate and outline design possibilities A. Identifying & investigating design possibilities (10) B. Producing a design brief & specification (10) A02- Design and make prototypes that are fit for purpose C. Generating design ideas (20) D. Developing design ideas (20) E. Realising design ideas (20) A03- Analyse and Evaluate F. Analysing & evaluating (20)</p> <p><i>using and working with materials (DELI)</i> <i>• stock forms, types and sizes (DO NOW/QUIZ/YR 9+10)</i> <i>• scales of production (DO NOW/QUIZ YR 10)</i> <i>• specialist techniques and processes (DELI)</i></p>	<p>product. Students will use (ACCESS-FMM)</p> <ul style="list-style-type: none"> □ Analysing the design brief and specifications along with the testing and evaluating of ideas produced during the generation and development stages. □ Test their final prototype(s) using a range of tests on which the final <p>Investigate</p> <ul style="list-style-type: none"> □ Carryout and use a range of research techniques (primary/secondary) in order to draw accurate conclusions. □ Produce a questionnaire (open/closed questions) □ Produce a design specification. <p>Designing</p> <ul style="list-style-type: none"> □ Free hand sketch and draw refine ideas in 2d & 3d □ Explore a range of possible ideas linking to the contextual challenge selected. □ Experiment with different ideas and possibilities that avoid design fixation. □ Evaluate rough ideas using SWOM and clients view based on their 	
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		<p>• <i>surface treatments and finishes.</i> <i>(DO NOW/QUIZ/YR 9+10) &</i> <i>(DELI)</i></p>	<p>design specs. (star chart/radar chart)</p> <p>Development and modelling</p> <ul style="list-style-type: none"> □ Develop and refine design ideas. This may include, formal and informal 2D/3D □ Drawing including CAD via (working drawings- orthographic views, exploded, 3d), □ model using paper/card, corrugated cardboard □ Produce manufacturing plans- (Gantt chart) and schedules. □ Evaluate their final/best design to see if it meets the design specification. □ Produce manufacturing specification providing sufficient accurate <p>Making</p> <ul style="list-style-type: none"> □ Use a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances. □ 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 	
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	<p>SPR 1- SUM 1</p> <p>30 lessons A high-profile activity or occasion - 2022 Commonwealth games</p> <p>Card/Corrugated cardboard, metal, manufactured board-mdf + pewter Metal forming, processing, machining inc. adding surface finishes, promotion QC design strategies, developing, modelling & making evaluating</p>	<p>The assessment criteria for the NEA are split into six sections as follows.</p> <p>Section Criteria Maximum marks</p> <p>AO1- Identify, investigate and outline design possibilities</p> <p>A. Identifying & investigating design possibilities (10)</p> <p>B. Producing a design brief &</p>	<p>assembly.</p> <ul style="list-style-type: none"> □ Use and apply appropriate and suitable surface finishes functional and aesthetic qualities <p>Analyse and Evaluate</p> <ul style="list-style-type: none"> □ 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) □ Test their final prototype(s) using a range of tests on which the final <p>Investigate</p> <ul style="list-style-type: none"> □ Use 5WH words and ACCESS-FMM to analyse a contextual challenge student will identify design possibilities □ Carryout and use a range of research techniques (primary/secondary) in order to draw accurate conclusions. □ Investigate client needs and wants and factors including economic and social challenges. □ Produce a questionnaire (open/closed questions) □ Use the work of others (past and/or present) to help them form ideas. (YR 9 HWK) □ Produce a design specification. 	
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		<p>specification (10) A02- Design and make prototypes that are fit for purpose C. Generating design ideas (20) D. Developing design ideas (20) E. Realising design ideas (20) A03- Analyse and Evaluate F. Analysing & evaluating (20)</p>	<p>Designing</p> <ul style="list-style-type: none"> □ Free hand sketch and draw refine ideas in 2d & 3d □ Explore a range of possible ideas linking to the contextual challenge selected. □ Experiment with different ideas and possibilities that avoid design fixation. □ Evaluate rough ideas using SWOM and clients view based on their design specs. (star chart/radar chart) <p>Development and modelling</p> <ul style="list-style-type: none"> □ Develop and refine design ideas. This may include, formal and informal 2D/3D □ Drawing including CAD via (working drawings- orthographic views, exploded, 3d), □ model using paper, corrugated cardboard □ Produce manufacturing plans- (flow chart/Gantt chart) and schedules. □ Evaluate their final/best design to see if it meets the design specification. □ Produce manufacturing specification providing sufficient accurate <p>Making</p>	
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	Revision	3.1 Core technical principles	<ul style="list-style-type: none"> □ new and emerging technologies <ul style="list-style-type: none"> ○ energy generation and storage ○ developments in new materials ○ systems approach to designing ○ mechanical devices □ • Materials and their working properties. 	Mini quizzes <ul style="list-style-type: none"> • Exit tickets strategy • Do now test 10 mins. • Teach 10 mins then tested 10 mins • SMHW quiz
Summer Term 2	Revision	3.2 Specialist technical principles	<ul style="list-style-type: none"> □ 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. 	Mini quizzes <ul style="list-style-type: none"> • Exit tickets strategy • Do now test 10 mins. • Teach 10 mins then tested 10 mins • SMHW quiz • YR 10 MOCK EXAM 2020