



# CURRICULUM PLAN

RESISTANT MATERIALS

BRAMHALL HIGH SCHOOL

## **Curriculum Intent**

### **YEAR 7**

DMA projects that help students to develop the skills, knowledge and understanding to design and make high quality 3D products and to communicate their design journey.

### **YEAR 8**

DMA projects that help students to develop the skills, knowledge and understanding to design and make high quality 3D products and to communicate their design journey.

### **YEAR 9**

DMA projects that help students to develop the skills, knowledge and understanding to design and make high quality 3D products and to communicate their design journey.

### **YEAR 10**

DMA projects that help students to develop the skills, knowledge and understanding to design and make high quality 3D products and to communicate their design journey.

### **YEAR 11**

DMA projects that help students to develop the skills, knowledge and understanding to design and make high quality 3D products and to communicate their design journey.

## YEAR 7

| Term   | Programme of Learning   | Links to the National Curriculum / Specification / Additional  | Assessments  | What extra learning opportunities are planned?                  | Disciplinary Literacy  |
|--|---|--|--|---|--|
| <p>Yr 7 students remain in a D&amp;T subject for 12 weeks. Yr7 students rotate around all D&amp;T subjects – 3 rotations in Yr7 and 2 in Yr8</p> | <p>Students design and make a personalised desk tidy for an identified target market. They make the product to set dimensions and design the cover and CAM from their own design and research tasks</p> <p><b>(learning &amp; developing)</b></p> <p><b>Skills, Knowledge and Understanding</b> Creation of folders<br/>Target market and mood board<br/>Desk Tidy Research &amp; analysis – specification Use of digital camera</p> <p>Selection of images from the internet</p> <p>Downloading from VLE</p> | <p>A = AIMS<br/>D = Design<br/>M = Make<br/>E = Evaluate<br/>T = Technical Knowledge</p> <p>A1, A2, A3, D1, D2, D3, M1, M2, E3</p> | <p>See assessment planning</p> <ul style="list-style-type: none"> <li>• Mood board</li> <li>• Target Market</li> <li>• Specification</li> <li>• Initial and developed Ideas</li> <li>• Making</li> <li>• Evaluation</li> </ul> | <p>Development of CAD work and use of CAM using 7 tutorials</p> | <p>Medium density fibreboard<br/>Birch Plywood<br/>Pine<br/>Softwood<br/>Coniferous<br/>Deciduous<br/>Thermo Plastic<br/>Acrylic<br/>Finger joint<br/>Poly Vinyl Acetate<br/>Client<br/>Vector<br/>Bitmap<br/>Specification<br/>Manufacturing<br/>Ideas<br/>Evaluation</p> |

# CURRICULUM PLAN – RESISTANT MATERIALS

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|  | <p>Conversion of simple images to bitmaps</p> <p>Cad – 2d design<br/>Editing – 2d design<br/>Size and measurement – 2 d design<br/>Use of CAD &amp; CAM<br/>Use of hand tools and machines<br/>Vector and bitmap awareness<br/>Workshop basic safety<br/>Downloading simple backgrounds<br/>Simplistic experimentation with layout<br/>Creation of final product<br/>Evaluation against design criteria</p> |  |  |  |  |
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## YEAR 8

| Term   | Programme of Learning   | Links to the National Curriculum / Specification / Additional  | Assessments   | What extra learning opportunities are planned?                       | Disciplinary Literacy   |
|--|---|--|---|--|---|
| <p>Yr 7 students remain in a D&amp;T subject for 12 weeks. Yr7 students rotate around all D&amp;T subjects – 3 rotations in Yr7 and 2 in Yr8</p> | <p>Students make an individually proportioned phone chair with accessible charging conduit out of wood and plastic creating a working drawing and using templates for the final net. Practical skills are enhanced using tools and techniques already taught on the Y7 project building necessary knowledge. New techniques and machines are introduced with more complex joints components being used.</p> <p>Understanding and analysing working drawings</p> <p>Meeting set deadlines<br/>Planning time effectively<br/>Use of CAD<br/>Independently selecting</p> | <p>A = AIMS<br/>D = Design<br/>M = Make<br/>E = Evaluate<br/>T = Technical Knowledge</p> <p>A1, A2, D2, D3, M1, M2, E2, T1</p> | <p>See assessment planning</p> <ul style="list-style-type: none"> <li>• Research into existing products</li> <li>• Creation of working drawing and template using mathematics</li> <li>• New techniques cutting and finish plastic</li> <li>• Cross halving joints</li> <li>• Finishing techniques for wood</li> <li>• Final product</li> </ul> | <p>Use of 2D design to create isometric and orthographic drawing</p> | <p>Hardwood<br/>Mahogany<br/>Teak<br/>Beech<br/>Birch<br/>Halving joint<br/>Conduit<br/>Template<br/>Orthographic<br/>Polyvinylchloride<br/>Dimensions<br/>Acrylic<br/>Polyurethane<br/>Varnish</p> |

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|  | <p>tools and equipment<br/>Independently working from a design drawing<br/>Independently modifying designs where necessary<br/>Utilisation of a working drawing</p> <p>Independently hand drawing isometric projection of the design mastery<br/>Creation of final product<br/>Creativity and originality</p> |  |  |  |  |
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|  | <p>surround resemble a house. The product is then evaluated against the design specification, orthographic working drawing and as a manufacturer.</p> <p>Working as an individual<br/>Select design theme<br/>exceeding set deadlines<br/>Independent creation of folders<br/>Planning time effectively to utilise lesson and home tasks<br/>Problem &amp; design brief mastery</p> <p>Target market mastery<br/>Metals Research &amp; analysis – specification mastery<br/>Use of VLE for independent study<br/>Design and working drawing creation mastery<br/>Use of CAD &amp; CAM mastery<br/>Independently selecting tools and equipment mastery<br/>Independently working from a design drawing mastery</p> |  |  |  |  |
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|  | <p>Independently modifying designs where necessary<br/>mastery Vector and bitmap understanding &amp; mastery<br/>Background experimentation and innovation<br/>Utilisation of an orthographic working drawing mastery<br/>Experimentation &amp; layout mastery<br/>Creation of final layouts – apply criteria<br/>Creation of final products<br/>Independent creativity and originality.<br/>Evaluation against design criteria<br/>Hand skills mastery classes</p> |  |  |  |  |
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## YEAR 9

| Term | Programme of Learning   | Links to the National Curriculum / Specification / Additional  | Assessments   | What extra learning opportunities are planned? | Disciplinary Literacy   |
|------|---|--|---|--|---|
|      | <p>Students design and make a sculpture out of mild steel, by using a range of metalworking techniques such as cutting, drilling and shaping with the additional new skill of brazing on the hearth. They creating a working drawing and a cardboard model of their final design to give them an appreciation of modelling techniques, a grasp of what the finished product will look like and to reduce waste. New techniques and machines are introduced with an emphasis on working safely in the workshop</p> | <p>A = AIMS<br/>           D = Design<br/>           M = Make<br/>           E = Evaluate<br/>           T = Technical Knowledge</p> <p>A1, A2, D2, D3, M1, M2, E2, T1</p> | <p>See assessment planning</p> <ul style="list-style-type: none"> <li>• Research into ferrous and non-ferrous metals.</li> <li>• Annotated Sketches of detailed drawings (aids design communication).</li> <li>• Card modelling</li> <li>• Creation of working drawing and template using mathematics/measurements.</li> <li>• New techniques cutting and finish metal</li> <li>• Metal Brazing</li> <li>• Finishing techniques for steel</li> <li>• Final product</li> </ul> |  | <p>Ferrous metals<br/>           Non-Ferrous metals<br/>           Alloy<br/>           Brass<br/>           Copper<br/>           Aluminium<br/>           Bronze<br/>           Mild Steel<br/>           high Carbon Steel<br/>           Stainless Steel<br/>           Brazing<br/>           Taps and Dies<br/>           Rivet</p> |

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|  | <p>environment and the use of appropriate PPE (Personal Protective Equipment).</p> <p>Understanding and analysing working drawings</p> <p>Meeting set deadlines<br/>Planning time effectively</p> <p>Safe and Effective use of saws, hammers and pillar drills</p> <p>Safe and Effective use of the Brazing Hearth</p> <p>Independently selecting tools and equipment</p> <p>Independently working from a design drawing</p> <p>Independently modifying designs where necessary</p> <p>Utilisation of a working drawing</p> <p>Independently hand drawing isometric projection of the</p> |  |  |  |  |
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|  | design mastery<br>Independently<br>modelling a version of<br>their final design out of<br>card Creation of final<br>product<br>Creativity and<br>originality |  |  |  |  |
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## YEAR 10

| Term           | Programme of Learning   | Links to the National Curriculum / Specification / Additional   | Assessments   | What extra learning opportunities are planned?  | Disciplinary Literacy  |
|----------------|---|---|---|---|--|
| <b>Term 1a</b> | Students create a working CAM toy for an identified target market. They investigate types of movement associated by different cams and apply these to designs. Models are created and modified and the students then make a working product for their specified end user. The product is then evaluated against the design specification, orthographic working drawing and as a manufacturer. | 3.1.1 – Sustainability.<br>3.1.1 – Production techniques and systems<br>3.1.5 – Mechanical systems – levers, linkages and rotary systems<br>3.2.5 – Using and working with materials - How to shape and form using cutting, abrasion and addition<br>3.2.8 Specialist techniques and processes<br>3.3.2 | See assessment planning<br>Context Analysis<br>Target market profiling, Cam movement research, Design specification, Initial ideas, Modelling and development and orthographic projection, Making, Evaluation | Pupils are also introduced to 3D Design software (Onshape) they learn the basics of the software and how to produce the CAM toy on the software. Instructions provided on how to use software to print out on a 3D printer. | Motion<br>Linear<br>Reciprocating<br>Oscillating<br>Rotary<br>Cam<br>Analysis<br>Context<br>Client |

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| <p><b>Term 1b</b></p> | <p>Students create a working CAM toy for an identified target market. They investigate types of movement associated by different cams and apply these to designs. Models are created and modified and the students then make a working product for their specified end user. The product is then evaluated against the design specification, orthographic working drawing and as a manufacturer.</p> | <p>Options – students opt for their favourite D&amp;T Subject</p> | <p>MOCK 1 – Students sit a full GCSE Mock Exam. <i>(non- aided the design theme is not shared with students)</i></p> |   |  |
| <p><b>Term 2a</b></p> | <p><b>Metal coat hook design and make task.</b></p> <p><i>(strict non-negotiable design criteria)</i></p> <p>Using a step by step guide students are taught how o mark out, drill, bend and finish mild steel into a coat hook using tools and equipment for metal work</p>  |   | <p>Final Product</p>   | <p>Flow charting diagrams – systems and control</p> |  |

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| <p><b>Term 1A &amp; 2b</b></p> | <p><b>Wooden display stand design and make task.</b></p> <p>Students are given a mini AQA project that focusses on the research aspects of the NEA after being given the task wording “Display stand for a Pen featuring 4 different wooden joints” They will then design and make the product under guidance</p>  |  | <p>MOCK 2 – Students sit a full GCSE Mock Exam.<br/><i>(students are supported with the theme and are prepared within lessons)</i></p> <p>Complete folder linked to NEA</p> | <p>Cam design</p>                        |  |
| <p><b>Term 3a</b></p>          | <p><b>Plastic vacuum form design and make task.</b></p> <p>Students are taught about vacuum forming using alternative techniques to making products within a workshop with both MDF &amp; any other materials that can draft suitable for a wall hanging.<br/>They will also be introduced into other plastic forming processes eg dip coating, injection moulding</p> |  | <p>PRODUCT EMPHASIS – NOT FOLDERWORK<br/>Assessing practical tasks – 3D products created</p>  | <p>3 dimensional planning activities</p> |  |

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| <b>Term 3b</b> | <b>GCSE PROJECT THEMES<br/>ARE RELEASED BY AQA</b><br><br>Students are made aware<br>of the dept. limitations for<br>their CA projects.<br><br><b>CONTROLLED<br/>ASSESSMENT STARTS</b> |  | Projects negotiated<br>and deadlines<br>agreed before<br>summer break.<br><br>4 A3 pages min<br>requirement |  |  |
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## YEAR 11

| Term           | Programme of Learning | Links to the National Curriculum / Specification / Additional | Assessments   | What extra learning opportunities are planned? | Disciplinary Literacy |
|----------------|-----------------------|---|---|--|-----------------------|
| <b>Term 1a</b> | CONTROLLED ASSESSMENT |   | <p>MOCK 3 – Students sit a full GCSE Mock Exam. <i>(students are supported with the theme and are prepared within lessons)</i></p> <p>Mock feedback session</p> |  |                       |
| <b>Term 1b</b> | CONTROLLED ASSESSMENT |   | <p>MOCK 3 – Students sit a full GCSE Mock Exam. <i>(students are supported with the theme and are prepared within lessons)</i></p> <p>Mock feedback session</p> |  |                       |

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| <b>Term 2a</b> | CONTROLLED ASSESSMENT                                 |  | MOCK 3 – Students sit a full GCSE Mock Exam. <i>(students are supported with the theme and are prepared within lessons)</i><br><br>Mock feedback session |  |  |
| <b>Term 2b</b> | Submission of Controlled Assessment.<br><br>Half term |  |  |  |  |

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| <b>Term 3a</b> | Yr11 have tailored revision lessons to prepare them for their exam whilst exploring gaps in learning.<br><br>Boosters planned and delivered to prepare students. |  |  |  |  |
| <b>Term 3b</b> |  |  |  |  |  |