# TECHNOLOGY – RESISTANT MATERIALS

# Year 8

## What are the aims and intentions of this curriculum?

The aim of our Key Stage 3 Curriculum is to allow pupils to explore their creativity using a range of materials, equipment and techniques. Pupils have the opportunity to design and make high quality products that respond to a wide variety of problems within a range of contexts. Resistant Materials specifically develops pupils design skills as well as their practical skills, focusing particularly on problem solving and evaluation skills.

| Term | Topics | Knowledge and key terms | Skills developed | Assessment |
|---|---|---|---|---|
| **Summer 2** | MAKING HIGH QUALITY PRODUCTS | • Correct selection of electrical tools, equipment, materials and techniques.<br>• Quality and accuracy used in making the night light circuit.<br>• Ability to apply all health and safety rules<br>• Produce a quality product that meets the design specification.<br>• Show a developing ability to work independently. | The knowledge needed to select the correct electrical working tool, equipment and materials for each stage in the night light circuit production.<br><br>The knowledge of working safely and demonstrate that they know how to work and be mindful of other students in the laboratory. | Practical activity of making the night light circuit. |
| | EVALUATING | Student appraisal of the finished product. | An appreciation for accurately reflecting on the finished product. They will also learn why product evaluation and testing is an important stage in the design process and how it helps to put suitable products on the market. | Written night light evaluation or review. |
| **Autumn 1** | **THE NIGHT LIGHT PROJECT**<br>**Circuit assembly**<br><br>Electrical Safety | **Students will learn:**<br><br>• What is electrical safety and its importance. | **Students will develop:**<br><br>An understanding and appreciation that safety rules MUST be followed when working with electricity.<br>An understanding for the importance of the following these safety procedures and if they are not adhered to the consequences that could occur. | Safety activity sheet |

| | | | | |
|---|---|---|---|---|
| | Current, voltage and resistance.<br><br>PLANNING | • What is current, voltage, resistance and the relationship between them.<br>• Electrical working tools, equipment, materials<br>• The different electrical components in the circuit and their uses.<br>• Soldering technique.<br>• Steps of procedure for making the night light or a flow chart sequence. | A knowledge of Ohms Law and its application to our way of life.<br><br>A general understanding of the tools, equipment, materials, safety precautions, ppe and risk assessments that are essential to create the night light circuit.<br><br>The basic knowledge of the electrical components in the circuit. This includes drawing basic diagrams and explaining the role each component plays in the circuit.<br><br>The skills needed to safely and accurately perform the soldering operation<br><br>A knowledge for the sequence of operations to successfully create the night light. | .<br><br>Calculating voltage, current and resistance<br><br>Group assessment<br><br>Electrical components activity sheet<br><br>Short practical demonstrations.<br><br>Design a flow chard sequence to highlight the procedure for making the night light circuit. |
| | MAKING HIGH QUALITY PRODUCTS | • Correct selection of electrical tools, equipment, materials and techniques.<br>• Quality and accuracy used in making the night light circuit.<br>• Ability to apply all health and safety rules<br>• Produce a quality product that meets the design specification. | The knowledge needed to select the correct electrical working tool, equipment and materials for each stage in the night light circuit production.<br><br>The knowledge of working safely and demonstrate that they know how to work and be mindful of other students in the laboratory. | Practical activity of making the night light circuit. |

| | | | | |
|---|---|---|---|---|
| | EVALUATING | • Show a developing ability to work independently.<br><br>Student appraisal of the finished product. | An appreciation for accurately reflecting on the finished product. They will also learn why product evaluation and testing is an important stage in the design process and how it helps to put suitable products on the market. | Written night light evaluation or review. |
| **Autumn 2** | **NIGHT LIGHT STAND**<br>EXPLORING IDEAS AND THE TASK | **Students will learn:**<br>• The design process.<br>• Situation and Design Brief.<br>• Task Analysis<br>• Writing specifications<br>• Research and Analysis | **Students will develop:**<br>An understanding that designing and making has aesthetic, environmental, technical, economic, ethical and social dimensions and impacts on the world.<br><br>An understanding for the importance of the design process and the different stages all products must undergo during production.<br><br>The skills needed to explore a given design brief, specifications, along with appropriate research to effectively analyse the task of creating a night light stand for the required target market. | Writing a suitable problem and design brief.<br><br>Creating a mind map for task analysis<br><br>Writing specifications and explaining the importance.<br><br>Homework to research existing night light stand designs. |
| | GENERATING IDEAS | • Developing initial night light stand Ideas 1 and 2<br>• Developing initial ideas 3 and 4<br>• Peer design review<br>• Modification of design<br>• Final design | An appreciation of existing products and solutions to inform their designing ideas.<br><br>The skills needed to create suitable design ideas that meet the given specifications and suit the intended target market.<br><br>An appreciation of constructive teacher and peer criticism to improve design ideas if necessary and then choose the most suitable final design. | Drawing and colouring initial design ideas.<br><br>Peer design review<br><br>Drawing the final design. |
| | DEVELOPING AND MODELLING IDEAS | | | |

| | | | | |
|---|---|---|---|---|
| | | • CAD drawings/Final Design<br>3rd Angle Orthographic Projection (Working Drawing)<br>• Cardboard Model<br>• Gantt Chart | The skills needed to accurately navigate the CAD software to complete a working drawing or 3d model of their night light stand.<br><br>The skills required to generate a cardboard model of the stand. | Using CAD software to produce a working drawing or 3d model.<br><br>Production of cardboard model |
| | PLANNING | • Plastic working tools, equipment, materials<br>• Plastic working safety and risk assessments.<br>• Steps of procedure for making the night light or a flow chart sequence. | A general understanding of the tools, equipment, materials, safety precautions, ppe and risk assessments that are essential to create the stand.<br><br>A knowledge for the sequence of operations to successfully create the night light. | Design a flow chard sequence to highlight the procedure for making the night light stand. |
| | MAKING HIGH QUALITY PRODUCTS | • Correct selection of wood working tools, equipment, materials and techniques.<br>• Quality and accuracy used in making the pencil holder.<br>• Ability to apply all health and safety rules<br>• Produce a quality product that meets the design specification.<br>• Show a developing ability to work independently. | The knowledge needed to select the correct plastic working tools, equipment and materials for each stage in the pencil holder production.<br><br>The knowledge of working safely and demonstrate that they know how to work and be mindful of other students in the laboratory. | |
| | EVALUATING | Student appraisal of the finished product. | An appreciation for accurately reflecting on the finished product. They will also learn why product evaluation and testing is an important stage in the design process and how it helps to put suitable products on the market. | Written pencil night light stand evaluation or review. |
| **Spring 1** | **THE BOARDGAME AND ELECTRONIC DICE PROJECT**<br>**Circuit assembly**<br><br>Electrical Safety | **Students will learn:**<br><br>• What is electrical safety and its importance. | **Students will develop:**<br><br>An understanding and appreciation that safety rules MUST be followed when working with electricity. | Safety activity sheet |

| | | | | |
|---|---|---|---|---|
| | | | An understanding for the importance of the following these safety procedures and if they are not adhered to the consequences that could occur. **(this will be a recapitulation)** | . |
| | PLANNING | • Electrical working tools, equipment, materials | A general understanding of the tools, equipment, materials, safety precautions, ppe and risk assessments that are essential to create the electrical dice. | |
| | | • The different electrical components in the circuit and their uses. | The basic knowledge of the electrical components in the circuit. This includes drawing basic diagrams and explaining the role each component plays in the circuit. | Group assessment |
| | | • Soldering technique. | The skills needed to safely and accurately perform the soldering operation **(recapitulation)** | Electrical components activity sheet |
| | | • Steps of procedure for making the electronic dice or a flow chart sequence. | A knowledge for the sequence of operations to successfully create the electronic dice. | Short practical demonstrations. |
| | MAKING HIGH QUALITY PRODUCTS | • Correct selection of electrical tools, equipment, materials and techniques.<br>• Quality and accuracy used in making the electronic dice circuit.<br>• Ability to apply all health and safety rules<br>• Produce a quality product that meets the design specification.<br>• Show a developing ability to work independently. | The knowledge needed to select the correct electrical working tool, equipment and materials for each stage in the electronic dice circuit production.<br><br>The knowledge of working safely and demonstrate that they know how to work and be mindful of other students in the laboratory. | Design a flow chard sequence to highlight the procedure for making the electronic dice circuit.<br><br>Practical activity of making the electronic dice circuit. |

| | | | | |
|---|---|---|---|---|
| | EVALUATING | Student appraisal of the finished product. | An appreciation for accurately reflecting on the finished product. They will also learn why product evaluation and testing is an important stage in the design process and how it helps to put suitable products on the market. | Written night light evaluation or review. |
| **Spring 2** | **THE BOARD GAME DESIGN**<br><br>EXPLORING IDEAS AND THE TASK | **Students will learn:**<br>• Situation and Design Brief.<br>• Task Analysis<br>• Writing specifications<br>• Research and Analysis | **Students will develop:**<br><br>The skills needed to explore a given design brief, specifications, along with appropriate research to effectively analyse the task of creating a board game for the required target market. | Writing a suitable problem and design brief.<br><br>Creating a mind map for task analysis<br>Writing specifications and explaining the importance.<br><br>Homework to research existing board game designs. |
| | GENERATING IDEAS | • Developing initial board game Ideas 1 and 2<br>• Developing initial ideas 3 and 4<br>• Peer design review<br>• Modification of design<br>• Final design | An appreciation of existing products and solutions to inform their designing ideas.<br><br>The skills needed to create suitable design ideas that meet the given specifications and suit the intended target market.<br><br>An appreciation of constructive teacher and peer criticism to improve design ideas if necessary and then choose the most suitable final design. | Drawing and colouring initial design ideas.<br><br>Peer design review<br><br>Drawing the final design. |
| | DEVELOPING AND MODELLING IDEAS | • CAD drawings/Final Design<br>3rd Angle Orthographic Projection (Working Drawing)<br>• Cardboard Model<br>• Gantt Chart | The skills needed to accurately navigate the CAD software to complete a working drawing or 3d model of their board game.<br><br>The skills required to generate a cardboard model of the board game.<br><br>A general understanding of the tools, equipment, materials, safety precautions, ppe and risk assessments that are essential to create the game. | Using CAD software to produce a working drawing or 3d model.<br><br>Production of cardboard model |

| | | | | |
|---|---|---|---|---|
| | PLANNING | • Wood working tools, equipment, materials<br>• Wood working safety and risk assessments.<br>• Steps of procedure for making the board game or a flow chart sequence. | A knowledge for the sequence of operations to successfully create the game. | Design a flow chard sequence to highlight the procedure for making the game. |
| **Summer 1** | **WALL DÉCOR PROJECT**<br>EXPLORING IDEAS AND THE TASK | **Students will learn:**<br>• The design process.<br>• Situation and Design Brief.<br>• Task Analysis<br>• Writing specifications<br>• Research and Analysis | **Students will develop:**<br>An understanding that designing and making has aesthetic, environmental, technical, economic, ethical and social dimensions and impacts on the world.<br><br>An understanding for the importance of the design process and the different stages all products must undergo during production.<br><br>The skills needed to explore a given design brief, specifications, along with appropriate research to effectively analyse the task of creating a wall decor for the required target market. | Writing a suitable problem and design brief.<br><br>Creating a mind map for task analysis<br><br>Writing specifications and explaining the importance.<br><br>Homework to research existing wall décor designs. |
| | GENERATING IDEAS | • Developing initial wall décor Ideas 1 and 2<br>• Developing initial ideas 3 and 4<br>• Peer design review<br>• Modification of design<br>• Final design | An appreciation of existing products and solutions to inform their designing ideas.<br><br>The skills needed to create suitable design ideas that meet the given specifications and suit the intended target market.<br><br>An appreciation of constructive teacher and peer criticism to improve design ideas if necessary and then choose the most suitable final design. | Drawing and colouring initial design ideas.<br><br>Peer design review<br><br>Drawing the final design. |
| | DEVELOPING AND MODELLING IDEAS | • CAD drawings/Final Design<br>3rd Angle Orthographic Projection (Working Drawing) | The skills needed to accurately navigate the CAD software (2D Design, Cubify) to complete a working drawing or 3d model (using the 3D | Using CAD software to produce a working drawing or 3d model.<br>Using the 3D printer and Laser Cutter safely. |

| | | | | |
|---|---|---|---|---|
| | | • Cardboard Model<br>• Gantt Chart | printer or Laser Cutter) of their wall décor design.<br><br>The skills required to generate a cardboard model of the wall décor design. | Production of cardboard model |
| | PLANNING | • Plastic/Wood working tools, equipment, materials<br>• Plastic/Wood working safety and risk assessments.<br>• Steps of procedure for making the wall décor or a flow chart sequence. | A general understanding of the tools, equipment, materials, safety precautions, PPE and risk assessments that are essential to create the stand.<br><br>A knowledge for the sequence of operations to successfully create the night light. | Design a flow chart sequence to highlight the procedure for making the wall décor project. |
| | MAKING HIGH QUALITY PRODUCTS | • Correct selection of wood working tools, equipment, materials and techniques.<br>• Quality and accuracy used in making the pencil holder.<br>• Ability to apply all health and safety rules<br>• Produce a quality product that meets the design specification.<br>• Show a developing ability to work independently. | The knowledge needed to select the correct plastic/wood working tools, equipment and materials for each stage in the wall décor production.<br><br>The knowledge of working safely and demonstrate that they know how to work and be mindful of other students in the laboratory. | |
| | EVALUATING | Student appraisal of the finished product. | An appreciation for accurately reflecting on the finished product. They will also learn why product evaluation and testing is an important stage in the design process and how it helps to put suitable products on the market. | Written wall décor evaluation or review. |