






# Technology Curriculum Map

<p><b>Intent:</b></p> <p>Design and Technology is an exciting, inspiring, and practical subject that encourages all children to learn to think creatively to solve problems, both as individuals and as members of a team. It is important for all students to understand their relationship of Technology and to promote an individual competence to use the skills learnt to problem solve, design, build and evaluate in a changing technological world.</p>	<p><b>Intrinsic Subject Value</b></p> <p>Acquisition and application of practical skills will instil students with confidence when problem solving in the 'real world', enabling them to be more independent in their future. An increased awareness of a variety of materials, equipment and processes will allow students to make informed choices regarding the environmental impact of their footprint on the environment.</p>
<p><b>KS2 'Subject' Curriculum</b></p> <ul style="list-style-type: none"><li>▪ Using research and develop design criteria to inform the design of innovative, functional products that are fit for purpose</li><li>▪ Generate, develop, model and communicate ideas through a variety of media</li><li>▪ Use a wide range of tools and equipment to perform practical tasks</li><li>▪ Select and use a wider range of materials and components, including construction materials, textiles and ingredients</li><li>▪ Investigate and analyse a range of existing products</li><li>▪ Evaluate their own ideas and products</li><li>▪ Understand how key events and individuals in design and technology have helped shape the world</li><li>▪ Apply their understanding of how to strengthen, stiffen and reinforce more complex structures</li><li>▪ Understand and use mechanical and electrical systems</li><li>▪ Apply their understanding of computing to program, monitor and control products</li></ul>	<p><b>'Subject' themes that run through the curriculum</b></p> <ul style="list-style-type: none"><li> Practical skills</li><li> Research &amp; analysis</li><li> Problem solving</li><li> Creative thinking</li><li> Technical skills</li></ul> <p><b>Abc</b> Difficult Knowledge</p>

<p><b><u>Introduction to Health &amp; Safety Workshop</u></b>  <b>Rationale:</b>          Supportive transition from KS2. Allows students to be confident and safe users of equipment within the workshop. Introduction to practical technology and establish routines.</p> <p><b>Essential Knowledge</b>          Safety in the workshop          Complete awareness of implications when instructions are not carried out          Difference between a manufactured board and a natural wood          Routines in a practical subject</p> <p><b>Substantive Knowledge:</b>  <span style="background-color: yellow;">■</span> How to use equipment safely  <span style="background-color: blue;">■</span> <b>Materials and their properties</b> – Can you explain the difference between a natural wood and a manufactured wood. Are you aware of the <b>difference between a ferrous metal and a non-ferrous metal?</b></p> <p><b>Disciplinary Knowledge:</b>          Introduction to workshop equipment with a focus on how to use safely.          Construction of mini-projects which enable skills to be practised (candle base/ key ring)</p> <p><b>Prior learning / retrieval:</b>          First project so prior learning will makes links back to KS2 and identify similarities between our feeder schools</p> <p><b>Links to KS2 NC:</b>          Connections formed to identify Technology content delivered Select from and use specialist tools, techniques, processes, equipment and machinery precisely</p> <p><b>Disciplinary literacy:</b>          Development of tier 3 terminology          Iterative design</p> <p><b>Summative assessment:</b>          Opportunities for self and peer assessment throughout. Retrieval practice will also embed key points raised during induction phase</p>	<p><b><u>Pewter Casting</u></b>  <b>Rationale:</b>          Introduces students to heat treatment and use of metal in projects. Allows students to practise basic workshop skills- hand tools (coping saw, file etc.) as well as machines. Develops their understanding of the physical properties of a range of materials and encourages creative thinking within set constraints.</p> <p><b>Essential Knowledge</b>          Be able to use machines safely- drill.          Be able to use hand tools safely- coping saw, junior hacksaw, file.          Knows which tool is appropriate for which task.</p> <p><b>Substantive Knowledge:</b>  <span style="background-color: blue;">■</span> What is pewter?  <span style="background-color: yellow;">■</span> What tools are appropriate for different materials?  <span style="background-color: green;">■</span> How does heat effect a materials properties?  <span style="background-color: cyan;">■</span> <b>What is a specification?</b>  <span style="background-color: magenta;">■</span> How do I communicate a design clearly?  <span style="background-color: pink;">■</span> <b>What is Isometric drawing</b>  <span style="background-color: yellow;">■</span> How do I cast metals safely?</p> <p><b>Disciplinary Knowledge:</b>          Students will work with up to 3 different materials, learning how to mark out, cut and clean up the materials accurately. <b>They will use drawing techniques to effectively communicate their ideas</b> and be able to assess their work against set criteria.</p> <p><b>Prior learning / retrieval:</b>          No expected prior knowledge as KS2 experience varies widely. Students will have some basic workshop experience from the introductory unit and so will be aware of health and safety and use of tools and machines.</p> <p><b>Links to KS3 NC:</b>          Developing specifications, communicating ideas, Selecting tools, processes etc. Testing and evaluating ideas, understanding the properties of materials.</p> <p><b>Disciplinary literacy:</b>          Brief, Specification, Pewter, Annotate, Isometric, Mould, Sprue, Quench, Acrylic, wet and dry paper, Chuck, Bit, Evaluate</p> <p><b>Summative assessment:</b>          Self and peer assessment throughout process, mid term formative assessment with plickers, summative assessment of mould by self and staff.</p>	<p><b><u>Bug Hotel</u></b>  <b>Rationale:</b>          Allows student to consider environmental issues and develop a response to a problem.          To introduce students to a wider variety of equipment and processes whilst developing their knowledge and understanding of key principles.</p> <p><b>Essential Knowledge</b>          Safety in the workshop          Properties of materials          Biodiversity          Identification of key tools/equipment in the workshop</p> <p><b>Substantive Knowledge:</b>  <span style="background-color: green;">■</span> Understand how technology can have an impact on the environment  <span style="background-color: green;">■</span> What function do insects perform within an eco-system?  <span style="background-color: blue;">■</span> An understanding of properties of resistant materials.  <span style="background-color: blue;">■</span> What is a design brief?  <span style="background-color: magenta;">■</span> <b>How can we represent our ideas in 3D?</b>  <span style="background-color: green;">■</span> What materials would be an appropriate environment for insects</p> <p><b>Disciplinary Knowledge:</b>          How do we measure and cut with accuracy – use of a variety of tools/equipment.          Students will use a variety of research methods, both teacher led and independent which will allow them to be able to respond to the design brief  <b>Isometric drawing is used to represent a 3D view</b>          Students will have a better understanding of the importance of wildlife protection</p> <p><b>Prior learning / retrieval:</b>          Sanding technique          Use of Pillar Drill          How to use equipment safely          Materials and their properties</p> <p><b>Links to KS3 NC:</b>          Identify and solve design problems, use research and exploration, to identify and understand user needs          Select from and use specialist tools.          Understand the responsibilities of designers</p> <p><b>Disciplinary literacy:</b>          Pollination, eco-system, phyla          Mitre, materials classification          Hinterland – pointless insect quiz</p> <p><b>Summative assessment:</b>          Recall activities and low stakes quizzing throughout. mid term formative assessment with plickers, summative assessment of design for interior by staff.</p>	<p><b><u>Phone holder</u></b>  <b>Rationale:</b>          An introduction to CAD/CAM and thermoplastics. This project is entirely computer based and will enable students to begin to use 2d Design</p> <p><b>Essential Knowledge</b>          Safety in the workshop          CAD/CAM – understand the difference          Thermoplastics – definition          Deforming plastics</p> <p><b>Substantive Knowledge:</b>  <span style="background-color: blue;">■</span> What is Computer-Aided-Design and how it is used to support manufacturing  <span style="background-color: green;">■</span> What is the difference between a thermoplastic and a thermosetting plastic?  <span style="background-color: blue;">■</span> What is Computer-Aided-Manufacture?  <span style="background-color: magenta;">■</span> <b>Can I design to suit a specific target market?</b>  <span style="background-color: yellow;">■</span> How can the shape of acrylic be modified?</p> <p><b>Disciplinary Knowledge:</b>          Students will be able to use a drawing package to create or re-create an image  <b>They will be shown how to use the functions of a drawing package to draw with complete accuracy</b>          Sending of data to a CAM device and strategies to support this          Students will understand how to heat and bend acrylic around a former and will grasp the concept of <i>plastic memory</i>.</p> <p><b>Prior learning / retrieval:</b>          Research techniques – links to bug hotel project          Links can be made to drawings made using ICT at KS2 level          All other concepts will be new content,</p> <p><b>Links to KS3 NC:</b>          Develop and communicate ideas using mathematical modelling and computer based tools</p> <p><b>Disciplinary literacy:</b>          Computer-Aided-Design/Manufacture, Thermoplastic, Thermosetting plastic, Acrylic.</p> <p><b>Summative assessment:</b>          Kahoot used to support low stakes quizzing          Google form used to support knowledge and understanding over the year</p>
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# Year 8

**Sweet Dispenser**  
**Rationale:**  
 A skills project building on the practical skills used in year 7 but with a specific emphasis on accuracy to ensure the mechanism works effectively. Use of CAD and CAM machines to create final product.

**Essential Knowledge**  
 Able to use tools and machinery safely  
 Understand the term specification  
 Able to draw accurate simple shapes in Isometric

**Substantive Knowledge:**  
 What is ACCESS FM?  
 How do I use 2D design?  
 How does the laser cutter work?  
 How do I join non-like materials effectively?  
 How can I communicate my ideas clearly?  
 How do I assemble multiple parts accurately?

**Disciplinary Knowledge:**  
 This is a skills based unit, focussing on the accurate marking out and shaping of materials. Students will also use CAD/CAM to produce part of the product and will learn how the laser cutter works. A basic understanding of mechanisms and how they work.

**Prior learning / retrieval:**  
 Correct and safe use of tools and equipment.  
 Materials properties.  
 Health and Safety.  
 Writing a Specification.  
 Drawing skills.

**Links to KS3 NC:**  
 Developing specifications, communicating ideas in different ways, selecting tools, materials and equipment, testing and evaluating ideas and work, utilising the properties of materials to ensure an effective solution.

**Disciplinary literacy:**  
 Mood Board, Specification, ACCESS FM, Annotate, CAD/ CAM, Rendering, Countersink, Orthographic, Testing, Evaluate.

**Summative assessment:**  
 Self and peer assessment throughout process, summative assessment of final product by self and staff.

**Mood Light**  
**Rationale:**  
 Building upon and develop practical skills delivered in year 7 – materials skills.  
 Introducing electronic skills – soldering & circuitry

**Essential Knowledge**  
 Understands how to use tools and equipment  
 Understands how to measure and mark out  
 Understands how to construct a simple circuit

**Substantive Knowledge: Knowing it - Facts**  
 Include theme colours  
 What is the difference between a natural wood and a manufactured wood?  
 How do I create a variety of wood joints?  
 How can I identify basic electronic components?  
 How can I solder safely?  
 What is a sub-assembly?  
 What is a Flow Chart  
 Know what an isometric angle is

**Disciplinary Knowledge:**  
 Using different techniques to join materials  
 Application of circuit design to assembly  
 Creation of flow charts to QA process  
 Build a flow chart to demonstrate feedback  
 Able to draw a 3D box in isometric and perspective

**Prior learning / retrieval:**  
 Properties of wood  
 Correct and safe use of equipment  
 Measuring and marking out

**Links to KS3 NC:**  
 Use a wider range of more complex materials taking into account their properties  
 Understand how electrical systems can be powered and used for example light

**Disciplinary literacy:**  
 Terminology linked to electronics will be new concepts – LED, resistor, soldering

**Summative assessment:**  
 Google form used to revisit all work completed by this stage – to include some year 7 content as well.  
 Low stakes quizzing used to support retrieval practice

**Mini CAD Project – 3D printing**  
**Rationale:**  
 To introduce students to the concept of 3D printing and have an understanding of the advantages in manufacturing.  
 To introduce the students to the design package – Tinkercad

**Essential Knowledge**  
 Understand the additive process that is 3D printing  
 Understand the role of 3D printing as an emerging process  
 Be able to design and construct 3D images using Tinkercad

**Substantive Knowledge:**  
 How can I draw a shape that is 3D dimensional  
 What is an additive process  
 What is Tinkercad?  
 What are the file types and how do I transfer data?  
 What impact could 3D printing have on manufacturing processes?

**Disciplinary Knowledge:**  
 Students are introduced to the possibilities of 3D printing. They will research how 3D printing is helping to make advances in Technology eg medical and also develop a greater understanding on materials that can be 3D printed.  
 Students will then use an online software programme called Tinkercad to design a keyring with text.

**Prior learning / retrieval:**  
 This is a new topic that would not have been covered in the KS2 curriculum, retrieval practise will involve a Plickers review mid project and a Kahoot to assess knowledge at completion

**Links to KS3 NC:**  
 Use a wider range of more complex materials taking into account their properties

**Disciplinary literacy:**  
 PLA, Dimensional, additive, X,Y,Z plane, Thermoplastics, Thermosetting plastics, Sustainability, Environment,

**Summative assessment**  
 End of project assessment will be in the form of a research page that will focus on the process of 3D printing whilst also combining an individual screenshot of their 3D printed piece.

**Environmental Project**  
**Rationale:**  
 To consider environmental and issues linked to 6rs and sustainability.  
 This project has a focus on research and literacy skills within the curriculum.

**Essential Knowledge**  
 Awareness of different renewable energy sources  
 Understand the term Life cycle analysis  
 An awareness of the impact of a carbon footprint  
 Awareness of sustainability issues within the fashion industry

**Substantive Knowledge:**  
 How does Climate Change benefit from renewable energies  
 How does Life Cycle analysis help drive product development  
 What are companies doing to contribute to net zero?  
 How can we be creative and reuse products for a second function

**Disciplinary Knowledge**  
 Students are introduced to contextual studies linked to examples of renewable energies  
 Sustainability and 6rs are supported with literacy led tasks  
 Students are encouraged to repurpose/reuse a plastic bottle  
 Two case studies help students to focus on product air miles and sustainability and the fashion industry

**Prior learning / retrieval:**  
 This is a topic that students should be familiar with due to KS2 curriculum: understand how key events and individuals in design and technology have helped shape the world.  
 Modelling/design skills identified in phone stand project

**Links to KS3 NC:**  
 identify and solve their own design problems and understand how to reformulate problems given to them  
 understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists

**Disciplinary literacy:**  
 Environmental, Sustainability, Fast Fashion, Renewable energy, Food Miles

**Summative assessment**  
 Kahoot to be delivered at start and at end of project to identify progress made and gaps in learning.

# Year 9

## Clock Project

**Rationale:** A project that enables students to have a complete free choice regarding their outcome. The clock project will introduce the students to a variety of design movements and consolidate design strategies to support design realisation

### Essential Knowledge

Safety in the workshop  
Understand the impact of designers/design movements  
Have a clear understanding of the properties of materials  
Understand how flowcharts can be used in the planning process

### Substantive Knowledge:

- Can I explain the difference between design movements whilst also highlighting the key characteristics?
- How can I use product analysis to enable design decisions?
- What is a manufacturing specification?
- I can appreciate the need for a design solution to be varied and not fixed on a particular theme
- What is a production plan?
- How does the use of materials affect the environment

### Disciplinary Knowledge:

Students will be focussing on the design cycle whilst having the opportunity to be autonomous designers. Research will be undertaken to inform and support design ideas and skills taught in previous years will allow students to have a skillset to design and plan with freedom

### Prior learning / retrieval:

Knowledge organiser – sustainability  
Retrieval quiz – Kahoot – design movement  
Materials knowledge and understanding

### Links to KS3 NC:

Projects delivered in ks3 lead towards this first project in year 9 which offers total freedom of outcome. Links made back to properties of materials  
Almost all content from the *Design & Make* element of the national curriculum is considered and consolidated throughout this project.

### Disciplinary literacy:

Memphis, Art Deco, Pop Art, Cubism, specification, analysis, communication

### Summative assessment:

Work will be continually assessed and final assessment will link to the students self-evaluation and test

## Steady hand game

**Rationale:** Whilst the clock project is an project designed to focus on design skills, the steady hand game is a project that consolidates and develops practical skills. This project involves a high level of practical skill, CAD/CAM content and electrical assembly techniques.

### Essential Knowledge

Safety in the workshop  
Be able to measure and mark out a variety of wood joints with an increasing level of accuracy  
Understand the difference between CAD/CAM  
Identify and explain electronic components

### Substantive Knowledge:

- Can I explain how to and create a variety of wood joints with accuracy?
- Do I understand the closed circuit to produce the electrical element of the project.
- Am I a confident user of Computer-Aided-Drawing
- Do I understand the conceptual process of the laser cutter
- Am I able to design a product to satisfy the needs of a particular target market.

### Disciplinary Knowledge:

The challenges use a range of strategies that will enable the students to become more competent in the workshop and increase their level of skill from previous years. Main research work will involve them researching a particular theme in order to inspire their design work for the game

### Prior learning / retrieval:

Links established with *year 8 mood light* project, research strategies will also be familiar to students in order to support 2D Design CAD work

### Links to KS3 NC:

Select from, and use a wider, more complex range of materials. Understand how electrical systems can be powered – inputs/outputs.

### Disciplinary literacy:

Terminology for different wood jointing methods and tools, technical language linked to 2D work.

### Summative assessment:

Final assessment of this project will take place by completion of a google form document.

## Team Challenge

### Rationale:

An 'end of KS3' set of group challenges where year 9 students compete in a variety of challenges and score points in various ways. A new challenge each week builds a spirit of fun competition which tests students on their design, communication and constructions skills whilst also fostering teamwork and leadership/ management skills.

### Essential Knowledge

Appreciate the value of team work  
Problem solving skills  
Adapting an analytical approach to a solution

### Substantive Knowledge:

- How do I create a graphic for my team?
- How can I build a paper rocket?
- What shapes are strong?
- How can I combine materials effectively?

### Disciplinary Knowledge:

Problem solving in a variety of materials and scenarios, *working as a team*, communication and even resources.

### Prior learning / retrieval:

The challenges use a range of skills and abilities learnt throughout KS3 in order to solve them effectively whilst also building on the students team work skills, delegation and communication skills.

### Links to KS3 NC:

Identify and solve own problems, use a variety of approaches to generate creative ideas, communicate design ideas, understand and use the properties of materials and the performance of structural elements.

### Disciplinary literacy:

Teamwork, Graphic, Aerodynamic, Launcher, Triangulation, Self-Supporting, Purpose, Concept, Construction, Architecture, Style

### Summative assessment:

Each challenge is assessed on a variety of criteria, some assessment is objective E.g. Distance travelled) some is more subjective (teamwork, quality of graphics etc.). Final results are cumulative over the challenges completed.