

## Curriculum Map: Design & Technology Year 8

*Please note that each project lasts one term and students rotate through all three projects across throughout the year.*

	<b>3D Printed Polymer Spinners</b>	<b>Night Light</b>	<b>Biomimicry and Mechanisms</b>
<p><b>Content</b> Declarative knowledge 'I Know'</p>	<p>Develop your knowledge and understanding of issues relating to the sustainability of plastics.</p> <p>Understand the differences between oil based and bio plastics.</p> <p>Understand the different properties of plastics.</p>	<p>Understand basic electronic components and how to program a microcontroller using flowcharts.</p> <p>Identify basic electronic components.</p> <p>Understand how flowcharts are used to program circuits.</p> <p>Understand the hazards and control measures associated with soldering.</p>	<p>Understand how biomimicry and mechanisms can be used to solve engineering/design challenges.</p> <p>Understand different types of motion.</p> <p>Understand and recall different types of levers.</p> <p>Understand how different linkages function.</p> <p>Understand how biomimicry can be used as a design strategy to solve engineering problems.</p> <p>Understand the specification and assessment criteria for the hazardous waste challenge.</p> <p>Understand the hazards and control measures associated with a range of different tools and equipment (modelling/prototyping).</p>
<p><b>Skills</b> Procedural Knowledge 'I know how to'</p>	<p>Demonstrate skilful Computer Aided Design (CAD) techniques using 3D modelling software.</p> <p>Observe photographic evidence to develop your understanding of the sustainability of plastics.</p> <p>Identify issues relating to the sustainability of plastics.</p> <p>Analyse and evaluate issues relating to the sustainability of plastics.</p> <p>Evaluate the advantages and disadvantages of oil based and bio plastics.</p> <p>Conduct tests on a range of plastic samples.</p> <p>Record the results and identify the different types of plastic.</p>	<p>Demonstrate skilful soldering technique.</p> <p>Demonstrate the use of basic commands in the correct sequence to create a functioning program.</p> <p>Apply a secure knowledge of flowcharts to perform different functions.</p> <p>Create programs of increasing difficulty to perform different tasks.</p> <p>Independently create a program using sound and light for a fully functioning nightlight.</p>	<p>Demonstrate skilful modelling techniques to solve a design challenge.</p> <p>Analyse the different type of motion used in everyday products.</p> <p>Analyse the different type of levers used in everyday examples.</p> <p>Analyse the use of linkages in everyday examples.</p> <p>Analyse and evaluate existing solutions inspired by nature.</p> <p>Demonstrate creativity by designing a future product inspired by nature.</p> <p>Demonstrate modelling techniques.</p>

	<p>Communicate a range of design ideas quickly and effectively using sketches.</p> <p>Demonstrate a range of SolidWorks tools (extruded feature, revolved feature, fillet tool, chamfer tool).</p> <p>Create a realistic render of your final design.</p>		<p>Create a functioning prototype inspired by mechanisms and biomimicry.</p> <p>Communicate creative and innovative designs.</p> <p>Design a solution with a challenging mechanism and effective use of biomimicry.</p>
<p><b>Strategies</b> Conditional Knowledge 'I know when to'</p>	<p>Apply an understanding of the centre of mass and rotational kinetic energy to your designs.</p> <p>Conduct independent research.</p>	<p>Apply your knowledge and understanding of programming to create different functions.</p> <p>Apply your knowledge of components to identify different inputs, processes and outputs.</p>	<p>Apply biomimicry and mechanisms principles to solve a design challenge.</p> <p>Apply knowledge of different types of motion to a design challenge.</p> <p>Apply knowledge of different types of levers to a design challenge.</p> <p>Apply knowledge of linkages to a design challenge.</p>
<p>Key Questions</p>	<p>What is the environmental impact of using oil-based plastic? What are the advantages and disadvantages of using bio-based plastic? How can we effectively use CAD/CAM?</p>	<p>What are inputs, processes and outputs and how can they be used to improve the function of electronic products? How can flow charts be used to program a product to perform different functions?</p>	<p>How can biomimicry be used to solve engineering challenges? How can mechanisms be used effectively in mechanical/functional products?</p>
<p>Assessment topics</p>	<p>AO1 Investigate, AO2 Design &amp; Prototype, AO3 Analyse and Evaluate, AO4 Core Technical Skills – Independence, skills and understanding.</p>	<p>AO1 Investigate, AO2 Design &amp; Prototype, AO3 Analyse and Evaluate, AO4 Core Technical Skills – Independence, skills and understanding.</p>	<p>AO1 Investigate, AO2 Design &amp; Prototype, AO3 Analyse and Evaluate, AO4 Core Technical Skills – Independence, skills and understanding (applying biomimicry design strategies)</p>
<p>Cross curricular links/Character Education</p>	<p>Geography and Science - Develop an understanding of global environmental issues related to plastics. Understand the lifecycle of plastic.</p> <p>Computing – the use of CAD/CAM</p> <p>Science – Centre of mass and rotational kinetic energy.</p> <p>Maths – dimensioning and geometry.</p>	<p>Science – Polarised components.</p> <p>Maths – Calculating costings.</p> <p>Computing – Programming a PIC.</p> <p>Health and Safety – Developing a working knowledge of safety.</p>	<p>Science (Biology) – Biomimicry and gaining inspiration from nature.</p> <p>Science (Physics) – Mechanisms and levers including technical terminology (fulcrum, load, effort).</p> <p>Health and Safety – Developing a working knowledge of safety.</p>