

## Design Technology KS4 Curriculum Map

	Year 10	Year 11
Term 1	<p><b>Designing Principles:</b></p> <p><b>Drawing and Rendering Techniques</b></p> <ul style="list-style-type: none"> <li>• Rendering</li> <li>• Perspective drawing</li> <li>• Isometric drawing</li> </ul> <p><b>Specialist Technical Principles:</b></p> <p><b>Papers and Boards (Packaging Project):</b></p> <ul style="list-style-type: none"> <li>• Sources of Paper and Boards</li> <li>• Sustainable paper production</li> <li>• Uses of common papers and boards</li> <li>• Standard material stock forms</li> <li>• Working with Paper and Boards</li> <li>• Commercial Manufacturing, surface treatments and finishes</li> <li>• Using paper and board for commercial products</li> </ul> <p><b>Core Technical Principles:</b></p> <p><b>Industry</b></p> <ul style="list-style-type: none"> <li>• New and Emerging Technology</li> <li>• Automation and use of Robotics</li> <li>• Buildings and the place of work</li> </ul> <p><b>Enterprise</b></p> <ul style="list-style-type: none"> <li>• Crowdfunding</li> <li>• Virtual Marketing and Retail</li> <li>• Cooperatives</li> <li>• Fairtrade</li> </ul> <p><b>Sustainability and Environment</b></p> <ul style="list-style-type: none"> <li>• Life Cycle Assessment</li> <li>• Waste Disposal</li> <li>• Continuous Improvement</li> <li>• Efficient Working</li> <li>• Pollution</li> <li>• Global Warming</li> <li>• Carbon Offsetting</li> </ul> <p><b>People, Culture and Society</b></p> <ul style="list-style-type: none"> <li>• Consumer Choice</li> <li>• Technology Push</li> <li>• Market Pull</li> <li>• Changing Job roles</li> <li>• Fashion and Trends</li> <li>• Faiths and Beliefs</li> <li>• Positive and Negative aspects of new products</li> <li>• Designing for the disabled and the elderly</li> <li>• Different Religious groups</li> </ul>	<p><b>NEA Designing Principles:</b></p> <p><b>Methods of Communication</b></p> <ul style="list-style-type: none"> <li>• 2D and 3D sketching and drawing</li> <li>• Drawing Techniques</li> <li>• Systems and schematic diagrams</li> <li>• Working drawings</li> <li>• Mathematical modelling</li> <li>• Model construction</li> <li>• Innovation</li> <li>• Functionality</li> <li>• Aesthetics</li> <li>• Marketability</li> <li>• Fit for purpose</li> </ul> <p><b>Specialist Technical Principles:</b></p> <p><b>Metal based Materials:</b></p> <ul style="list-style-type: none"> <li>• Mining for metals</li> <li>• Extraction of metals</li> <li>• Sustainability of metals</li> <li>• Properties of metals</li> <li>• Standard material stock forms</li> <li>• Metal fixing</li> <li>• Metal shaping, processing and machining</li> <li>• Metals for commercial products</li> <li>• Commercial processes</li> <li>• Quality control</li> <li>• Metal surface treatments and finishes</li> </ul> <p><b>Specialist Technical Principles:</b></p> <p><b>Polymers</b></p> <ul style="list-style-type: none"> <li>• Plastics</li> <li>• Origins of plastics</li> <li>• Thermoplastics</li> <li>• Thermosetting plastics</li> <li>• Biodegradable plastics</li> <li>• Standard material stock forms</li> <li>• Standard components</li> <li>• Working with polymer-based materials and fixings</li> <li>• Addition, deforming and reforming</li> <li>• Plastics for commercial production techniques</li> <li>• Quality control</li> </ul>

	<p><b>Production Techniques and Systems</b></p> <ul style="list-style-type: none"> <li>• Automation</li> <li>• Computer aided Designing and Manufacturing (CAD/CAM)</li> <li>• Flexible Manufacturing Systems</li> <li>• Just in Time and Lean Manufacturing</li> </ul> <p><b>Informing Design Decisions</b></p> <ul style="list-style-type: none"> <li>• Planned obsolescence</li> <li>• Design for Maintenance</li> <li>• Ethics and the Environment</li> <li>• End of working life disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Plastic surface treatments and finishes</li> </ul>
Term 2	<p><b>Core Technical Principles:</b></p> <p><b>Energy Generation</b></p> <ul style="list-style-type: none"> <li>• Turbines and Generators</li> <li>• Fossil Fuels</li> <li>• Shale gas</li> <li>• Renewable energy sources</li> </ul> <p><b>Energy Storage</b></p> <ul style="list-style-type: none"> <li>• Pneumatics</li> <li>• Hydraulics</li> <li>• Kinetic Energy</li> <li>• Flywheels</li> <li>• Batteries</li> <li>• Disposal of Batteries</li> </ul> <p><b>Modern Materials</b></p> <ul style="list-style-type: none"> <li>• Corn starch polymers</li> <li>• Flexible MDF</li> <li>• Fibre optics</li> <li>• Liquid Crystal Displays</li> <li>• Nanomaterials</li> </ul> <p><b>Smart Materials</b></p> <ul style="list-style-type: none"> <li>• Thermochromics pigments</li> <li>• Shape memory alloy</li> </ul> <p><b>Composite Materials and Technical Textiles</b></p> <ul style="list-style-type: none"> <li>• Composite materials</li> <li>• Technical textiles</li> <li>• Gore-Tex/Kevlar</li> <li>• Conductive fabrics</li> <li>• Fire resistant fabrics</li> <li>• Microfibers and microencapsulation</li> </ul> <p><b>Systems approach to designing</b></p> <ul style="list-style-type: none"> <li>• Systems diagrams</li> <li>• Inputs</li> <li>• Common input components</li> <li>• Outputs</li> <li>• Common output components</li> </ul>	<p><b>NEA - Making Principles:</b></p> <p><b>Selection of materials and components</b></p> <ul style="list-style-type: none"> <li>• Component selection</li> <li>• Considering functionality</li> <li>• Availability and cost</li> </ul> <p><b>Tolerances and Allowances</b></p> <ul style="list-style-type: none"> <li>• Tolerance</li> <li>• Measuring</li> <li>• Tolerance of electronic components</li> </ul> <p><b>Material management and marking out</b></p> <ul style="list-style-type: none"> <li>• Tessellation</li> <li>• Measuring units</li> <li>• Material requirement</li> <li>• Marking out materials</li> <li>• Datum reference</li> <li>• Pattern and grain matching</li> <li>• Marking and cutting out tools</li> </ul> <p><b>Specialist tools and equipment</b></p> <ul style="list-style-type: none"> <li>• Health and safety</li> <li>• Data sheet</li> <li>• Instruction manuals</li> <li>• Risk assessment</li> <li>• Outsourcing work</li> </ul> <p><b>Surface treatments and finishes</b></p> <ul style="list-style-type: none"> <li>• Functionality</li> <li>• Aesthetics</li> <li>• Preparation of surface</li> <li>• Application of treatments and finishes</li> </ul> <p><b>Revision:</b></p> <p><b>Core Technical Principle Topics</b></p> <p><b>Specialist Technical Principle Topics</b></p> <p><b>Design/Make Principle Topics</b></p>

	<p><b>Electronic Systems Processing</b></p> <ul style="list-style-type: none"> <li>• Processes</li> <li>• Digital and analogue signals</li> <li>• Programming microcontrollers</li> <li>• Astable device</li> <li>• Microcontrollers</li> </ul> <p><b>Mechanical Devices</b></p> <ul style="list-style-type: none"> <li>• Movement</li> <li>• Levers</li> <li>• Linkages</li> <li>• Rotary systems</li> </ul> <p><b>Specialist Technical Principles:</b></p> <p><b>Textiles based Materials (Textiles Aprons)</b></p> <ul style="list-style-type: none"> <li>• Sources of textiles</li> <li>• Fibres</li> <li>• Sustainability of textiles</li> <li>• Physical and working properties of Textiles</li> <li>• Standard material stock forms</li> <li>• Textiles shaping, processing and machining</li> <li>• Sewing</li> <li>• Working with textiles based materials and fastenings</li> <li>• Textiles for commercial products</li> <li>• Commercial printing</li> <li>• Quality control</li> <li>• Textiles surface treatments and finishes</li> </ul>	
Term 3	<p><b>Specialist Technical Principles:</b></p> <p><b>Forces and Stresses on Materials and objects</b></p> <ul style="list-style-type: none"> <li>• Forces</li> <li>• Stresses</li> <li>• Tension</li> <li>• Compression</li> <li>• Torsion</li> </ul> <p><b>Improving Functionality</b></p> <ul style="list-style-type: none"> <li>• Consideration of forces and stresses</li> <li>• Strengthening and enhancing materials</li> <li>• Stiffening materials</li> <li>• Folding and bending</li> </ul> <p><b>Ecological and social footprint</b></p> <ul style="list-style-type: none"> <li>• Carbon footprint</li> <li>• Social footprint</li> <li>• Social issues when designing products</li> </ul>	<p><b>Revision:</b></p> <p><b>Core Technical Principle Topics</b></p> <p><b>Specialist Technical Principle Topics</b></p> <p><b>Design/Make Principle Topics</b></p>

	<ul style="list-style-type: none"> <li>• Social issues when manufacturing products</li> <li>• Ecological issues when designing products</li> <li>• Ecological issues when manufacturing products</li> <li>• Harvesting raw materials</li> <li>• Deforestation</li> <li>• Mining</li> <li>• Farming</li> <li>• Oceanic pollution</li> <li>• Atmospheric pollution</li> </ul> <p><b>The six Rs</b></p> <ul style="list-style-type: none"> <li>• Refuse</li> <li>• Recycle</li> <li>• Reuse</li> <li>• Rethink</li> <li>• Reduce</li> <li>• Repair</li> </ul> <p><b>Scales of Production</b></p> <ul style="list-style-type: none"> <li>• One off production</li> <li>• Batch production</li> <li>• Mass production</li> <li>• Continuous production</li> </ul> <p><b>Timber based Materials (Aeroplane Project):</b></p> <ul style="list-style-type: none"> <li>• Sources of timber-based materials</li> <li>• Timber conversion</li> <li>• Manufactured Board</li> <li>• Sustainable timber production</li> <li>• Standard material stock forms</li> <li>• Shaping and processing wood</li> <li>• Wood joints</li> <li>• Timber and manufactured board for commercial products</li> <li>• Quality control</li> <li>• Surface treatments and finishes</li> </ul> <p><b>NEA - Designing Principles: Investigation</b></p> <ul style="list-style-type: none"> <li>• Primary Data sources</li> <li>• Secondary Data sources</li> <li>• Market Research</li> <li>• Ergonomics</li> <li>• Anthropometrics</li> <li>• Analysis and Presentation of data</li> <li>• Design Brief</li> <li>• Manufacturing Specification</li> </ul>	
--	---	--

	<ul style="list-style-type: none"><li>• Environmental, social and economic challenges</li><li>• Designers and Design Companies</li></ul> <p><b>NEA – Designing Principles:</b></p> <p><b>Design Strategies</b></p> <ul style="list-style-type: none"><li>• Collaborative designing</li><li>• User-centred design</li><li>• Systems approach</li><li>• Iterative design</li></ul>	
--	--	--