

# Our Lady Queen of Peace

Catholic High School

## Curriculum Overview

### YEAR 10 Design & Technology

#### Careers

| Local Market Information                                                                                                   | Skills                                                                       | Jobs                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BAE Systems<br>Vinci Construction<br>Bakkavor<br>Kraft Heinz<br>Extreme Low Energy (ELe®)<br>Leyland Trucks<br>BAE Systems | Communication<br>Time Management<br>Practical skill<br>Organisational Skills | Product Designer<br>Advanced Manufacturing<br>Machinist<br>Metal Worker<br>Joiner<br>Research & Development<br>Environmental Engineer<br>Electronic/Electrical Engineer |

#### Knowledge & Understanding

|                | Topics<br>(Bigger Picture)                                                        | Knowledge<br>(Key Concepts)                                          | Recall & Retrieval Practice Focus                                                                                           | Subject Specific<br>Literacy Development<br>Key Vocabulary | Cultural Capital /<br>Enrichment<br>Opportunities                       |
|----------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------|
| Half<br>Term 1 | <b>Working with timber</b>                                                        | Impact of how raw materials become useable materials.                | Explaining where timbers come from and the effect on the global environment. Exam style questions covering topics from KS3. | Coniferous, Deciduous, Sustainable.                        | Creating a bespoke timber-based product based on design choices.        |
|                | Origins and categories of timber including impact on the environment and society. |                                                                      |                                                                                                                             |                                                            |                                                                         |
|                | Working properties of timber including joining methods.                           | Various technical joining methods to develop key skills.             | Applying correct joining methods to different scenarios.                                                                    | Joint, Accuracy, Glueless, Joinery                         | Weekly D&T Lunch Club.<br><br>Link to construction sectors in the local |
|                | Understanding the suitability for use of timber in day-to-day products.           | Selecting the right material for a product based on a specification. | Hardwood, softwood, manufactured boards.                                                                                    | Hardwood, Softwood, Grain.                                 |                                                                         |

|             | Knowledge & Understanding                                                           |                                                                      |                                                                                                                                                                             | Subject Specific Literacy Development     | Cultural Capital / Enrichment Opportunities                                                                                                                                                              |
|-------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | Topics (Bigger Picture)                                                             | Knowledge (Key Concepts)                                             | Recall & Retrieval Practice Focus                                                                                                                                           | Key Vocabulary                            |                                                                                                                                                                                                          |
|             | Selecting correct tools and equipment for timber.                                   | Organising workspaces for independent practise.                      | Types of Fixings/Marking out tools / equipment and use of Tools Shaping Risk / Health and Safety                                                                            | Marking Guage, Tri Square, Tolerance      | area.                                                                                                                                                                                                    |
|             | Interpreting and producing technical information.                                   | Reading and producing technical drawings and information.            | Isometric/Orthographic/Projection/ Freehand Sketching and Exploded views<br>End of topic test                                                                               | Isometric, Orthographic, Perspective.     |                                                                                                                                                                                                          |
| Half Term 2 | <b>Working with Metals</b>                                                          | Impact of how raw materials become useable materials.                | Exam style questions covering topics from previous HT and KS3.                                                                                                              | Mining, Ore, Carbon footprint.            | Weekly D&T Lunch Club.<br><br>Creating a bespoke metal-based product based on design choices.<br><br>Industry Visit<br><br>Link to Engineering sectors in the local area.<br><br>Visit from CAD engineer |
|             | Origins and categories of metal including impact on the environment and society.    |                                                                      |                                                                                                                                                                             |                                           |                                                                                                                                                                                                          |
|             | Working properties of metals including joining methods.                             | Various technical joining methods to develop key skills.             | Applying correct joining methods to different scenarios.                                                                                                                    | Welding, Riveting, Brazing.               |                                                                                                                                                                                                          |
|             | Understanding the suitability for use of metal in day-to-day products.              | Selecting the right material for a product based on a specification. | Ferrous, Non-Ferrous, Alloys, Corrosive.                                                                                                                                    | Forces, Torsion, Tension, Compression.    |                                                                                                                                                                                                          |
|             | Selecting correct tools and equipment for metal.                                    | Organising workspaces for independent practise.                      | Types of Fixings/Marking out tools / equipment and use of Tools Shaping Risk / Health and Safety<br>End of topic test                                                       | Scribe, Engineers Blue, Lathe, Machining. |                                                                                                                                                                                                          |
|             | Using CAD/CAM                                                                       | Developing skills on 2D and 3D design software                       | Parametric, Layout, Sketch, Extrude, Line, Shape.                                                                                                                           | Rapid Prototyping, Automation,            |                                                                                                                                                                                                          |
| Half Term 3 | <b>Polymer Based Products</b>                                                       | Impact of how raw materials become useable materials.                | Exam style questions covering topics from previous HT and KS3.<br>Thermoset and thermos plastic, creation of polymers, history of plastic and the effect on the environment | Silo, Oil, Carbon, Polymer chains.        | Creating a bespoke plastic-based product based on design choices.<br><br>Weekly D&T Lunch                                                                                                                |
|             | Origins and categories of plastics including impact on the environment and society. |                                                                      |                                                                                                                                                                             |                                           |                                                                                                                                                                                                          |

|             | Knowledge & Understanding                                                                                       |                                                                                 |                                                                                                        | Subject Specific Literacy Development               | Cultural Capital / Enrichment Opportunities                                      |
|-------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------|
|             | Topics (Bigger Picture)                                                                                         | Knowledge (Key Concepts)                                                        | Recall & Retrieval Practice Focus                                                                      | Key Vocabulary                                      |                                                                                  |
|             | Working properties of plastics including joining methods.                                                       | Various technical joining methods to develop key skills.                        | Vacuum forming, laser cutting, heat treatment and shaping.                                             | Thermoset, Thermoplastic, Heat treatment, Moulding. | Club.<br><br>LFC Foundation STEM session.                                        |
|             | Understanding the suitability for use of plastic in day-to-day products.                                        | Selecting the right material for a product based on a specification.            | Adhesives, chemical bonding, cutting, shaping and finishing.                                           | Chemical bond, Brittle, Capillary action.           |                                                                                  |
|             | Selecting correct tools and equipment for plastic.                                                              | Organising workspaces for independent practise.                                 | Tool recognition, demonstrate safety and knowledge of PPE.                                             | Vacuum form, Line bender, Hot wire cutter           |                                                                                  |
|             | Understanding user centred design and how different user groups are categorised so that their needs can be met. | How as designers we make decisions based on the needs of users and user groups. | Understanding how to apply Ergonomics, Anthropometric Data, Aesthetics, Function.<br>End of topic test | Ergonomics, Anthropometric data, User groups.       |                                                                                  |
| Half Term 4 | <b>Paper and Boards</b>                                                                                         | Impact of how raw materials become useable materials.                           | Exam style questions covering topics from previous HT and KS3.                                         | GSM, Pulp, Calendaring                              | Creating a bespoke paper and card product-based product based on design choices. |
|             | Origins and categories of paper including impact on the environment and society.                                |                                                                                 |                                                                                                        |                                                     |                                                                                  |
|             | Working properties of paper including usage within Design and Technology.                                       | Various technical joining methods to develop key skills.                        | Producing net diagrams, geometric shapes, Aesthetics, strength.                                        | Card, Corrugated Card, Nets                         |                                                                                  |
|             | Understanding the suitability for use of paper in day-to-day products.                                          | Selecting the right material for a product based on a specification.            | Print media, packaging, fast food packaging, writing and drawing.                                      | Digital, Photoshop, Graphics, CYMK                  | Weekly D&T Lunch Club.<br><br>Visit to construction site.                        |
|             | Selecting correct tools and equipment for working with paper.                                                   | Organising workspaces for independent practise.                                 | Assessed on using craft knives, guillotines, cutting mats, CAD/CAM.                                    | Cutting mat, Craft Knife, Safety Ruler              |                                                                                  |
|             | Producing concept models and                                                                                    | Understanding how                                                               | Cutting techniques, shaping and                                                                        | Innovation, Trial and                               |                                                                                  |

|             | Knowledge & Understanding                                                                                                 |                                                                              |                                                                                                                                 | Subject Specific Literacy Development    | Cultural Capital / Enrichment Opportunities                                                                                                                        |
|-------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | Topics (Bigger Picture)                                                                                                   | Knowledge (Key Concepts)                                                     | Recall & Retrieval Practice Focus                                                                                               | Key Vocabulary                           |                                                                                                                                                                    |
|             | developing prototypes.                                                                                                    | to develop a design from a drawing to a 3D model.                            | jointing techniques, logical work flow.<br>End of topic test                                                                    | Error, Construction.                     |                                                                                                                                                                    |
| Half Term 5 | <b>Electronic Products</b>                                                                                                | Impact of how raw materials become useable materials.                        | Questions on how the electronics industry can have a negative impact on our environment.<br>Where does our energy come from?    | Components, Ohms, Amps                   | Creating a bespoke electronic-based product based on design choices.<br><br>Weekly D&T Lunch Club..<br><br>"From Idea to Career" exploring 12 engineering sectors. |
|             | Origins and categories of electronics including impact of technology push and market pull on the environment and society. |                                                                              |                                                                                                                                 |                                          |                                                                                                                                                                    |
|             | Designing and creating electronic devices.                                                                                | Using diagrams to design and prototype various types of electronic circuits. | Component identification and recognition, Input -Process-Output, recognising SI units for electrical circuits.                  | Resistor, Voltage Current                |                                                                                                                                                                    |
|             | Applying mathematical and scientific formulae into circuit design.                                                        | Demonstrating planning of circuit components for different functions.        | Ohms law, Calculating electrical energy and power, Calculating electrical charge.                                               | Ohms Law, Power Calculation, Overload    |                                                                                                                                                                    |
|             | Selecting correct tools and equipment for working with electronics including safety.                                      | Organising workspaces for independent practise.                              | H&S for soldering, Tool recognition, describing processes.                                                                      | Sensor, Control, Switching               |                                                                                                                                                                    |
|             | Industrial production methods and advanced manufacturing                                                                  | Understanding automation, mass batch and one-off production methods.         | Show understanding of mass, batch, just-in-time and one off production, Kaizen, the history of automation.<br>End of topic test | Surface mount, Automation, Contamination |                                                                                                                                                                    |
| Half Term 6 | <b>Textiles in Product Design</b>                                                                                         | Impact of how raw materials become useable materials.                        | Exam style questions covering topics from previous HT and KS3.                                                                  | Cotton, Silk, Yarn.                      | Creating bespoke a textiles-based product based on design choices.                                                                                                 |
|             | Origins and categories of textiles including impact of how fabrics effect culture and society                             |                                                                              |                                                                                                                                 |                                          |                                                                                                                                                                    |
|             | Designing and creating textile-                                                                                           | Selecting the right                                                          | Types of textile, production methods,                                                                                           | Sewing, Applique,                        |                                                                                                                                                                    |

|  | Knowledge & Understanding                                               |                                                                            |                                                                                                                   | Subject Specific Literacy Development               | Cultural Capital / Enrichment Opportunities |
|--|-------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------------------|
|  | Topics (Bigger Picture)                                                 | Knowledge (Key Concepts)                                                   | Recall & Retrieval Practice Focus                                                                                 | Key Vocabulary                                      |                                             |
|  | based products.                                                         | material for a product based on a specification.                           | fairtrade.                                                                                                        | Stitching                                           | Weekly D&T Lunch Club                       |
|  | Selecting correct equipment for working with textiles including safety. | Organising workspaces for independent practise.                            | H&S for textile tools, Tool recognition, describing processes.                                                    | Textile construction, Sewing Machine,               | West Lancs College STEM Festival            |
|  | Smart and new materials.                                                | Understanding how textiles aren't just fabric for clothing.                | Exam style questions Identifying materials and explaining how they are either smart or new and how they function. | Kevlar, Carbon fibre, Thermochromic, Photochromatic |                                             |
|  | Fashion trends and design movements.                                    | Design trends and impacts on culture. Famous designers and design history. | End of topic test                                                                                                 | Vivienne Westwood, Fashion House, Design Movement.  |                                             |

| Key Assessments |                        |                                                                     |                                                              |
|-----------------|------------------------|---------------------------------------------------------------------|--------------------------------------------------------------|
| When            | What will be assessed? | Why is this being assessed?                                         | How will results be stored & students receive feedback?      |
| December        | Theory information:    | Assess Understanding of the content taught for Unit 1 (Exam) so far | Written feedback given to students, and recorded on tracker. |

|       |                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                      |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | New Materials                                                                                                                           |                                                                                                                                                                         |                                                                                                                                                      |
| March | Theory information based upon:<br><br>Material Properties<br>New Materials<br>Material<br>Categories<br>CAD/CAM<br>Scales of Production | Assess Understanding of the content taught for Unit 1 (Exam) so far, written mock exam assessment.                                                                      | Recorded on tracker and SIMS, students will receive marked papers back with areas for improvement.                                                   |
| April | Theory Paper based around content taught during terms 2-5.<br><br>Practical assessment (Mini NEA)                                       | Assess Understanding of the content taught for Unit 1 so far, written mock exam assessment.<br>To Show understanding or the task in practice for the full NEA (Unit 2). | Recorded on tracker, students will receive marked papers back with areas for improvement.<br>Recorded on tracker with written feedback for students. |
| June  | 2 Hour mock exam.                                                                                                                       | Assess Understanding of the content taught for Unit 1 (Exam) so far, written mock exam assessment.                                                                      | Recorded on Pupil Progress, students to go through paper with teacher to see where improvements can be made.                                         |