**Curriculum Map Design & Technology**

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| **R****Real World****E****Engaging & Enriching****S****Skills for Life****I****Inclusive****L****Leadership****I****Independence****E****Encourages Reflection****N****Next Steps****C****Challenge****E****Ethics & Empathy** | **KS2 National Curriculum** | **Unit** | **7** | **8** | **9** | **10 & 11****AQA GCSE Design and Technology** | **Next Steps** |
| Understand design criteria to help design purposeful products.Be able to select from a wide range of tools to help cut, shape, join and finish materials.Apply their understanding of how to strengthen complex shapes and structures and use mechanical electronic systems in their products.**KS3 National Curriculum**Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological World.Build and apply a repertoire of knowledge, understanding and skills (Electronics, System and Control and Textiles) to design and make high-quality prototypes and products for a wide range of users.To develop an iterative design process mindset to tackle domestic and local design problems and contexts.Critique, evaluate and test existing and new products in order to inspire their own design thinking and strategy. | Term 1  | **Textiles- fabric monster*** Research- critique the work of others
* Use embroidery, applique, and embellishment techniques.
* Different textiles, natural, synthetic and technical and their environmental impact
* Use templates and saving material and the environmental factors associated with wastage.
* Generating ideas and label using prior knowledge.

**Specific practical skills*** Pin, cut, stitch, assemble and stuff (wadding) fabric.
 | **Acrylic Clock- Memphis design*** Polymers, learn about the molecular structure of thermosetting and thermoforming plastics
* The evolution of plastics and the impact it has on our society
* abstract and Memphis design movements
* motions, cams and levers- clock mechanism
* generating ideas in the Memphis design style

**Specific practical skills*** Using templates, planning the cut (box technique), cut, shape join (solvent cement) acrylic.
 | **Table Tennis Bat*** Natural and man-made woods
* Ergonomics and Anthropometrics
* Production aides and templates
* Use subtractive and additive manufacturing methods
* Testing their bat- PE department

**Specific practical skills*** Assemble material without adhesive (glue)
* Use wood filler and surface treatment (sanding sealer)

**Careers and soft skills in D&T- support options process** | **Term 1- Design Approaches*** Designers and design companies
* Scales of production
* Modelling, prototyping and testing
* Quality control (QC), Quality Assurance (QA)
* CAD & CAM, Just in Time (JIT), Lean manufacture, Flexible manufacturing systems (FMS)
* Market Pull, Technology Push
* The 6Rs of sustainability

**Practical project*** Modelling- robotic hand

**Term 2- Material properties*** Working and physical properties of materials
* Wood (timber)- origin, stock forms, surface treatment and finishes
* Plastic, metals, textiles and paper and boards
* Composites, alloys and modern materials
* Material reinforcement and modification

**Practical project*** Serving tray making
* Polymorph experiment

**Term 3- Manufacturing Processes*** Wasting (subtractive), additive, deforming and reforming of wood, metal, plastic, textiles and paper and board
* Mechanical systems

**Practical project*** CAD- serving tray design

**Start of NEA (coursework 50% of final grade) - Section A:** Investigating the problem (research)- 4 pages | **Term 1- NEA continue**Students research and practice and then complete each section under controlled assessment (supervised in school)* **Section B:** Produce a design brief and specification- 2 pages.
* **Section C:** Generate design ideas- 3 pages.
* **Section D:** Developing design ideas- 4 pages.

**Mock 1 preparations*** Revision undertaken to sit a past full exam paper.

**Term 2- NEA Continue*** **Section E:** Realising Design ideas (practical- making)- 2 pages

**Mock 2 preparation** * Revision undertaken with focus on key exam topics based on Mock 1 analysis.

**NEA Continue*** **Section F:** Analysing and evaluating- 2/3 pages.

**May- NEA deadline** (50% of course)**Term 3- Exam preparation**Students will revise the contents of the course, create revision material, and practice exam questions in readiness for the final exam in June.**June- Final exam** (50% of course). | **KS5 and Degree level:*** Product Design and Development
* Engineering- mechanical, electronic, and material science.
* Architecture
* Plumbing
* Electrician

**Career pathways and Apprenticeships:*** Carpentry/ joinery
* Plumbing
* Electrician
* Engineering
* Fashion design

**Related careers and soft skills**Healthcare* Surgeon
* Dentist
* Optician
* Nursing

Digital and computing* Marketing
* Graphic design
* Computer programming
* Software engineer
* Web developer

**Design and Technology Club**Wednesday3-4pm Room Create 2 |
| Term 2  | **Acrylic LED keyring*** Basic electronics and components
* Explore a range of polymer and composite materials.
* Label an exploded diagram.
* Justify their own design ideas using a design constraint criteria.
* Model using corrugated card and Styrofoam to test ideas.
* Modelling and prototyping

**Specific practical skills*** Marking out, cutting, drilling and edge treatment of acrylic
 | **Night light- electronics*** Function and symbols of different electronic components
* Soldering and safety
* Input, process, and output in electronic product
* Learn how to identify a bad, good and a high-quality soldering joint.
* testing in electronics and de-soldering a joint.
* Vacuum forming and moulds.

**Specific practical skills*** Soldering on copper board, strip and tin wire and vacuum forming
 | **LED Desk Lamp*** Systems approach to design
* Explore **Printed Circuit Boards (PCB)**
* Further develop soldering technique
* Tessellation and nesting- material management
* Interpreting electronic symbols and circuits
* Conductors and isolators

**Specific practical skills*** Soldering LEDs, resistors, and using nuts and bolts
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| Term 3  | **Engineering- Campervan*** Iconic design
* Explore different parts of a motor vehicle.
* Write a manufacturing specification.
* Working and physical properties of BDMS (brightly Drawn Mild steel)
* Design chassis on Adobe Photoshop (CAD)

**Specific practical skills*** Mark, cut, shape and assemble BDMS, Pinewood, MDF and an A3 card net.
 | **Computer Aided Design (CAD)- Google Sketchup Robot*** Understanding axes, scaling, perspective and dimensioning
* Extrude and intrude 3D objects.
* Navigate, rotate and orbit objects.
* Draw with accuracy by inputting measurements.
* Change styles and line tone.
* How to import and export objects and textures

**Specific practical skills*** Create a three- dimensional model of an idea using Computer Aided Design (CAD).
 | **Mobile Phone Amplifier*** Ethical issues- electronic devices and sound
* engineering drawings and key symbols- diameter, radios, hidden detail and chamfer
* designers and design companies- the work of others
* Artificial intelligence, automation, Internet of Things
* Laser cutter and 3D printer

**Specific practical skills*** Gluing and clamping material (quick release clamps), using a hole saw and laser cutting.
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