

St Michael's Church of England High School – Scheme of Learning Overview

Subject: Design & Technology		Year group: 7	
Unit: Resistant materials rotation - Steady hand game project			
Overview (including links to Big Ideas)			
<p>The national curriculum for design and technology at St. Michael’s high school, aims to ensure that all pupils:</p> <ul style="list-style-type: none">• Develop the creative, technical, and practical expertise need to perform everyday tasks confidently and to participate successfully in an increasingly technological world.• Build and apply a repertoire of knowledge, understanding and skills to design and make high quality prototypes and products for a wide range of users.• Critique, evaluate and test their ideas and products and the work of others.• Understand and apply the principles of nutrition and learn how to cook. <p>Our big ideas are sequenced across all three rotations in year 7, allowing students to investigate, explore and build upon their knowledge across three subject specialist areas through a combination of theory based and practical lessons and regular homework tasks. Our big ideas include:</p>			
Designing	Research, product analysis, design brief, specification and iterative approach.		
Problem solving	Design ideas, design development, modelling, materials, analysing and evaluating, environmental considerations.		
Manufacturing techniques and processes	Hand techniques including use of tools and equipment, use of machines, equipment, appliances, CAD/CAM, measuring, dimensions, quantities, and scales of production.		
CAD/CAM	Design development, pros and cons compared to traditional methods.		
User needs	Products in society, impact on culture, specifications, target users, cultural and religious values.		
Tools & equipment	Understanding and applying health and safety rules in each specialist room (RM, TX and FD), hand tools, equipment, machinery and appliances.		
Links to Prior and Future learning (Why this? Why now?)			
<p>Prior to year 7, students will have had varying experiences of Design Technology during their time at Primary school. Here at St. Michael’s high school, we provide the opportunity for primary school students to experience Design and Technology during our year 6 transition days and as early on in year 5 WOW sessions to give all attendees the opportunity to see how exciting our department is, meet staff, break down initial nerves and experience some of our big ideas in the specialist rooms/workshop.</p> <p>Our year 7 students experience all three specialist areas of Design and technology, one rotation per term. Our big ideas are explored across all three projects, allowing students to build up a foundation of knowledge, skills and expertise by the end of year 7.</p>			
Knowledge Goals		Lesson sequence	
<p>Problem solving:</p> <p>Research children’s toys/games</p> <ul style="list-style-type: none">• Be able to research ideas independently using primary and secondary sources.		<p>Week 1-2</p> <ul style="list-style-type: none">• Introduction to Design & Technology – Resistant materials• Aims and knowledge/skill goals• Expectations & routines	

Designing:

- Design inspiration and research of popular cartoon faces, selecting a design brief

Tools & Equipment: Introduction to personal **health and safety** and of the workshop inc. machinery, equipment and handheld tools.

Design & manufacturing skills, systems

- To have an understanding of the iterative design process from identifying a 'problem' to creating a 'solution'.
- Practise tasks with pine and MDF materials, **measuring and marking with accuracy**
- Using equipment and hand tools inc. steel rules, measuring/marketing out, tenon/coping saws and files
- **Using machinery** inc. the circular sander and pillar drill.
- **Understanding a basic electronic system**, electronic components & **soldering methods** to create a **circuit** and **common electrical outputs e.g. LEDs and buzzers**
- Know the names of electronic components and their function.
- Be able to use technical terms and keywords such as identifying tools, equipment and machinery by their correct names.
- Use tools, equipment and machinery safely by identifying potential risks and how to avoid danger in the workshop.
- Know how to safely solder.
- Be able to self/peer assess project work and recognise how to develop ideas and make improvements.

User needs:

- Develop an understanding **what people want/need**.
- To understand the purpose of **product analysis**
- To create **ergonomic** features on the SHG

- Health and safety in a D&T workshop and ICT suite.
- Visual research – cartoon faces
- Practise design ideas
- Initial design ideas in project booklet including annotations/comments
- Self/peer assessment using criteria
- Theory – product analysis (p,4) Research and the internet (p,5) Iterative design (p,14)

KO topic 1: User needs

Week 3-4

- KO quiz 1
- Initial design improvements
- Final design – including comments
- Self/peer assessment using criteria
- Drawing final design on to MDF square and rendering.
- Teacher workshop demo: using the coping saw (cutting and shaping using workshop tools and the disc sander)
- Student practical: MDF trial
- Student practical: Cutting and shaping the MDF design.
- Theory – H&S in the workshop (p,27) tools and equipment. (p,38-39)

KO topic 2: Tools and equipment

Week 5-6

- KO quiz 2
- Teacher workshop demo:
 - Pine base
 - Centre post and wand inc. cup hook
 - Centre block (measure/shape/micro drill)
- Student practical:
 - Pine base
 - Centre post and wand
 - Centre block
 - Theory – Planning (p,11-12) Joining (p,36)

KO topic 3: Classifying materials & selecting materials

Problem solving:

Understanding the **environment in relation to timber** and **reducing waste** of materials.

Class theory (Silver CGP books) and Knowledge organiser homework topics

1. Understanding needs (p, 6)
2. Tools and equipment (p,38-39)
3. Classifying materials and selecting materials (p, 30-31)
4. Quality & accuracy and manufacturing and processing (p,20-21)
5. Environmental concerns (p,28-29)
6. Keywords and definitions

Week 7-8

- KO quiz 3
- Teacher workshop demo:
 - LEDs (drill, attach LEDs)
 - Battery holder (Hot glue)
 - Buzzer (Hot Glue)
 - Copper wire (Shape with pliers)
 - Coiled wire
- Student practical:
 - LEDs
 - Battery holder and Buzzer
 - Copper wire
 - Coiled wire

Theory: Importance of quality and accuracy (p,20-21)

KO topic 4: Quality & accuracy and manufacturing & processing

Week 9-10

- KO quiz 4
- Teacher workshop demo:
 - Safety when soldering
 - Soldering components
- Student practical:
 - Soldering components

Theory: Scale of production (p,18-19)

KO topic 5: Environmental concerns

Week 11-12

- KO quiz 5
- Teacher workshop demo:
 - Recap safety when soldering
- Student practical:
 - Soldering components

Theory: Evaluating and adapting designs, final evaluation

KO topic 6: keywords and definitions

- KO quiz 6

Key vocabulary (Tier 2 and 3)	Reading/Writing/Numeracy development
<p> User needs Accessible Cultural and religious values Materials Machine tools Pilot hole Bradawl (for wood) Centre punch (for metal) Hand drill Power drill (pillar drill) Drill bit Twist bits Flat bits Countersink bits Flat file Half round file Round file Properties (how materials behave, look,feel) Aesthetics Manufacture Design brief Primary and secondary research Sustainability Tolerance Durability Quality control Evaluating Prototype Scale of production One -off production High-volume production/mass production Batch production Flowcharts Quality assurance Quality control Manufacturing aids CAD/CAM Risk assessment CNC machines Biodegradable The 6 'R's of sustainability Recycle Timber Composites Manufactured boards Medium density fibreboard Life cycle analysis Sustainable forests </p>	<ul style="list-style-type: none"> • Warm up/cool down routines – reading tasks • Reading textbook in lessons • Reading knowledge organisers as part of home learning • Access to D&T based publications and magazines • Technical vocabulary word banks displayed on PowerPoint slides and wall displays • Understanding the purpose and measurement for seam allowances • Annotation of designs using tier 2/3 words

Teaching strategies	
<u>Quality First Teaching strategies (QFT)</u> <ul style="list-style-type: none"> Annotated seating plans, access to pupil passports and SEN requirements to inform of QFT strategies Task organisers given for 1:1 direct instruction – also tasks on PowerPoint or the board. green and red cards Mini whiteboards 1:1 guidance and support via TEAMS Directed TA support if allocated to a student/class. Visual guides/resources, step by step plans 	
<u>Stretch and Challenge</u> <ul style="list-style-type: none"> Higher level technique tasks set to pitch up the expectations and challenges. No opt out questioning 	
Assessment	
<p>Weekly KO quiz, self/peer assessment using checklists and success criteria. Teacher assessment of the final design and outcome including feedback for improvements.</p> <p><u>Formative assessments:</u></p> <ul style="list-style-type: none"> Self and peer assessments Teacher whole class verbal feedback Teacher written feedback <p><u>Summative assessments:</u></p> <ul style="list-style-type: none"> Formal assessments in student assessment book with opportunity for improvements Summative assessment 1 (Spring term) Summative assessment 2 (Summer term) 	
Homework	
<ul style="list-style-type: none"> Fortnightly knowledge organiser topics to compliment class theory and preparation for fortnightly class quizzes. Independent home learning tasks to compliment classwork. 	
Cultural/Social/Economic Development	Subject specific information (eg scientific enquiry/historical enquiry/key practical's)
<p>Linking traditional and modern electronic games. Potential trip to Southport Victorian Fair to see and experience traditional games. Understanding trees in the nature are divided in to two categories: Deciduous and coniferous (soft and hard wood trees) and learning their characteristics, reducing waste of materials and considering the 6 'R's of sustainability.</p>	<p>Using specialist tools, equipment and machinery. -Soldering electronic components.</p>