The King's CHURCH OF ENGLAND ACADEMY KIDSGROVE

Curriculum plan: Engineering

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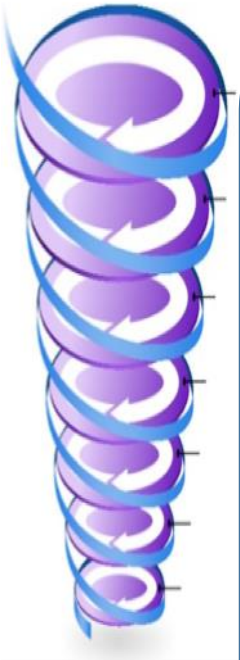
INTENT:



"'The way you learn anything is that something fails, and you figure out how not to have it fail again."

Robert Arrighi

Studying Engineering at The King's allows students to understand the mechanical and physical environments of their surroundings. It helps students to foster a sense of inquisitiveness, appreciating how problems are solved and in what environment these solutions can continue to be developed so they remain in tune with our ever changing world.

As a department, we aim to provide our students with the necessary theoretical knowledge, understanding and practical skills to manufacture solutions to realistic world problems and scenarios. The strong emphasis on problem solving is linked intrinsically with creativity where students are encouraged to push boundaries, challenge the status quo and continually think 'outside of the box'.

Sharing our passion and deep subject knowledge equips our students with high quality learning experiences which will inspire, ensure outstanding progress and provide them with a range of skills to enable them to be effective participators in society. They will study a wide range of topics and have learning experiences which will widen their understanding of the mechanical and physical world. Students will be challenged by difficult tasks and be asked to respond to a range of demanding activities which will push students to value creativity and harness a deep knowledge of materials, properties and manufacturing processes.

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Half term points

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2

10	**Understanding engineering drawings/ Proposing design solutions.**
	
	Learning to include:
	• Interpret standard engineering symbols
	• Read information such as third angle, isometric.
	• Interpret drawings
	• Understanding sketches
	• Interpret specific requirements
	
	Learning to include:
	Identify existing solutions.
	Generate ideas
	Implement the idea.
	
	Career links.
	Different engineering sectors and employments.
	Team working skills.
			Communicate an engineering design solution/Planning manufacture
			
			Learning to include:
			Materials
			Produce a manufacturing specification in CAD.
			• ferrous metals
			• non-ferrous metals. e.g. aluminium, titanium, copper, silver and zinc.
			• thermosetting polymers. e.g. phenol-formaldehyde, polyamides and polyurethane
			• thermoforming polymers. e.g. polyethylene, polypropylene and acrylic
			
			Properties of engineering materials
			• strength
			• hardness.
			• toughness
			• characteristics of engineering materials.
			• machinability
			• workability
			• durability
			Components.
			• proprietary components
			• characteristics of components
			
			Processes
			• cutting. E.g. Drilling, sawing, filing and shearing.
			• shaping. e.g. turing and milling.
			• forming. e.g. forging, casting, extruding, moulding, folding, bending
			• joining. e.g. fastening, bonding, soldering, brazing.
					Planning manufacture/using engineering tools and equipment.
					
					Learning to include:
					Solving applied engineering problems.
					• developing practical recording skills, learning how to comment on:
					  ○ visual features.
					  ○ surface features.
					  ○ mass.
					  ○ colour
					  ○ degradation.
					  ○ identification marks
					• develop measuring skills
					  ○ measuring diameter.
					  ○ measuring linear dimensions.
					  ○ use of comparative techniques.
					• knowledge of component values e.g. resistors.
					• appraisal/interpretation skills, such as justification and reasoning.
					• removal of semi-permanent fixing
					• parts removal and layout
					
					Learning will include:
					• Learners should be able to apply a range of key engineering process used in manufacture.	

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	Half term points					
	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
11	**Understand the effects of engineering achievements/understand the properties of engineering achievements.** Learning to include: Describing engineering developments. Explaining the effects of engineering achievements. Explaining how environmental issues affect engineering applications. understand materials, their properties and their selections for specific purposes. Describing properties required for engineering products. Explaining how materials are tested for properties.		**Understand methods of preparation, forming, joining and finishing of engineering materials/solving engineering problems.** Learning to include: Describing the engineering process. Describing applications of engineering processes. Safe working practices. Using mathematical techniques for solving engineering problems. Understanding and producing engineering drawings.		**Problem solution** Learning to include: • Career links. Range of different engineering roles. Practical applications focusing on accuracy and precision.	