

Year 9	Energy, Structures and Mechanisms	Tote Bag	Food	Robotics	Metal animal	3D CAD/CAM
Specific knowledge and skills	This topic involves looking at how electricity is generated, experimenting with structures such as bridges, and understanding common mechanisms The following will be the focus: • How electricity is generated • Sustainable futures • How materials can be designed to be strong yet light • Experimenting with structures to build an efficient bridge • Looking at mechanisms to see how they work	Students will be introduced to block printing and advancing technical skills through designing and make a tote bag. This will be themed 'food festival' and should be promotional for their imaginary food stall at the festival. The following will be the focus: • How to mark out accurate measurements and use seam allowance using a pattern master. Gaining an understanding of fold lines and cut lines, creating accurate markings and independent cutting out. • How to create their template and block print using it. Simplistic block print allows design transfer to fabric in a simplistic but effective method.	Students will learn to use raw meat products such as beef, cake making and a pasta workshop. The following will be the focus: • Sauce making such as reduction • Shaping & finish a dough. • Whisking method • Raising agent - Mechanical aeration and biological • Finishing techniques • Bread making	Students will develop practical competence with mechanical components, motors, sensors and controller systems, alongside computational-thinking skills including sequencing, repetition, selection, variables and debugging. They will communicate design decisions using annotated sketches, flowcharts, test tables and a concise engineering notebook. The project concludes with a team robotics challenge in which students apply their mechanical and programming knowledge to complete a defined autonomous and/or driver-control task. The following will be the focus: • Constructing mechanical devices • Programming systems to perform tasks • Working in a team to complete tasks • Understanding key concepts relating to industrial robotics	Students will be introduced to health and safety in the metal work room whilst making a metal animal. The following will be the focus: • Modelling prototypes • Marking out and cutting mild steel using tools such as scribes, engineer's square, centre punch, ball pein hammer, hacksaw, guillotine and abrafile • Drilling using a pillar drill and machine vice • Using heat treatment processes such as brazing and forging • Dip coating	Students will build on their CAD knowledge from previous years to design a range of items on the screen and produce two of these using a 3D printer. The following will be the focus: • Building up a range of 3D CAD skills using Autodesk Inventor • Work with assemblies to generate more complex designs • Being able to edit various features and improve designs • Understand how 3D printers function and their advantages/disadvantages • Understand the impact CAD/CAM is having on industry • Be able to generate 2D engineering drawings from 3D designs • Learn how CAD can be used to model designs before production

		- How to create a prototype Test running size, proportion and strap length before making their real bag allows students to understand anthropometrics and the importance of prototyping as part of the iterative design process. - How to apply eyelets - Additional hardware will be applied by the students, allowing them to gain a new skill that can be taken forward to GCSE. Use of hand-held machinery and accurate marking from a template.				
Key terms	Generator, Turbine, Sustainability, Fossil fuels, Triangulation, Corrugation, Gears, Cams, Levers	Anthropometrics, Prototype, Measurements, Tape measure, Pattern Master, Seam Allowance, Applique, Natural and Synthetic Fabrics.	Sauce making, biological and mechanical raising agents, whisking method, evaluation.	Algorithm, Autonomous, Actuator, Brain, Bug, Conditional statement, Controller, Debugging, Drivetrain, Input, Iteration, Loop, Mechanism, Motor, Output, Process, Program, Sensor, Sequence, Test data, Variable	Marking out, mild steel, brazing, forging, filing, hacksaw, oxide, dip coating.	CAD/CAM, dimension, extrude, assembly, fillet radius, chamfer, orthographic, 3D printer, PLA, one off and mass production.
Key concepts	Creativity Planning Materials Analysis Sustainable futures	Planning Materials Sustainable Futures	Planning Materials Analysis Sustainable futures	Creativity Planning Sustainable futures	Creativity Planning Materials Analysis	Creativity Planning

Assessment	Planning and knowledge Testing and evaluation	Generation and development of ideas and Working with materials.	Working with materials Testing & Evaluating	Generating and developing ideas Working with materials	Generating and developing ideas Working with materials	Planning and knowledge Working with materials
------------	--	--	--	---	---	--