

KS4 Module 1: Communicating Designs. Principles of Engineering Design	KS4 Module 2: Communicating Designs Principles of Engineering Design	KS4 Module 3: Communicating Designs Principles of Engineering Design
<p>Knowledge <i>What pupils will know</i></p> <ul style="list-style-type: none"> • Know how to interpret and work to a specification • Sketches for the design idea • Advantages and disadvantages of each sketching technique • Annotation and labelling techniques • Drawing for a design idea • Standard conventions <ul style="list-style-type: none"> ○ BS 8888 • Working drawings <ul style="list-style-type: none"> ○ Knurls, countersinks, holes, chamfers, type of line • Criteria included in an Engineering design specification <ul style="list-style-type: none"> ○ Needs and wants of a user ○ Reasons for the product criteria included in a design specification 	<p>Knowledge <i>What pupils will know</i></p> <ul style="list-style-type: none"> • Produce a 3D CAD model <ul style="list-style-type: none"> ○ Work planes ○ CAD rendering • Aspects of 3D CAD assembly drawing • The advantages and disadvantages of CAD/ CAM • Design processes and strategies <ul style="list-style-type: none"> ○ Iterative, user centred, inclusive, sustainable, ergonomic design • Design cycle <ul style="list-style-type: none"> ○ Identify; types of information obtained through primary & secondary research ○ Design; Engineering specification, sketching, modelling ○ Optimise; make and evaluate including testing ○ Validate; 	<p>Knowledge <i>What pupils will know</i></p> <ul style="list-style-type: none"> • Influences on Engineering Design <ul style="list-style-type: none"> ○ Market pull & technology push ○ Planned obsolescence, 6R's of sustainability • How manufacturing considerations affect design <ul style="list-style-type: none"> ○ Scales of manufacture; one off, batch, mass & continuous. • Material availability and form
<p>Skill <i>What pupils will be able to do</i></p> <ul style="list-style-type: none"> • 2d/3d techniques (one- and two-point perspective, Oblique, isometric projection, thick and thin lines, tone, shadow and texture) • Explain; materials, key features, function, dimensions • Produce orthographic projection drawings • Produce an assembly drawing <ul style="list-style-type: none"> ○ Isometric projection centre lines, parts list for referencing (up to 4 parts). 	<p>Skill <i>What pupils will be able to do</i></p> <ul style="list-style-type: none"> • CAD tool features • Create 3D CAD model consisting of multiple components <ul style="list-style-type: none"> ○ Lines, arcs, polygons, extrude, shelling, dimensioning, holes. • Create multiple components, mate tool, revolve tools • Conduct market research <ul style="list-style-type: none"> ○ Interviews, surveys, questionnaires 	<p>Skill <i>What pupils will be able to do</i></p> <ul style="list-style-type: none"> • Risk assessments • Types of manufacturing processes <ul style="list-style-type: none"> ○ Wasting, shaping, forming, finishing, assembly • Quality standards; British and International standards

<ul style="list-style-type: none"> Conduct an analysis of an Engineered design specification 		
KS4 Module 4: Design, evaluation and modelling. Principles of Engineering Design	KS4 Module 5: Design, evaluation and modelling. Principles of Engineering Design	KS4 Module 6: Design, evaluation and modelling. Principles of Engineering Design
Knowledge <i>What pupils will know</i>	Knowledge <i>What pupils will know</i>	Knowledge <i>What pupils will know</i>
<ul style="list-style-type: none"> Product analysis (secondary research) Product disassembly (primary research). Analyse the disassembled product <ul style="list-style-type: none"> Materials and components Assembly methods Production methods Components and their function 	<ul style="list-style-type: none"> Methods of modelling <ul style="list-style-type: none"> CAD modelling Physical modelling. Card, paper, grey board, foam Advantages and disadvantages of modelling materials Card, block, breadboard modelling 	<ul style="list-style-type: none"> Physical Modelling Ranking matrices <ul style="list-style-type: none"> Qualitative and quantitative comparison with the design brief and specification
Skill <i>What pupils will be able to do</i>	Skill <i>What pupils will be able to do</i>	Skill <i>What pupils will be able to do</i>
<ul style="list-style-type: none"> Carry out a product analysis using ACCESSFM Compare products using; <ul style="list-style-type: none"> Ranking matrices Identify and describe the advantages and disadvantages of products using primary and secondary data. Use appropriate tools and instruments <ul style="list-style-type: none"> Understand potential hazards 	<ul style="list-style-type: none"> Create a 3D CAD model using 3D CAD software Mate different components. Simulate the operation of a product using CAD software Select and use appropriate modelling methods Apply safe working procedures Compare a prototype against a design specification Identify potential improvements in the design 	<ul style="list-style-type: none"> Apply safe working procedures Record key stages of making a prototype Compare a prototype against a design specification Identify potential improvements of a prototype