ENGINEERING

Year 11

What are the aims and intentions of this curriculum?

The aim of our Key Stage 4 Curriculum will allow students to explore engineering skills through the design process, learn about the role of designers in the production of engineered products, and begin to understand how and why they use their knowledge. When students enter industries as engineers the curriculum will allow them to understand vital aspects of engineering practice. Students will be able to develop a range of skills, whilst solving problems and produce/present varied ideas.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Summer 2	Investigating an engineering project.	Re-forming means changing something from one shape to another. Welding means heating the surfaces of two objects to the point of melting and then joining them together. Blow moulding is a manufacturing process by which hollow plastic parts are formed.	Students will develop understanding to know that properties of a material determine how it reacts when forces are applied to it. Students will carry out research or experiments to determine hardness of different materials.	In small groups students will examine chairs they have been sitting on, then identify toughest, hardest and strongest materials in it (chair).
Autumn 1	Responding to an engineering brief	Prototypes are the first version of a product from which other forms are developed. Reverse engineering is the process of disassembly and analysis of a product to investigate how it is manufactured and the purpose of the components from which it is made.	Students will be able to carry out sequential drawing for making products for example a paper plane. Students will also make examples of model construction kits, like ships and aircraft. Students will be able to produce sketches and show products (for example; mobile phones) order of assembly.	Students will consider the different types of work instructions that are used in manufacturing and the reasons for using them. Teacher will discuss the benefits with their class. .
Autumn 2	Responding to an engineering brief	Alloys are a mixture of two or more metals that have improved properties and characteristics Accuracy depends on the way in which measurements are taken and how they are recorded.	Students will develop skills to work with many different types of materials, each with different handling requirements. Students will learn how to create tally and data collection charts accurately.	In small groups students will discuss why specific equipment is used with certain materials. Students will record the results of investigations in a table.

Spring 1	Responding to an engineering brief	Degree of accuracy is half a unit on either side of the unit of measurement; if the unit is 1, then any measurement between 9.5 and 10.5 will be measured as 10 Trends are patterns in data, eg, value might increase for one variable as the values decrease for another.	Students will be able to use data they have collected or that their teacher has provided to produce examples of different types of charts.	By using some examples of charts and graphs students will discuss in groups why each type of graph/charts was chosen to present that data and the most effective methods.
Spring 2	Responding to an engineering brief	Reliability depends on their being only small variations in data and measurements being within tolerance. Precision refers to the closeness of two or more measurements to each other. For example, if you weigh a given substance five times, and get 3.2kg each time, then your measurement is very precise.	Students will be able to analyse a range of factors that affects engineering products, such as physical requirements, aesthetics, size, function and performance requirements.	Research an engineered product, either by looking on the internet or by examining a physical product.
Summer 1	Responding to an engineering brief	Speeds and feeds refer, respectively, to the 'spindle speed' (the speed at which a machine spindle rotates) and the 'feed rate' (the rate at which a machine tool moves across a 'workpiece' i.e. the material being machined).	Students will develop engineering component and assembly drawing skills using CAD/CAM systems. Students will develop skill to know that: engineering drawings often include information about radii, diameters and tolerances among other manufacturing information.	In groups students will explain what each type of drawing shows and when they are needed. Students will assemble an engineered product using only engineering drawings.