

Subject	Engineering	Year Group	10			
	Term/Unit 1	Term/Unit 2	Term/Unit 3	Term/Unit 4	Term/Unit 5	Term/Unit 6
Scheme title	Introduction to the Engineering principles/ Traditional Engineering drawings	Health and safety legislation and CAD Technical drawing	The application of SI measurements/ Production planning and risk assessments	Mathematics in Engineering/ Skill building project	Skill building and Engineering drawings	Skill building and Material categories and properties
Purpose of scheme	Pupils will complete alternate lessons where they'll work on their preparation for the synoptic project, followed by a lesson preparing for the exam. The first term will be an introduction into the 'Engineering principles'. During their practical lessons they'll learn to identify and execute different drawing techniques and respond to a design brief taken from a past synoptic project.	As per course specification, pupils will learn about health and safety legislation. This includes responsibilities of employers, employees and what laws exist. Pupils will learn how employers keep their employees safe and what PPE is used in engineering. In addition pupils will continue to work on their drawing techniques (focusing on CAD) and complete part of a mock synoptic project on technical drawing.	Pupils will learn what SI measurements are and how and why they are used. They will be able to identify the purpose and application of different SI measurements and apply them to an engineering context. In preparation for the synoptic project, pupils will learn how to produce a project plan, adopting the correct conventions and how to conduct risk assessments.	Maths and physics are a huge part of all engineering principles. For this term pupils will learn to apply mathematical formula to practical applications in an engineering context. In addition, pupils will prepare for the practical element of their synoptic project by develop their practical skills through a range of skills building projects.	Pupils will continue to work on the technical skills required for Engineering. They will work towards making an excavator as part of a mock synoptic project, so pupils will need to demonstrate all of the necessary practical skills before hand. In addition, pupils will study the conventions of engineering drawings including scaling, annotations and BSI measurements.	Pupils will continue to construct and complete an excavator in response to a past synoptic project. Pupils will study on a theoretical level, the different materials used in engineering. This includes metals, timbers, plastics, composites and joining methods.
Knowledge in sequence	<b>Theory lessons</b> - Pupils will learn how the course is broken down into coursework and examination and learn about the content for each. They'll then explore the world of engineering and begin to understand the different types of engineers that exist. Pupils will explore all 8 Engineering principles over the term with and assessment at the end. <b>Practical lessons</b> - For the synoptic project, pupils must learn about the different traditional drawing techniques used in engineering. Pupils will explore and test these techniques before responding to a drawing task, which has been taken directly from a previous synoptic project.	<b>Theory lessons</b> - Pupils will learn about Health and safety legislation. They will begining about what laws are in place and how they keep both employers and employees safe. Pupils will learn about health and safety practices such as employee statutory rights and PPE. <b>Practical lessons</b> - In order for pupils to continue to prepare for their synoptic project, they will complete a drawing challenge which is taken from a past synoptic project. Pupils will be required to draw by hand, used learnt drawing techniques, an excavator, displaying the correct supporting information such as measurements and scaling.	<b>Theory lessons</b> - Pupils will learn about SI measurements. They will study the practical application of SI measurements in a variety of different context and across the engineering principles. <b>Practical lessons</b> - As part of the synoptic project that pupils will complete in year 11, pupils will need to be able to produce a production plan and risk assessment for any proposed practical work. In practical lessons pupils will gain experience production both documents in response to a mock synoptic challenge.	<b>Theory lessons</b> - Pupils learn how to calculate mathematical equations in and engineering context for the following applications and in the following order: for properties, forces and motion, electricity and power, geometric, projects and products. <b>Practical lessons</b> - Pupils will continue to develop their practical skills over a series of set practical tasks. The following tasks will be completed and in the following order: Laser cutting and engraving, 3D printing, Cutting, Drilling and vacuum forming.	<b>Theory lessons</b> - Pupils will learn how to read, interpret and produce engineering drawings. This will learn how to calculate scale and read and use the correct BSI conventions and tolerance. They will learn about the BSI kitemark. <b>Practical lessons</b> - Pupils will continue to develop their engineering technical skills. They will study and mimic linkages using modelling materials. Pupils will eventually respond to a mock synoptic project by building an excavator using engineering drawings.	<b>Theory lessons</b> - Pupils will study the following engineering materials, including types, source, uses, properties and sustainability in the following sequence: Timber, metal, plastics, composites and joining methods. <b>Practical lessons</b> - Pupils will continue to construct and excavator in response to a set brief from a past synoptic project.
Skills	Isometric drawing, Orthographic projection, freehand sketching	Isometric drawing, Orthographic projection, freehand sketching	Creating a risk assessment, creating a production plan, calculating with a variety of SU measurements.	Apply mathematical formula, Use 2D design to draw shapes, create 3D design for 3D printing, cut metal and timber, Mark out and drill using a pillar drill, and use a vacuum former.	Reading and producing accurate engineering drawings and using the correct conventions. Using linkages to redirect force and motion. Using pivot points. Cutting timber, cutting metal, drilling timber, drilling metal.	Using linkages and pivot points to change the direction of force. Using 2D design and the laser cutter. Applying wax.
Key words	Aerospace engineering, mechanical engineering, electrical engineering, civil engineering, biomedical engineering, automotive engineering, software engineering, engineering principles. Isometric, orthographic, 3rd angle.	Isometric drawing, Orthographic projection, freehand sketching, hazardous, PPE, legislation	Microamp, millilamp, nanomole, kilamp, thermodynamic temperature, microsecond, millisecond, micromole, millimole, candela, millicandela, ampere, current, input, output, process, precaution, hazard, hydraulics,	Force, mass, density, current, power, voltage, resistance, moment, acceleration, momentum, radius, pyramid, volume, area, pivot, perpendicular, velocity	BSI, scale, tolerance, pivot, linkage, ISO, axonometric, 2 point perspective, third angle perspective	hardness, toughness, elasticity, plasticity, ductility, durability, malleability, Optical, reflectivity, photosensitivity, Thermal, flammability, thermal conductivity, thermost, toxicity, oxidation, conductivity, resistance, magnetism
End point	By the end of this scheme term pupils will be familiar with the engineering principles. They should be able to identify each and describe some of their properties/ features. Pupils should also be more confident with non CAD drawing techniques and be able to draw confidently in isometric, orthographic projection and freehand.	By the end of this term pupils will be aware of the Health and safety work act and its governing body. They will recognise the important of health and safety in the workplace and in the world of engineering. They will know how to mitigate potential risks through the use of PPE. In addition, pupils will continue to develop their technical drawing skills and complete part of a mock synoptic challenge on producing hand drawn sketches.	Pupils will be able to identify the practical application of SI unit and associate each with the relevant engineering principles. Pupils will be able to complete mathematical sums using SI measurements. Pupils will be able to produce risk assessments and production plans using the correct codes and conventions.	Pupils will be more competent at using formula to make calculations in an engineering context. Pupils will also begin to build a selection of relevant engineering skills to prepare for responding to the synoptic project in year 11.	Pupils will learn to read, interpret and produce engineering drawings. Pupils will construct an excavator in response to a past synoptic project brief and develop technical skills and an understanding of the synoptic project and its expectations.	Pupils will have constructed an excavator in response to a mock synoptic brief. Pupils will be able to identify different materials and sub categories of materials. Pupils will be able to explain the source of materials and what their working properties are. Pupils will be able to explain the environmental impact and sustainability of different materials and the consequences of using them.
Assessment Methods	End of term theory assessment on the Engineering principles. They will also be assessed on the outcome of their mock synoptic project.	Pupils will complete an assessment on health and safety legislation. They will also be assessed on the outcome of their mock synoptic project.	End of term theory assessment on SI measurements. They will also be assessed on the outcome of their mock synoptic Risk assessment and production planning.	End of term paper assessing the application of engineering formula.	End of term task assessing understanding of engineering drawings	End of term assessment assessing the final excavator and the technical skills utilised in terms of their accuracy and efficiency. End of term assessment on materials and properties.