

### **Yr9 project Title: 2D/3D CAD**

The Year 9 Design & Technology project is designed to develop pupils' understanding and application of Computer-Aided Design (CAD) through a creative and engaging design-and-make project. It gives students the opportunity to research, develop and refine their own ideas using digital design software, before producing an accurate and functional final product. Throughout the project, pupils develop their skills in design development, problem-solving, accuracy and attention to detail while gaining confidence in using industry-relevant CAD software.

This unit is appropriate for Year 9 because it provides an ambitious progression from the practical and design skills developed earlier in KS3. Students build on their previous experiences by learning to create and modify 3D models using Onshape, developing an understanding of dimensions, constraints, assemblies and design iteration. They also use 2D Design to produce accurate 2D drawings and prepare designs for manufacture using digital fabrication processes. By combining both 2D and 3D CAD skills, students develop a greater understanding of how digital technologies can be used throughout the design process, from initial concept and development through to manufacture and evaluation.

### **Yr9 Project Title: 3D PRINTING**

The Year 9 Design & Technology World-Building Structures project is designed to develop pupils' understanding of Computer-Aided Design (CAD), 3D modelling and digital manufacturing through a creative and engaging design project. Students will design and develop their own structures as part of an imagined world, considering the purpose, appearance, scale and function of their designs. They will then use CAD software to create detailed 3D models before preparing and 3D printing their designs using ABS material.

This unit is appropriate for Year 9 because it provides an opportunity for students to apply and extend their existing design and CAD skills through a more challenging digital manufacturing process. Students will develop their ability to use CAD software to create accurate 3D forms, modify and refine designs, and consider how different design features will affect the final printed product. They will also gain an understanding of the properties and applications of ABS as a manufacturing material, including the importance of design tolerances, wall thickness, supports and print orientation.

Throughout the project, students will follow an iterative design process, developing ideas, creating digital prototypes, identifying potential manufacturing issues and refining their designs before production. The project encourages creativity and problem-solving while developing students' confidence in using digital technologies and their understanding of how CAD and additive manufacturing are used within modern Design & Technology and industry.

### **Y9 Project Title: Welding and Fabrication Table and Photoframe**

Project Overview: In this unit, students will build on previous knowledge of material science, where they will look at Ferrous, Non-Ferrous, Alloys, Polymers and manufactured boards.

Students will learn to make a photo frame from a given engineering drawing and equipment. Students will learn how to use the following tools and equipment safely:

- MIG Welder
- Hacksaw
- File
- Magnetic Clamp
- Pillar Drill
- Strip Heater
- Laser Cutter
- CAD Software

### **Year 9 Project Title: High-skill cooking & street food**

Project Overview: Students will learn about the farming methods used across the world and the importance of understanding dietary requirements and allergies in the food industry. Students will make the following dishes:

- Apple pie
- Sausage plait with homemade puff pastry
- Meringue kisses and plate design
- Decorated Swiss roll
- Naan bread
- Spring rolls
- Showcase lesson- this will be a 3 week showcase as students will demonstrate the skills learnt through their rotation by following a set brief. They will research

and produce a time plan of a street food dish of their choice and then execute their time plan by making their chosen dish.

### **Y9 Project Title: Planter (Construction)**

**Project Overview:** In this unit, students will build on previous knowledge of material properties, where they will look at softwoods and manufactured boards.

Students will learn to make a to construct a wooden planter using an orthographic drawing with a strong focus on accuracy and quality control. Students will learn how to use the following tools and equipment safely:

- Marking gauge
- Try square
- Bench hook
- Belt sander
- Disc palm sander
- Clamps
- Manufacturing template

### **Y9 Project Title: Electronics**

**Project Overview:** In this unit, students will build on previous knowledge of 3D CAD design and electronics.

Students will learn to make a PCB using TechSoft PCB and to produce an engraved PCB using a CNC engraving machine. Furthermore, students will design a housing in Autodesk TinkerCad to hold the circuit board they have assembled. Students will use the following tools and equipment:

- Soldering Iron
- CNC Engraving Machine
- TechSoft PCB design software
- FDM 3D Printer
- Autodesk TinkerCad software
- Electronic components

- Multi meter