

## Year 7

The core experience in Design and Technology, in KS3, is essentially about providing opportunities for students to develop their capability and confidence to produce a product. As a school we place an emphasis on 'quality' products as there is great benefit in students experiencing success.

In Year 7, students work through a variety of design and making activities to form a basis of knowledge and skill to build from in later years. It extends and reinforces what they should already know such as drawing and basic construction techniques which develops their confidence. For example, drawing, hand-eye coordination, model making in card, handling materials, cutting with scissors. They will work with expert guidance, modelling feedback to ensure by year 8 they can confidently cut and shape different types of material such as plastic, wood and metal, using hand saws, electric fret saws, files and wet and dry paper.

We start the journey with year 7 with a project that focuses students on one of the most widely used materials of our time: plastic. This 12 week project develops pupils' knowledge of this material: Its properties and uses, advantages and, of course, drawbacks, including the ongoing discussion between the use of plastic on the environment and its importance to industry. In essence this project introduces students to a way of exploring and evaluating this material that is repeated and built upon with other materials later in KS3. Students who have come from craft based projects at Primary are introduced to our specialist workshop facilities and are taught how to be safe, confident and accurate using various tools and machines to cut, shape and finish material to a high degree to ensure that students feel proud of what they have made. They are encouraged to develop knowledge about the material Acrylic. This is a very useful plastic as we can develop skills shaping, gluing and finishing it and extend their skills later on using different making processes. The machines they use in this project are the electric fret saw, disc sander, pillar drill and polisher which gives them confidence within a workshop setting. They also use the following tools; coping saws to cut, files to shape and wet & dry paper to develop a high quality finish and gluing is carried out safely using liquid solvent cement. They build on these skills to develop more complex making as they progress through KS3.

Using these machines and tools underpin everything they make in KS3/KS4 and will give pupils confidence to make anything. The skills will be built upon in other projects. They gain an understanding of the properties of the material and the impact it has on the environment, such as the waste we find in our seas and are introduced to the concept of recycling and biodegradable materials and products. They gain the ability to measure and mark-out accurately, developing an understanding of the importance of accuracy. They develop knowledge of ergonomics and the ability to render their drawings. They also use cards to model design ideas to develop an understanding of product testing prior to manufacture.

After this initial project, we then introduce them to Computer Aided Design. Students are taught the importance of CAD in the design of products and how to use a basic CAD programme. Using this develops their computer skills in both 2D design and 3D design and is a further tool that will improve their design skills. The project is taught through a focused practical task using the computer package. They have to draw following instructions and knowledge gained during the project. The skills taught will include; 2D drawing using measuring and line tools, making the design 3D using the extrusion tool and how to produce an orthographic view of their work and a final rendered drawing. This will start to give them the fundamentals so that they can produce products and parts using CAM in future years.

We also do a project based around Textiles. This allows them to use a range of materials. Safety and safe working practices are taught. This is very important as it makes the students feel secure and helps build confidence. All pupils will learn how to sew a number of hand stitches before moving on to learn the basic function on the sewing machine and complete a 'driving test' on paper before we continue on to using thread. This means they can learn how the machine works in a practical way and that they can see and judge accuracy.

They then work to create ideas for a printed bag (with zip) whilst understanding monoprinting and making a printing block. They are guided to draw and explain their ideas and to think about problems

that might arise when making. Throughout the project they are improving fine motor skills, which is really important for many subjects and jobs, for example, tailoring to medical surgery. Alongside this practical they learn about different fibre and fabrics, how they are produced and made into usable textile products. We also introduce, briefly, the effects that these fibres and fabrics have on the environment. They learn about different fibre groups and are able to sort fabrics into these 'families'. There are extension tasks to learn more techniques and to practice skills.

The final project in yr 7 involves working with wood and metal and the impact they have on society. We introduce students to these materials to gain some experience of handling and working with these materials. These materials are fundamental to many design and making tasks. Over 12 weeks, pupils develop their knowledge and application of the above resistant materials and they are introduced to iterative design through modelling in compliant materials. Iterative design is a design methodology based on a cyclic process of prototyping, testing, analyzing, and refining a product or process. Based on the results of testing the most recent iteration of a design, changes and refinements are made. This is a fundamental skill in design that will help them become creative thinkers. They learn about joining metal together using riveting and joining wood together using a slot joint and are encouraged to use hand tools including: try squares, chisels, mallets, tenon saws and bench-hook, tin snips, hand-drills and the pillar drill. A whole range of tools to appreciate the nuance and different functions of each one and how they can be used to work the material they use. This develops an understanding of the properties of each material, allowing them to evaluate uses and consider sustainability issues around using pine and aluminium. It is a truly wide ranging project.

We also think that it is vitally important to boost drawing skills, which is an indispensable communication skill in design. This is accomplished through a drawing project which develops students' 3d drawing ability by challenging them to use Planometric Oblique, Isometric and 2pt perspective drawing techniques and apply them to produce drawings using each style. This helps them communicate their design ideas in future, giving them the building blocks to develop skills for Yr8.