KS3 Design and Technology overview 2021/22

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In KS3 Design and Technology students are introduced to a range of materials, tools and equipment and core theory, encouraging technical understanding, creativity and curiosity. The aim is always to be able to work safely, confidently and competently in the Academy workshops. Throughout each material area students are taught about sustainability and where materials come from. CAD is also taught in year 7 and 9.

Year 7

The material areas learnt in year 7 are electronics, graphic design and 2D CAD and students are introduced to the workshop area by completing a focused practical task.

The focused practical task, in the second half of the autumn term, is making a wooden picture frame. This is focusing on skills in the workshop and by the end of this short project students will be able to use a range of hand and power tools safely and will be familiar with the process of making and evaluating a well finished product.

In the first half term students complete a 2D Design CAD project, learning the basics of this programme and having the opportunity to apply these skills in the summer term.

From January, students will make a speaker and packaging, designed for a particular user. They will learn to solder and work with wood (MDF); measuring, marking, cutting, joining and finishing accurately, safely and to a high standard. They will design and make the packaging for the speaker, learning about graphic design and blister style packaging.

Year 8

This year starts with a focused practical task of making and evaluating a wooden picture frame. This introduces students to the workshop, using hand and power tools safely and becoming familiar with the routines and expectations within a workshop environment.

The main project for year 8 is designing, making and evaluating a mechanical toy. This project teaches students about mechanisms and movement, specifically how cams create and transfer movement in products. Students will work within the material areas of wood (pine) and textiles. The moving part of the toy will be made from fabric. Within the area of textiles, students will learn about decorative techniques, joining fabrics and where fabric comes from.

Year 9

The first project for year 9 is a focused practical task: make and evaluate a keyring from aluminium. This will enable students to use tools, equipment and processes to mark, cut, drill and finish metal in the workshop. Students will learn where metal comes from, its life cycle and sustainability.

From January, year 9 students will be introduced to model making and plastic forming through a ‘no waste’ project. Model making (cardboard) is used to explore concepts and students will understand the importance of trying out ideas first before making a final prototype, this reflects the iterative design process at GCSE D&T.

During the second half of the spring term, students will learn the basics of 2D Design/stikka machine/CADCAM to produce a final product. The main material area for this project is plastic (acrylic) and students will learn how to form/bend plastic in the workshop using a line bender and vacuum former safely.

The final project for year 9 will be learning the basics of 3D CAD, Siemens Solid Edge. This skill is necessary to succeed at KS4 and students will learn how to create simple then more sophisticated shapes using this CAD programme.

Curriculum Sequencing Rationale

1a.	**What are the key topics taught in Year 7?** Primarily health and safety and how to work safely using a variety of different equipment in the D&T classroom. Students learn how to use the basic tools in the classroom such as a coping saw, file, belt sander. Students learn basic design skills and how to work towards a brief. In addition, students learn how to use Computer Aided Design (CAD) and apply those skills to their projects. Students work together on a Dragon Den style activity where they work as a team to promote an idea.
1b.	**Why is this?** Health and safety is paramount in a D&T classroom. All students must learn how to work safely and efficiently and not be a danger to themselves or others. CAD is a leading topic in design and technology and gives students the skills to design patterns and shapes that can be used on up to date technologies such as the sublimation printer, laser cutter and sticker machine. Students also learn the skills in the workshop of how to work with resistant materials, with a focus on wood. These skills are transferrable to other projects. The final project develops teamwork skills, presentation skills and students learn to make a video.
2a.	**What order is this taught in and why?** Students start off with a short and exciting project introducing students to CAD. This demonstrates to students how Design Technology has strong links to Computer Science. Students will revisit these skills frequently throughout their curriculum. Students move onto Health and Safety in the workshop and make a picture frame based, designed for a specific client. Students then move back to CAD to apply the skills they have learn to design a logo for a speaker. This follows a classic research, design, plan and make pattern. The project shows the students the wide range of skills they will learn in D&T and how important collaborative work and teamwork is.
3a.	**How do we build on these topics and rationale in Year 8?** Students currently in year 8 design and make a picture frame, the same as year 7. These key skills are essential and are now being learnt due to the pandemic and social distancing. Students learn to use their designing and making skills to work on a textile project of making a mechanical toy. They need to understand CAMs and design and make the box before making the fabric toy. To make the fabric toy students need to learn how to draft a paper pattern, how to accurately cut and measure, use a sewing machine and use a variety of decorative techniques.
3b.	**What order is this taught in and why?** Students begin by learning health and safety and workshop skills. These still can then be transferred across to their mechanical toy project. The mechanical toy project reinforces the knowledge learnt in the picture frame project but combines with textile skills. Again, demonstrating how a range of skills can be applied to different materials to produce a range of outcomes.
4a.	**How do we build on these topics and rationale in Year 9?** Students start by applying their design, plan and make skills to make a metal keyring. Students will use new equipment for metal and new tools and equipment including the pillar drill. Students are introduced to sustainability within the design industry and carbon footprint, solidifying this learning through a recycling project. Students then move onto a new project to make a phone holder that produces no waste. They use new equipment including the line bender and vacuum former and work with plastic. Students then complete an isometric drawing of their product and design using 3D CAD.
4b.	**What order is this taught in and why?** Students begin making their keyring to remind students of health and safety in the workshop, introduce them to a new material but using the and developing their skills. Students then study the different metals and the environmental impact metal has on the environment. This then moves students onto relevant projects; using existing materials to make a product (upcycling) and also making a product with no waste. Students finish the year using 3D CAD and creating isometric drawings, developing further their designing and CAD skills.

5a.	**Select one concept/theme you teach in your subject across more than one key stage** **How is this taught in each year?** There are many concepts taught across KS3 and KS4 with the main focus being design, plan, make and evaluate. Alongside this, all students develop CAD skills, eventually moving onto 3D CAD.
5b.	**How does this become progressively more challenging?** When planning and designing, students will have target audiences, these briefs become more challenging for students, for example designing something with no waste. When making, students using different materials, starting with wood, moving onto textiles and finally using metal and plastic. Students are expected to complete their final KS4 Designs using CAD. Students are expected to use CAD accurately to produce precise drawings that can be used when making.
6.	**What exam boards do you use in KS4 and why? How does this link to your KS3 curriculum?** OCR Design and Technology is a great exam board for our learners. They cover all material areas (CAD, wood, metal, plastic, textiles) at KS3 which prepares them for study at KS4. Students have a good knowledge of CAD at KS4 which is essential for the course. The course is 50% coursework and 50% exam, a great opportunity for students to apply their design, plan, make and evaluate skills to a long project in their coursework.
7.	**What career opportunities does the study of your subject bring?** Studying D&T gives students opportunities to go into apprentices such as mechanics and carpentry. Also students have the option to study architecture, graphic design, illustration, interior design, textile design and fashion, sound technician, industrial designer, engineer, set designer and many more.