Design & Technology

Design & Technology (D&T) is an area of study that focuses on planning, designing and creativity. The subject gives all students the opportunity to learn how to make things, repair products and discover solutions to different problems. This subject is one of the most progressive on the national curriculum, mainly due to the developments in technology and the rapidly changing world we live in. Technology is having an impact on the whole planet and we need to prepare our students for the developments they will encounter. Students in Design & Technology develop designing and making skills in addition to learning about electronics, computing, engineering, CAD, CAM, robotics, materials and textiles technology. They also develop business critical skills through problem-solving, innovation and team-work.

Throughout the Key Stage 3 course (Years 7 – 9), we aim to give all students a basic level of knowledge by helping them to be more creative, resilient, work independently, in groups and develop problem solving skills. These skills are transferable to other subjects and are all skills which will assist these children as they progress through the school and onwards.

In both Key Stages 3 and 4, students develop practical skills, creative skills and a knowledge of technology that will help prepare them for other academic subjects and their future. The course helps students to be more considerate of environmental impacts and the technological changes in the world they will encounter. Students are encouraged to work independently, develop problem solving skills and understand the process of design. The Key Stage 4 D&T course helps to develop some of the important skills, techniques and knowledge required for those students who intend to progress onto Key Stage 5. The course also develops the skills to lead into apprenticeships or specific college courses that focus on practical and creative skills.

Throughout Key Stages 3 and 4, we intend to deliver a wide curriculum giving students the chance to explore different areas of Design & Technology. The children develop and practise new skills and we aim to ensure that all students are confident in the following areas

- Help students to develop a variety of creative and practical skills through working with different techniques and materials
- Gain an understanding of designing, making and evaluating with a range of materials
- Develop technical knowledge in mechanical systems and properties of materials.
- Give students the opportunity to learn skills in cookery and be able to cook a range of predominantly savoury dishes.
- Develop an understanding of nutrition and health.
- Learn different techniques and skills in the kitchen.
- Understand about ingredients, their source, seasonality and the characteristics of the ingredients.
- Help to prepare students for an increasingly technical world.
- Gain awareness and understanding of the following factors
  - History of design
  - Social
  - Cultural
  - Environmental
  - Economic
- Further develop creative skills and techniques through, designing, making and evaluating.
- Prepare students to progress into apprenticeships or full-time career in creative and practical industries.
- Prepare students to progress into A Level course in product design.

Teaching Design & Technology is very different to other subjects. It focuses on so many different skills. Those who find creative subjects difficult can still excel in Design & Technology through the construction, engineering, science and mathematical elements of the subject. Those who are creative can work more with designing and

manufacturing. The course develops students to work both with function and form and our aim as a department is to help students to develop skills in both of these areas.

Year 9 – Design & Technology

Students will study each of the units of work below for a period of 9 – 10 weeks. They will then rotate to the next teacher to learn another area of technology. Students learn four subjects in Year 9 - Graphics, Resistant Materials, Textiles and Food Nutrition & Preparation.

Resistant Materials

Content of study	Spice Rack Project
What are the aims and objectives of this term?	During weeks one to ten, students revisit the skills learnt using timber and are introduced to new skills using CAD CAM. Students produce a spice rack using soft wood and manufactured board. They learn about different tools and develop skills learnt in Years 7 and 8. The theory we cover includes: • Sourcing timber • Plastics and environmental impact • Vacuum forming • Bending different materials • CAD CAM theory • Design ideas • Air pollution • Graphs and data analysis • Metals and properties • Finishing techniques
What previous knowledge is required?	Many of the skills, tools and equipment used in this project will be skills previously learnt in Years 7 and 8. Students will be learning about the environment something they will have learnt earlier in Key Stage 3 but also most with have studied this in Key Stage 1 and 2. Students will have also learnt about drawing techniques in graphics which they will be able to revisit in this project.
How will this term's content help with future learning?	The practical skills students learn in this project helps to develop their confidence when using tools and equipment. Students will learn about CAD CAM and use this in their practical lessons. This is a skill they will need for KS4 and 5.
Resources	Students who wish to develop further knowledge on the areas of study covered in Year 7 can research areas on the link below: ENGINEERING - DESIGN AND TECHNOLOGY (technologystudent.com) Below are some of the videos that we use in this unit of work: 39) Bioplastic Made from Corn - YouTube Belovac E Class Vacuum forming Deep draw bathtub out of 1/4" Acrylic – YouTube Formech explores how vacuum forming is innovating design at Pratt Institute, School of Architecture - YouTube https://www.youtube.com/watch?v=hukafUxglmE https://www.youtube.com/watch?v=fBp3_TrWhEo https://www.youtube.com/watch?v=AVdXVWSbBZ0

	Bendable Plwood .mov - YouTube https://www.youtube.com/watch?v=6eusHWufjVI Dyson purifying technology - How it works - YouTube https://www.youtube.com/watch?v=W6rrudwhoEc Finishing wood - BBC Teach https://www.youtube.com/watch?v=PwgqOb_sSFA
Links to the national curriculum/specification	• Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • use research and exploration, such as the study of different cultures, to identify and understand user needs • select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools • identify and solve their own design problems and understand how to reformulate problems given to them • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists
Assessments	Students will be assessed on the practical piece of work they complete. They will receive a formal assessment which takes place in week 2 of the rotation – this is based on the child's ability to evaluate the impact of plastics on our environment and the world in which we live. Students will receive homework every fortnight. One of these homework tasks is a piece of assessed work. Students are able to choose a Homework task from a choice of 48 different activities.

Food Preparation and Nutrition

Content of study	Food Theory and Practical Cookery
What are the aims and objectives of this term?	During weeks one to ten, students build on practical skills learnt in the previous two years. The theory we cover includes: • Different types of bacteria • Micro-organisms • Protein – function, sources, deficiency and excess • Storing food safely • Protein chemical properties • Food provenance • Energy balance, BMR and PAL • Planning a recipe • Technological advancements in food • Nutritional analysis

What previous knowledge is required?	Some students enter Key Stage 3 with prior D&T knowledge but many have little if any experience of the subject. The aim is to develop student's knowledge to bring them to a similar level by the end of this rotation.
How will this term's content help with future learning?	The practical skills students learn in this project helps to develop their confidence when using tools and equipment. The theory work involved in this unit gives the students an understanding of some of the basic skills required in the subject which will be used throughout Key Stages 3 and 4.
Resources	Students who wish to develop further knowledge on the areas of study covered in Year 9 Food can research areas on the link below. Food A Fact Of Life Below are some of the videos that we use in this unit of work. https://youtu.be/Mwe2-sTDKBw https://youtu.be/KSKPgaSGSYA https://www.youtube.com/watch?v=flxmB8NKMzE https://www.youtube.com/watch?v=WO3LdfUoTQ4 https://www.youtube.com/watch?v=3_Pp9fwLkBY
Links to the national curriculum/specification	As part of their work with food students should be taught: • How to cook and apply the principles of nutrition and healthy eating. • Food safety principles when buying, storing, preparing and cooking food. • How to store foods correctly and the importance of date marks. • The signs of food spoilage. • The factors which affect bacterial growth. • Using awareness of taste, texture and smell to decide how to season dishes and combine ingredients, adapting and using recipes. • Understand and apply the principles of nutrition and health • Cook a range of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet. • Use utensils and equipment • Apply heat in different ways • Use awareness of taste, texture and smell to decide how to season dishes and combine ingredients. • Understand the characteristics of a broad range of ingredients
Assessments	Students will be assessed on practical skills and dishes they complete. They will receive a formal assessment which takes place in week 2 of the rotation – this is based on the student's ability to identify food safety principles when buying, storing and cooking food for a barbeque. Students receive feedback on their work and are given the opportunity to improve their work and grade in week 4. Students will receive homework every fortnight. One of these homework tasks is a piece of assessed work. Students are able to choose a Homework task from a choice of 48 different activities.

Graphics Project

Content of study	Graphics Project: Swatch watch
What are the aims and objectives of this term?	During weeks one and ten, students will design a swatch watch and packaging that reflects a particular culture (Italian, Indian, African or British). Students make a model of a watch using board, add a finish using plastics, make packaging insert from Styrofoam and then packaging using CAD/CAM if laptops are available or by hand if not. They also make a former to vacuum form as a window for the packaging.

	The theory we cover includes: • Design brief and specification • Watch development • Isometric drawing • One-point perspective • CAD/CAM • Two-point perspective • Rendering two-point perspective • Printing and finishing techniques
What previous knowledge is required?	In Year 7, students worked with Styrofoam so will know how to use the hot wire cutter, coping saws, files, wet and dry paper. In Year 8, students had learnt how to use the vacuum former, this project builds on this as students make their own formers. They also learnt colour theory which will support learning in Year 9. The students learnt about nets which is developed further in Year 9.
How will this term's content help with future learning?	In Key Stage 4, students need to know about papers and board, and if they choose graphics as their specialism the practical knowledge from this project will support them when they design and make their final product for GCSE.
Resources	Students who wish to develop further knowledge on the areas of study covered in Year 9 can research areas on the link below. GRAPHICS SECTION (technologystudent.com) Below are some of the videos that we use in this unit of work. • How To Blend Colored Pencils - YouTube • https://www.youtube.com/watch?v=M7L6VrGbQvw&app=desktop • https://www.youtube.com/watch?v=5LMU-zB8Sro • https://www.youtube.com/watch?v=cKqD6WkGZdo • https://www.youtube.com/watch?v=fIz-xWOB-gY • https://www.youtube.com/watch?v=UsHRGDvN4sM&app=desktop • http://www.technologystudent.com/PDF3/printp6.pdf • http://www.technologystudent.com/pdf12/block_print1.pdf
Links to the national curriculum/specification	• Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • use research and exploration, such as the study of different cultures, to identify and understand user needs • select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools • identify and solve their own design problems and understand how to reformulate problems given to them • analyse the work of past and present professionals and others to develop and broaden their understanding • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions
Assessments	Students will be assessed on their practical piece of work.

	They will receive a formal assessment which takes place in Week 1 of the rotation – this is based on the child's ability to design ideas for their Swatch watch based on the culture given to them, to analyse each idea using ACCESS FM, and to write a conclusion summarising their findings. Students will receive homework every fortnight. One of these homework tasks is a piece of assessed work. Students are able to choose a Homework task from a choice of 48 different activities.
Textiles	
Content of study	Textiles Project: Pencil roll
What are the aims and objectives of this term?	During weeks one and ten, students will press print a design onto fabric and create a pencil roll. Students will learn how to use the sewing machine and other textiles equipment. The theory we cover includes: • Customer profile • Printing styles – theory • Understanding Fair Trade • Industrial fabric printing • Industrial manufacture • Fabrics theory – natural, man-made and smart materials • Evaluation of product against the customer profile
What previous knowledge is required?	Students have previously worked with knitted fabrics in Years 7 & 8. In Year 9, they work with woven fabrics for the first time. Students may have printed on paper in art lessons in primary school and created a repeating pattern.
How will this term's content help with future learning?	In Key Stage 4, students will need to understand how to use a variety of machinery, tools and manufacturing techniques to make their final product.
Resources	Below are some of the videos that we use in this unit of work. • https://schools.fairtrade.org.uk/teaching-resources/look-for-the-label-fairtrade-cotton/ • https://schools.fairtrade.org.uk/resource/unravelling-the-thread/ • https://www.youtube.com/watch?v=xzrubUGa23Ehttps://www.youtube.com/watch?v=xzrubUGa23E • https://www.youtube.com/watch?v=tSuJU7QF_Sk • https://www.youtube.com/watch?v=-w3ACZ0OGWU
Links to the national curriculum/specification	• Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • use research and exploration, such as the study of different cultures, to identify and understand user needs • select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties • identify and solve their own design problems and understand how to reformulate problems given to them • analyse the work of past and present professionals and others to develop and broaden their understanding

	• understand and use the properties of materials and the performance of structural elements to achieve functioning solutions
Assessments	Students will be assessed on their practical piece of work. They will receive a formal assessment which takes place in week 1 of the rotation – this is based on the child's ability to write a customer profile. Students will receive homework every fortnight. One of these homework tasks is a piece of assessed work. Students are able to choose a Homework task from a choice of 48 different activities.