

KS3 Curriculum Plan: Design and Technology

Department Vision

The DT students at Q3 Academy Great Barr will develop technical and practical competencies, as well as the skills and attitudes desired by employers. Our learners will become problem solvers who will take measured risks to reach the best possible outcomes.

Intent

The aim of the DT curriculum is to:

1. Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world.
2. Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users.
3. Critique, evaluate and test ideas and products and the work of others.

Sequence of Learning

Year 7

Pencil Holder – Why this? The pencil holder project will give you an insight into a range of material groups, acrylic and wood (pine and mdf). It is also important to cover health and safety practises in a workshop environment, along with practical skills associated with using a range of common hand tools. **Why now?** This will be the student's first experience in the workshop, so it is important that we begin with looking at health and safety. Students will be using materials and tools during this project and it is critical that this is done safely. Through this project students will learn a range of basic skills needed to allow them to be successful in future projects. It will provide them with a foundation on which they can build their knowledge.

Ugly Doll - Why this? The ugly doll project will enable students to gain an insight into sustainability in the textiles world, with thousands of tonnes of textiles going to landfill each year, it is important to understand the impact of this and to explore possible solutions. Students worked with wood and plastics in the first project and now we can introduce textiles as a new material. They will also begin to explore the process of design in this new project. **Why now?** We began to learn about the properties of new materials, wood and acrylic in the first project and now we introduce another new material; textiles. This enables students to expand their knowledge of materials and gain an understanding of their properties, construction

Building Citizens of the World

Health and Safety in the classroom- risk assessments, following rules and procedures, taking responsibility for yourself and other learners.

We consider possible career paths for students studying DT, right from the beginning of year 7. We have posters up in classrooms, so students can see the paths that they can follow.

We look at the environment and the ethics behind the use of different materials right from the start of year 7 when we discuss different types of wood and plastic. We also look in-depth at sustainability during our year 7 textiles project. Students will be taught that there is always a potential impact on individuals, society and the environment when there are developments in DT. We will also look at the ethical responsibilities that designers, engineers and technologists have.

methods and their functions. Now students have begun to develop an understanding of new materials, the next natural step is to begin to explore the process of designing using a given material.

Motion and Movement - Why this? The motion and movement project will give students the opportunity to understand how different products work and what impacts their flow of movement. Why now? During the year, students have been able to begin to develop their understanding of designing products and different material properties; for this project we want students to begin to understand how products work. Students will be introduced to CAD, which will allow them to develop an understanding of designing using computer software. Students will use CAD to design their own cam and follower; bringing together their knowledge of movement and design.

Year 8

Jitterbug - Why this? The Jitterbug project will give students their first insight into electronics and commonly used electrical circuits. This project also allows students to use new tools, equipment and machines in the workshop. (Students will have the opportunity to further develop their CAD skills and will be introduced to soldering for the first time) Why now? In preparation for future projects, your underpinning knowledge of these topics will prove invaluable and allow you to access the workshop and its equipment fully. (Students began to develop basic skills in CAD in year 7 and now they will continue to improve these skills through this project. The soldering skills are important to introduce here, so students can use this in future electronics projects).

3D Printing - Why this? This project will give students an insight into the new and emerging technology; 3D Printing. This technology is being developed and integrated within a variety of industries, such as automotive, food and medicinal manufacture all over the world. Why now? Within the Jitterbug project, students used 2D Design; this project will further develop computer aided design skills by using Onshape 3D design software.

Throughout KS3, there is focus on Tier 2 and 3 vocabulary to support students in developing strong literacy skills and understanding of subject specific terminology, as well as general vocabulary, which will support students in their ability to communicate effectively. Disciplinary reading will be included in each project to allow students to see vocabulary in context.

Jewellery - Why this? This project will introduce students to metal as a material, learning about its properties. Students will complete a product analysis, use a brief and a specification to design and make their own product. Why now? During Year 7 students completed projects, with a focus on gaining an understanding of health and safety, beginning to develop an understanding of some of the key materials used in DT and to develop skills of using some of the tools within the workshop. This project will enable students to transfer those skills into another material specialism; metals.

Year 9

Passive speaker - Why this? Designing and manufacturing a product using research and a number of iterations gives designers the best opportunity to create a successful product. Why now? Having studied a range of key concepts in Year 7 and Year 8, students will now use their skills and understanding to help them design, develop and manufacture a working prototype. All of the components of the design and make process have been covered in the earlier projects and so this is the natural conclusion; students can put it all together.

Microcontrollers - Why this? Students need to be aware of and able to use basic programming software. This technology is used in many areas of life and it is likely that some of our students will enter careers in this industry. It is important that students are able to understand how electronic systems can be powered and how they can be used to embed intelligence. During this project they will have the opportunity to use programming software to embed inputs and outputs into a circuit board and create design ideas that would contain these elements. Why now? During year 8, students gained a basic understanding of electronics throughout the Jitterbug project; now they will have the chance to gain deeper knowledge about how products can be programmed for a variety of functions.

Mini NEA - Why this?- As students come towards the end of the KS3 curriculum this project is a chance to bring together all of the knowledge and skills they have acquired into one project. Why now?- Students will have covered all areas of the KS3 National Curriculum and be equipped with the knowledge and skills to enable them to complete an NEA style project in full. It will be an opportunity to take ownership of a project, create and develop ideas that ultimately ends with a final prototype/model that can be evaluated.

Implementation:

When studying DT at Q3 Academy, students will undertake a variety of creative and practical activities, in order to develop their knowledge, understanding and the skills needed to engage in an iterative process of designing and making. Over time, students will develop greater competence in following the design, make and evaluate process in domestic, local and industrial contexts.

Inclusion

All lessons will be differentiated appropriately to suit the individual learner's needs.

Extra challenges and learning opportunities are available throughout each area of study.

LSA and LSPs will be directed appropriately by the members of staff.

When discussing designers and looking at businesses and products, the staff delivering the curriculum ensure that there is as much diversity as possible in examples given and discussed.

KS3 Curriculum Plan: Food Technology

Department Vision

To equip learners with theoretical knowledge about the industry as well as enabling them to develop practical skills in planning, preparing and cooking a variety of dishes. As a department we want students to be enthusiastic about food and cooking, to build on their practical skills and work in a team to increase confidence when cooking.

Intent

For students to understand;

1. How to plan, prepare, cook and store dishes safely, with an understanding of what may happen if not done correctly.
2. How to eat a healthy diet and the nutrition involved and what may happen if too much or too little is eaten of a particular nutrient.
3. The functional and chemical properties within food to gain a deeper understanding of how and why they react when they are cooked.
4. The factors that affect food choice such as dietary needs and seasonality.

Sequence of Learning

Health and Safety Why this? Health and Safety is a vital part of cooking, it is important that you are aware of the risks involved when completing practical's and how the industry follows food safety rules and regulations to ensure that food is safe to eat. Why now? Before completing food practical's, it is essential that you have gained a good understanding of the risks involved in the environment you are working in, this will enable you to develop skills safely and understand industrial practises.

Nutrition Why this? The government guidelines suggest that to have a balanced diet we should follow the Eatwell Guide, which is made up of five different sections; carbohydrates, protein, fruit and vegetables, dairy and fat. Why now? This topic develops your understanding of nutrition, it is important so that you are aware of the foods that provide you with particular nutrients, this will aid your understanding when making informed choices of ingredients in your practical's.

Food Science Why this? Through practical application and theory work you will be able to understand the function and chemical properties of ingredients, discovering why ingredients work in different ways and how they react with others. Why now? During the nutrition element of the course, you will have learnt about what different foods do for our bodies, this topic will enable you to understand how those ingredients work. For example; when eggs are cooked they coagulate which means they can thicken recipes.

Building Citizens of the World

Links to health and safety which can be used throughout life.

Social skills due to group work and communicating with others including staff.

Understanding of nutrition and where food comes from – seasonality.

<p>Food Choice Why this? Food choice refers to how people decide on what to buy and eat. A complex set of factors that vary from person to person and depend on culture, heritage and up-bringing and dietary needs all influence food choice. Why now? The knowledge gained through previous units gave you an understanding of ensuring food is safe to eat, understanding nutrients and how they work, enables you to gain a deeper understanding of why people eat the food they do; for example, if someone is coeliac they would not choose foods with gluten e.g. bread as this would make them poorly.</p>	
<p>Implementation:</p>	
<ul style="list-style-type: none"> • understand and apply the principles of nutrition and health • cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet • become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes] • understand the source, seasonality and characteristics of a broad range of ingredients 	
<p>Inclusion</p>	
<p>All lessons will be differentiated appropriately to suit the individual learner's needs. Extra challenges and learning opportunities are available throughout each area of study. LSA and LSPs will be directed appropriately by the members of staff. Letter sent out to parents at the beginning of the year with a list of recipes so they can plan ahead (buy sugar in bulk, etc.) Recipes scaled down so they cost less. Ingredients provided for students who need them using Pupil Premium funding.</p>	

KS4 Curriculum Plan: Design and Technology**Department Vision**

Through creativity and imagination students will become confident independent learners that are willing to take risks to solve problems and nurture practical and technical skills that are valued by employers.

Intent

The aim of the DT curriculum is to:

- Develop the creative, technical and practical expertise needed to problem solve and perform everyday tasks confidently and participate successfully in an increasingly technological world.
- Build and develop underpinning knowledge of the key principles of design in order to generate innovative design ideas and manufacture high quality prototypes based on the needs of the user.
- Enable students to recognise the increasing impact and responsibility designers and manufacturers have on society, sustainability and the environment.

Implementation:

Having already completed a range of projects at KS3 that cover the national curriculum students will build on that underpinning knowledge to deepen their understanding of key concepts surrounding the design and manufacture. This will include more extensive studies into the theory behind the design as well as building on the practical skills required to engage successfully in the iterative design process of designing, developing, testing and evaluating.

Students will study the work of other designers, past and present and analyse their work as inspiration for their own designs. They will also explore the work of famous design companies and develop an understanding of their design ethos, process and manufacturing principles.

Inclusion

All tasks, techniques and processes are differentiated and tailored to individual needs and groups of learners. SEND and PP students are identified on all seating charts and extra assistance is given here. Individual tutorials, group discussions and peers working are used to offer support. Teachers work closely with LSAs to work with individual students to help with their individual needs.