

# Product Design at Norbury High

We believe every student deserves a curriculum which prepares them for the world in which they live. Product design gives all our students an opportunity to succeed through developing specific skills and abilities that will enable them to engage positively with the designed-and-made world. They learn how products and systems are designed and manufactured and how a variety of resources including traditional and digital technologies (computer-aided design/computer-aided manufacturing [CAD/CAM]) can be used creatively to improve the world around them.

The department is enthusiastic about providing opportunities which allow students to develop their knowledge of the subject. Students grow in confidence through a dedicated teaching environment, use of specialist manufacturing tools, equipment and teaching. Creativity and imagination are at the heart of our practice but product design is not just about creativity; it is a subject which draws on, develops and implements a range of different disciplines including mathematics, science, computing, engineering, geography and art. Literacy is at the core of product design and this is embedded and implemented through analysis and evaluation.

## Key Stage 3

### Year 7

Students get an opportunity to experience three main specialisms within design and technology: engineering, product design and electronics. The programme of study allows students to engage in an iterative design process, making use of a variety of materials, technology and techniques. It develops students' problem-solving skills as they learn to work independently or as part of a team to design and make a product.

### **Engineering: Bridge Project**

Students are introduced to the importance of bridge structures which are useful for connecting people to resources, places, and other people. Bridge construction often involves unique challenges that require creative engineering approaches. This project makes use of historic and contemporary examples and includes learning about different types of construction such as arch, beam, truss and suspension bridges. Students explore the effects of tensile and compressive forces and investigate the calculations necessary for bridge design; they learn about loads and cross-sectional areas through designing and testing their own creations. Students apply this knowledge when

constructing their own bridges. The project allows students to work collaboratively which develops their team building skills.

### **Product Design: Bird Project**

As students' progress through the year, they are given opportunities for deeper study of the world in which they live. Using skills developed in the bridge project, students are able to take more risks en route to becoming resourceful, innovative, enterprising and capable citizens.

Students learn about the work of the [Royal Society for the Protection of Birds \(RSPB\)](#), a wildlife conservation organisation, and the work it does in the wider world to protect tropical birds. They design and make their own mechanical bird using two distinct types of wood.

This project allows students to design and create a product that solves real and relevant problems within a variety of contexts; they consider their own problems alongside those of specific clients (in this case, the RSPB) and target market groups. Students have the opportunity to work with wood and develop basic practical skills.

### **Electronics: Torch Key Ring**

Students are introduced to a variety of electrical components and look at how these work together to create a circuit to power a torch key ring. They develop technical drawing skills and create prototypes using CAD and CAM.

This project allows students to tackle a design-and-make assignment linked to real life problems they can all relate to. The daily use of these key rings can act as a reminder of students' achievements within product design as well as reinforcing what has been learned.

## **Year 8**

In year 8, product design builds on students' learning from year 7, focusing on motions, cams, CAD and CAM.

In this unit, students design and build a cam-operated toy with motions and scenery based around a West End theatre theme. They revisit writing a design brief and specification - vital parts of the design process. They build on their knowledge of wood categories, learning in more depth about softwoods and joinery techniques including

finger joints. Students will choose motions that express physical or abstract concepts. They will design and build a working cam toy that expresses these concepts as a representative model or metaphor. The addition of motion, as in the cam toy activity, can make the project even more engaging and lead to a creative and entertaining product. Students practise higher order thinking skills when engaging with this project.

## **Year 9 - Product Design**

Students will draw upon their prior knowledge of electronics in year 7, while developing a deeper understanding of electrical components and how they connect to a circuit board to power a product. Through the design process pupils develop their creativity, thinking skills, practical abilities and a sense of pride in their own work.

Students design and make their own USB lantern inspired by cultural patterns; in doing so they draw upon cross-curricular links to science (circuitry), geography (researching the origins of a cultural pattern from a chosen country) and history (the historical meaning and significance of cultural patterns). Students learn about electronic components and circuits, exploring circuit designs and learning how to solder a USB cable to a circuit board.

Using culture as the theme allows the students to learn about and discuss cultures other than their own. They learn about the wider world and the beautiful differences which exist within the communities of which they are a part.