



## Curriculum Intent

The focus of Design and Technology is to enable students to approach ideas in both a literal and lateral manner, providing them with the skills to effectively communicate ideas, designs and processes in a professional manner to industry standard. Students will use their knowledge of Maths and Science and apply it to their work to create both their own designs as well as a commercially viable product. Students will be introduced to a varied diet of tools and machinery that is commonplace in the design industry, developing skills which will eventually allow them to complete GCSE projects.

## Autumn Term | Design and Technology | Plastic Theory

### Students will learn:-

An overview of the main categories and types of polymers:

#### thermoforming including:

- acrylic (PMMA)
- high impact polystyrene (HIPS)
- high density polythene (HDPE)
- polypropylene (PP)
- polyvinyl chloride (PVC)
- polyethylene terephthalate (PET)

#### thermosetting including:

- epoxy resin (ER)
- melamine-formaldehyde (MF)
- phenol formaldehyde (PF)
- polyester resin (PR)
- urea-formaldehyde (UF).

### What does excellence look like?

Explain in detail the working properties of different plastics and apply them successfully to products.

- Students can identify sustainable products and/or alter plastic products to make them sustainable.
- Students can identify the manufacturing process of a product.
- Students can apply their knowledge to correctly apply their knowledge of Plastics and Manufacturing methods to their origami animals.

### How will we assess impact?

- Recapping knowledge with plenary and starter activities
- End of unit testing
- Peer and self-assessment
- Written evaluation of project work

## Knowledge, understanding & Skills

### Know

- Recap on using the workshop in a safe manner. Workshop rules and guidelines.
  - Students learn the origin of plastic.
  - Processing methods and refinery to create plastic
  - Students learn the differences structures and properties of plastic
- Properties  
Thermoplastic/ Thermosetting plastic  
Characteristics when heated.  
Life cycle  
Visual appearance  
Applications to products

An understanding of manufacturing and shaping processes.

6 Rs - what is sustainability, why is it important, how can the 6 Rs help us become more sustainable?

Sustainable forests -The great pacific garbage patch.

### Apply

- Apply knowledge of plastics to be able to identify different types of plastics from their properties or their final uses.
- Explain the basic properties of Thermoplastics and thermosetting plastics
- Interpret information provided to decide on the suitability/ potential to be sustainable.

### How is homework used to enhance learning?

Students work from a booklet that includes quiz's, activities, exemplars. Students are provided graded exemplars for most activities.

Students are provided assessment criteria's for assessment activities in booklets.

H/W – further research (developing research and extended writing skills) on the great pacific garbage patch

## Spring Term | Design and Technology | Drawing Skills

### Students will learn:-

Develop, communicate, record and justify design ideas using a range of appropriate techniques such as:

freehand sketching, isometric and perspective

2D and 3D drawings

system and schematic diagrams

annotated drawings that explain detailed development or the conceptual stages of designing

Computer based tools

### What does excellence look like?

- Clean straight lines when drawing
- Good contrast between light and dark when shading.
- Rendering and colour is within the assigned areas.
- Can draw medium to complex isometric shapes using the isometric grid.
- Can draw complex shapes in a variety of methods.
- Students can communicate their design ideas effectively.
- Student to draw a net of their design using CAD methods

## Knowledge, understanding & Skills

### Know

- Students will understand how to:

- Confident lines/ mark making
- Smooth shading
- Cross sectional shading
- Tone
- Shade
- Faint lines for construction
- Thick and thin line techniques
- Render to suggest textures and materials.
- Can add colour to emphasis shape.
- Can add colour to make the shape stand out.
- Isometric drawing
- Oblique drawing
- CAD software – 2D design
- Learning 3D software to represent ideas – Google sketchup.
- 1-point perspective
- 2 point perspective
- AMA - crating

### Apply

- To apply drawing subject knowledge to successfully design origami animal in a drawing method of their choice.
- To apply shading and colour to help communicate design ideas.



### How is homework used to enhance learning?

- Students are provided with exemplar.
- Isometric grids
- H/W to design and create origami animals for a selected target market – Assessed on drawing skills and creativity.

### How will we assess impact?

- Drawing assessment takes place twice a year  
\*New assessment booklets to start 2019-20
- Peer assessment
- H/W drawing of block bots are assessed.

## Summer Term | Design and Technology | Making and Evaluation

Students will learn:-

### Prototype development

Students should know and understand how to evaluate prototypes and be able to:

- reflect critically, responding to feedback when evaluating their own prototypes
- suggest modifications to improve them through inception and manufacture
- assess if prototypes are fit for purpose.

Tolerances Work accurately using tolerances.

- How a range of materials are cut, shaped and formed to designated tolerances.
- Why tolerances are applied during making activities.

### Specialist tools and equipment

- How to select and use specialist tools and equipment, including hand tools, machinery, digital design and manufacture, appropriate for the material and/or task to complete quality outcomes.
- How to use them safely to protect themselves and others from harm.

### Selecting finishes and treatments

- Students should know and understand that surface treatments and finishes are applied for functional and aesthetic purposes.
- How to prepare a material for a treatment or finish.
- How to apply an appropriate surface treatment or finish.
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## Knowledge, understanding & Skills

### Know

- Students will understand how to use:

- Tenon Saw
  - Coping Saw
  - Sand paper – Different grades
  - Disc Sander
  - Electric Sander
  - Pillar Drill
  - Electric cordless drill
  - Line bender / strip heater
  - Wet and dry sand paper
  - Araldite
  - Scroll saw
  - Vice
  - Laser cutter
- How to finish and polish Acrylic
- How to successfully glue Acrylic.

### Apply

- To apply an objective analysis of their work in order to improve the overall quality.
- Being able to analyse and evaluate work objectively.
- To apply shading and colour to help communicate design ideas.
- To be able to create a design using 2D software.

## What does excellence look like?

### Skills

- To be able to cut accurate straight lines.
- Can use a coping saw to create smooth curves.
- Can use a scroll saw to create both straight and curved lines.
- Transfer imagery from CAD software to CAM machinery
- Control the depth of drilled holes.
- Able drill holes in the right place.
- Able to cut out their designs using the laser cutter with assistance.
- Highly smooth finish from sanding.
- Using Wet and dry sand paper to smooth and polish plastic.
- Create a fully finished product.
- Detailed objective analysis of prototype\_with the ability to modify manufacturing processes to improve.

## How is homework used to enhance learning?

- Students are guided through how to use equipment.
- Students are made aware of safety concerns and how to remain safe at all times.
- Students are directed to [www.DTStudent.com](http://www.DTStudent.com)
- To watch how to guides to further develop their understanding at home.

## How will we assess impact? (3D)

### Assessment

- Product is assessed once completed.
- Peer assessment throughout.

## International Opportunities

### Visits Programmes

Tour of Milan centre – Galleria, Fashion District, Teatro alla Scala etc.  
Blanes - Park Güell – architecture, where Gaudí turned his hand to landscape gardening.

### Within the curriculum

Term1: Introduce students to plastics and the impact of this on the environment. Look at habitats and oceans around the world and the detrimental changes happening because of plastic usage.

Term 2: Students given a selection of international designers and movements to explore and research, De Stijl, Gaudi, Bauhaus etc.

Term 3: Watch videos of architects from around the world e.g. Zaha Hadid and the work they create.