Whittington Green School – Design and Technology (Resistant Materials)

Dream Reach Achieve

CURRICULUM INTENT: The Whittington Green Design and Technology department aims to provide a high quality education which develops lifelong learners who demonstrate a curiosity, creativity and the skills and knowledge required to understand the role of design and technology in industry and in everyday lives. Pupils are given the skills and knowledge to design and make products that solve real and relevant problems within a variety of contexts, considering the needs of potential clients, wants and values. Pupils learn how to take creative risks, becoming

Purpose of study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

The national curriculum for design and technology aims to ensure that all pupils:

♣ develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world

♣ build and apply a repertoire of knowledge, understanding and skills to design and make high-quality prototypes and products for a wide range of users

♣ critique, evaluate and test their ideas and products and the work of others

♣ understand and apply the principles of nutrition and learn how to cook.

Subject Content

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of domestic and local contexts [for example, the home, health, leisure and culture], and industrial contexts [for example, engineering, manufacturing, construction, food, energy, agriculture (including horticulture) and fashion].

Attainment targets

By the end of key stage 3, pupils are expected to know, apply and understand the matters, skills and processes specified in the programme of study.

Design

Through the content across all three disciplines, pupils should be taught:

- use research and exploration, such as the study of different cultures, to identify and understand user needs
- identify and solve their own design problems and understand how to reformulate problems given to them
- develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses
- develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools

Make

Pupils should be taught to:

- select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture
- select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties

Evaluate

Pupils should be taught to:

- analyse the work of past and present professionals and others to develop and broaden their understanding
- investigate new and emerging technologies
- 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

Technical Knowledge

Pupils should be taught to:

- understand and use the properties of materials and the performance of structural elements to achieve functioning solutions
- understand how more advanced mechanical systems used in their products enable changes in movement and force
- understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]
- apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].

Year 7	
By the end of key stage 3, pupils are expected to know, apply and understand the matters, skills and processes specified in the programme of study. **Design** Pupils should be taught to: • identify and solve their own design problems and understand how to reformulate problems given to them Make Pupils should be taught to: • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture.	Evaluate Pupils should be taught to: • investigate new and emerging technologies • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups Technical Knowledge Pupils should be taught about: • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions
Cultural capital	Careers links will be covered to give context to all lessons that are delivered. Wider curriculum opportunities will be taken where appropriate to broaden student experiences i.e. trips etc.
Adaptations for SEND	A broad and relevant curriculum will be taught to all students in design and technology, this will be appropriately scaffolded by LSA's and teachers to ensure every student can access the curriculum.

Term/Unit	Topic Overview / Content	Learning Expectation / Concepts and Skills	Recall and review of past learning	National Curriculum target	Key Vocab / Concepts
Health and safety	Form understanding of the routines and rules of the workshop in terms of Health and Safety and behaviour.	• Understand the reasons for wearing various items of PPE in various scenarios. • Understanding how to operate hand tools safely and in accordance with the workshop rules. • Understand how to use machine tools in the workshop in a safe manner to both the user and others in the workshop.	Recall previous knowledge from primary schools in regards to Health and Safety and using PPE, Hand tools and Machine tools.	• select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture.	Safety Apron Goggles Space Hazzard
Marking out tools and equipment	Form understanding of marking and measuring equipment and identify the tools demonstrated and used. Observe how to use marking out and measuring equipment and practice using themselves with accuracy.	• Identify a steel ruler and be able to state why it is used instead of the standard variety plastic ruler. • Be able to read measurements correctly on the ruler. (0 starting right at the end of the ruler rather than a little bit inwards) • Understand the use of a Try-square and be able to use it to mark a right angle.	Recalling the importance of using marking out equipment accurately from health and safety unit.	• select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture.	Equipment Accuracy Measurement marking
Cutting and shaping with accuracy	Form understanding of cutting and shaping equipment and identify the tools demonstrated and used.	• Identify a Tennon saw and be able to state that it is used for cutting straight lines in wood. • Demonstrate the use the Tenon saw safely with some accuracy • Identify a coping saw and be able to state that it is used for cutting curved lines in wood.	Recall the use of behaving safely in the workshop including following all safety rules and procedures. From the health and safety and marking out units.	• select from and use specialist tools, techniques, processes, equipment and machinery precisely, including	Saw Safety Accuracy Quality Surface

	Observe how to use cutting out and shaping equipment and practice using themselves with accuracy.	• Demonstrate the use the Coping saw safely with some accuracy • Identify a Pillar drill and be able to state that it is used for making a chosen size hole in wood. • Demonstrate the use the Pillar Drill safely with some accuracy • Identify a disk sander and be able to state that it is used for shaping and smoothening down timbers • Demonstrate the use the Disk sander safely with some accuracy • Identify a disk sander and be able to state that it is used for shaping and smoothening down timbers • Demonstrate the use the Mitre Saw safely with accuracy • identify a Mitre Saw and be able to state that it is used for cutting timbers at given angle • Identify a Bench hook and be able to state that it is used for supporting material that is being cut at a right angle. • Demonstrate the use the Bench hook safely		computer-aided manufacture.	
Evaluating	Understanding how to Critically evaluate their own work effectively	• Describe how the work they have produced works well and how it could be improved. • Critically evaluate their work on their progress from one project to the other in terms of safety and accuracy.	Recall all manufacturing techniques covered in previous units.	• test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups	• Evaluate • Reflect • Improve • Assess • Client Critique

Technical Knowledge	Form an understanding of key topics to embed technical knowledge	• Understand the term Sustainability and its role in the Design industry • Understand methods of harnessing power (renewable energy/non renewable energy) • Understand the three categories of timber and the differences between them • Understand new and emerging technology such as CAD/CAM	Using Masters of recall as homework will allow students to recall technical knowledge throughout the year.	• understand and use the properties of materials and the performance of structural elements to achieve functioning solutions	• Fair trade • Crowd funding • Technology push • Market Pull • CAD/CAM • Design for Maintenance • Design for disassembly • Planned obsolescence • Hardwood • Softwood • Manufactured • Solar • Wind • Tidal • Hydroelectric