Design & Technology in the OCL Primary Curriculum

Intent

The OCL Curriculum Statement of Intent has been carefully considered for each curriculum area to ensure the content designed meets this at every opportunity.

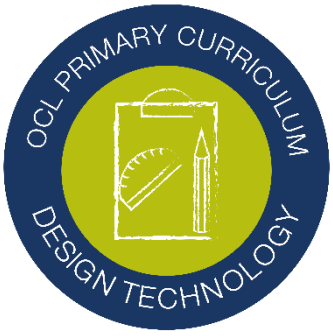
The context that our children and young people live in:

- Our children live in a world where they require the skills and qualifications, flexibility, emotional intelligence and expertise to be leaders and to thrive as human beings.
- Our children live in world where accepting themselves as individuals and celebrating who they are is key in navigating a complex and ever-changing environment.
- Our children live in a world where they need to feel a sense of ability to change things for the better and have self efficacy.
- Our children live in a world where they need a network of relationships and a network of support to thrive and excel.
- Our children live in a world where early development of vocabulary skills is the single most important factor to get right as early as possible.

We want our children and young people to:

- Be inspired to improve the world around them.
- Have the ambition, skills and expertise to thrive in a fast changing, interconnected and communication rich world, with the confidence and technical expertise to thrive.
- Have a network that supports them.
- Be comfortable in who they are and able to continuously explore who they are becoming.
- Be rich in language with a passion for learning.
- Seek to include others, be other-centred and celebrate difference.
- Have a values approach to life and a sense of what is right and wrong through the lived experience of the 9 habits.

Therefore, we focus on developing character, competence and community. The Design &Technology curriculum specifically meets the OCL statement of intent by focussing on character, competence and community in the following areas:

	**Character:** To be self-confident, motivated problem solvers inspired by engineers, designers, chefs and architects with the drive to change our world and perspectives
	Competence: D&T develops critical thinking and problem-solving skills that are applied to real life contexts. We strive to empower our pupils to become competent problem solvers able to use the language, technical knowledge and understanding of the processes of design to solve real life problems
	Community: Design Technology is all around us. The skills developed will enable our pupils to play an active part in the world giving insight into the worlds of textiles, electronics, mechanics, structures, food production and design whilst understanding how key events and individual have helped to shape our global world

Implementation

To ensure our intent transfers into everyday classroom practice, we use current research in cognitive science to develop pedagogy and specific CPD to ensure subject content is expertly delivered. This is alongside individualised coaching in constantly striving to continually improve practice. Responsive feedback approaches, delivered through out highly effective one-to-one horizons approach, ensure each adult knows the relevant next steps to maximise learning opportunities.

Using research from Dan Williamson's Models of Memory, Sweller's Cognitive Load Theory, Rosenshine's Principles of Instruction and the thinking behind Ebbinghaus' Forgetting Curve, the curriculum is implemented effectively through a set of core concepts, developed for each curriculum area. This enables children to assimilate new information into growing schema as they move through the academy. By presenting new information to students as another example of these core concepts it allows them to process information in relation to previously learned knowledge and make connections.

The core concepts for Design &Technology:

Core Concepts in Design &Technology				
Designing Understanding core concepts and purposes, generating, developing, modelling and communicating ideas	**Making** Planning, practical skills and techniques	**Evaluating** Own ideas and products, existing products, key events and individuals (KS2)	**Technical Knowledge** Making products work	**Cooking and nutrition** Where food comes from, food preparation, cooking and nutrition

The curriculum is mapped using these core concepts. We plan for progression using the key points outlined in the impact section below. Lesson content is planned towards these progression points and follows the model of direct instruction, shared and modelled practice before culminating in independent practice and mastery. Specific knowledge is acquired through the knowledge organisers in each curriculum area and unit of study to ensure broad and balanced coverage and as a tool for children to add to, revise and structure that knowledge.

Subject Delivery

Lesson Timings	Type of delivery
Design &Technology is taught through the Thematic curriculum with varying hours per week depending on the thematic focus. In additional to this, coverage also comes in the Art and Design fortnightly skill sessions (See Art and Design Statement). There is a strong focus during the STEAM theme where children develop and extend their design planning skills.	Thematic – D&T is woven into the fabric of the themed weeks allowing pupils to demonstrate their knowledge and understanding by enabling extended design projects resulting in a final product. Discrete – teaching the skills of designing, product evaluation and background knowledge across all areas in predominantly blocked units giving pupils dedicated the time to research, develop and evaluate their projects.

Annual Organisation per year group

Thematic Teaching

Term	Theme	Subject Focus	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	Who am I and who am I becoming?	Portraiture	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview
Autumn 2	Citizenship and the World	My role in protecting the planet	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview
Spring 1	Heritage and culture	Community quilts textiles product	DT - Textiles product	DT - Textiles product	DT - Textiles product	DT - Textiles product	DT - Textiles product	DT - Textiles product
Spring 2	STEAM	Mechanisms and structures	DT – Mechanics & Structures	DT – Mechanics & Structures	DT – Mechanics & Structures	DT – Mechanics & Structures	DT – Mechanics & Structures	DT – Mechanics & Structures
Summer 1	Community	Local artist and food in the community	DT – Food Focus	DT – Food Focus	DT – Food Focus	DT – Food Focus	DT – Food Focus	DT – Food Focus
Summer 2	Performance		Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview	Art Focus- See Art overview

Impact

The ultimate test of the impact of the curriculum is in whether the students know what you want them to know, and what you think they should know. This has been carefully mapped against the core concepts for Design &Technology in the tables on the following pages.

To determine this, we check and monitor children's learning, providing teachers and students with information about progress and analysis of deliberate retrieval practice. We need to be able to fluidly use 'checking for understanding' techniques in the moment as well as being able to know what has been learnt and retained over time and the depth of that learning:

- We use checking for understanding techniques through Socrative quizzes and hinge questions to ensure we are aware of all students learning during the lesson and adapt the pace as necessary.
- Retrieval practice is built in where most impactful to interrupt the forgetting curve and secure constructs in long term memory.
- Depth of knowledge is then assessed through spaced quizzing, end of unit assessment quizzes and Student Portfolios in Showbie.

Design &Technology Specific Impact Measures

In Design &Technology quizzing is used as a method of assessing pupils understanding at the end of a core concept to analyse the extent to which knowledge has been consolidated into long-term memory. Retrieval practice tasks throughout the lessons also interrupt the forgetting curve to enable faster access to prior learning. Pop tasks at the end of the themes pull together the learning for the subject under the core concept areas to consolidate learning and to prepare children to make links to the future learning in subsequent years.

Progression Points against the Core Concepts

Core Concepts	Progression Point 1 (Y1)	Progression Point 1 (Y2)	Progression Point 1 (Y3)	Progression Point 1 (Y4)	Progression Point 1 (Y5)	Progression Point 1 (Y6)
Designing	• Use knowledge of existing products to support plans for a similar product. • Describe, explore and investigate products that have been disassembled. • Use construction kits, pictures, templates, mock ups and captions to plan and design. • Talk about and describe the tools and materials needed in order complete the key tasks within a plan.	• Use knowledge of a range of products to inform plans and designs. • Talk about and disassemble products and describe their function. • Use simple prototypes, labelled sketches and detailed instructions in plans and designs. • Talk in depth about ideas, plans and reasons for choices.	• Use research to develop design criteria that are fit for purpose. • Disassemble products and describe in detail their functions. • Use annotated sketches, cross-sectional, exploded diagrams and increasingly complex prototypes. • Support discussions about ideas, plans and designs with relevant information.	• Generate plans and designs based on research and ideas that take account of the users' views and the intended purpose. • Produce detailed designs and plans using prototypes, commentary and diagrams that include accurate measurements. • Link discussions about ideas, plans and designs to the investigation, disassembly and evaluation of a range of products describing in detail their parts and their function.	• Clarify and justify plans, designs and ideas by drawing upon and using a range of relevant sources of information. • Produce detailed designs and plans drawn to scale from a range of viewpoints, using pattern pieces and computer-aided design packages effectively. • Discuss ways in which ideas, plans and designs are formed and modify to ensure that the design criteria are met effectively.	• Use research and exploration, such as the study of different cultures, to identify and understand user needs. • Develop and communicate ideas using annotated sketches, detailed plans, 3D and mathematical modelling, oral and digital presentations and computer based tools. • Use a variety of approaches, e.g. biomimicry and user-centred design to generate creative ideas and avoid stereotypical responses.

Making	• Explore and talk about the characteristics of an increasing range of materials. • Select and use simple tools to cut and join a range of materials. • Use a straight edge to mark lines for cutting. • Join edge to edge using glue. • Curl paper. • Use a hole punch and stapler. • Select from a range a finish to improve the appearance of a product. • Follow procedures for safety and hygiene.	• Select materials and components according to known characteristics and functions. • Select and use an increasing range of tools to cut, shape and join materials and components. • Use a ruler to measure and mark lines for cutting. • Make and use gluing tabs. • Make simple paper models, mock-ups and templates. • Select an appropriate way to improve the appearance of a product. • Follow procedures for safety and hygiene.	• Select from and use a wide range of materials and components according to both functional and aesthetic qualities. • Select and use tools and equipment to measure, mark out and shape materials and components. • Use a hack saw and bench hook safely. • Insert paper fasteners for card linkages. • Make increasingly complex paper models, mock-ups and templates. • Select the most effective finish to enhance the appearance of a product. • Follow procedures for safety and hygiene.	• Select a range of appropriate tools to cut, shape and join materials and components effectively. • Select and use tools and equipment to measure, mark out and shape materials and components accurately. • Use a G clamp effectively. • Join and combine materials and components in permanent and temporary ways. • Make a range of complex paper models, mock-ups and templates. • Produce a well-finished product that fulfils the functional and aesthetic design criteria. • Follow procedures for safety and hygiene.	• Select a range of appropriate tools to cut, shape and join materials and components with accuracy and precision. • Use an increasing range of tools and equipment to measure, mark out and shape materials and components accurately. • Use a drill to make an off-centre hole. • Join and combine a range of materials and components using the most effective permanent and temporary way. • Make and adapt where necessary complex mock-ups and templates. • Identify and apply an appropriate finishing technique to ensure a high-quality end product which meeting the design criteria. • Follow procedures for safety and hygiene.	• Select from and use a wider, more complex range of materials, components and ingredients, taking account of their properties. • Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer aided manufacture. • Use a broad range of manufacturing techniques including handcrafted skills and machinery to manufacture products precisely. • Produce ordered sequences and schedules for manufacturing products, detailing resources required. • Produce costings using spreadsheets for products they design and make. • Exploit the use of CAD/CAM equipment to manufacture products, increasing standards of quality, scale of production and precision. • Follow procedures for safety and hygiene and understand the process of risk assessment.
Evaluating	• Talk about and describe key features of a range of products. • Explore and evaluate a range of existing products. • Begin to evaluate the success of the product in terms of function and aesthetic criteria.	• Investigate and compare a range of similar existing products. • Compare and contrast the similarities and differences of products with the same function. • Evaluate ideas and products against design criteria; and suggest ways in which products can be improved.	• Investigate and begin to analyse a range of existing products. • Use knowledge of similarities and differences between products with the same function to support identification of most effective product. • Evaluate ideas and products against own design criteria, taking into account the views of others.	• Investigate and use analysis of existing products to inform own work. • Identify from a range the key features and functions needed to create an effective and efficient working product. • Give reasons, supported by factual evidence for the success of aspects of a product.	• Use analysis of existing products supported by accurate factual information to inform own work. • Test and evaluate products to identify the variants which may affect the function of a product. • Give reasons, supported by factual evidence for the success of aspects of a product and provide considered solutions to resolve those parts that could be improved.	• Understand developments in D&T, its impact on individuals, society and the environment. • Test, evaluate and refine ideas and products against a specification, taking into account the views of intended users. • Analyse the work of past and present professionals and others to develop and broaden understanding. • Investigate new and emerging technologies.

Technical Knowledge: Axles, Pulleys and Gears	• Deconstruct and reconstruct boxes accurately. • Attach wheels to a chassis using an axle, e.g. cotton reels and dowel. • Use pencils or tubes as rollers to move an object across the floor.	• Construct cubes of different sizes from a net. • With support attach a fixed axle to a chassis and add wheels ensuring that they can move freely. • Construct a simple pulley using rope over a horizontal bar to raise an object off the ground. • Use construction kits with gears to construct a line of gears that turn.	• Construct cuboids of different sizes from a net. • Attach a fixed axle to a chassis and add wheels ensuring that they can move freely. • Construct a pulley that allows a load to travel horizontally along a rope. • Use construction kits with gears to mesh gears at right angles.	• Describe in detail the way in which an axle and chassis help a vehicle to move. • Use a range of different ways to attach an axle to a chassis, e.g. card triangles, drilled holes, cable clips and clothes pegs. • Identify, describe and evaluate products that contain pulleys and drive belts. • Create pulleys and drive systems that can be driven by motor and computer.	• Design and build a working model where the direction of movement can be controlled, e.g. with a chassis with a pivoting axle. • Explain how a belt and pulley system can be used to reverse the direction of rotation and alter the plane of rotation by 90 degrees. • Explain how the number of teeth of a gear affects the speed of rotation.	• Understand and use the properties of materials and the performance of structural elements to achieve functioning solutions. • Understand how more advance mechanical systems used in their product enable.
Technical Knowledge: Electrical and Mechanical Components	• Use remote controlled devices, e.g. a remote controlled vehicle, Bee bot etc • Talk about how common electrical equipment works, e.g., kettle, telephone, and microwave. • Talk how equipment can be used safely. • Create a simple circuit using a battery, bulb and wires.	• Describe how a simple battery powered circuit can be controlled by different kinds of switches. • Talk about simple electrical safety. • Create simple circuits incorporating a battery, bulb, switch, buzzer and wires.	• Explore and describe how an electric motor can be used in a circuit. • Identify key features of electrical safety. Use a remote-controlled device to switch lights on and off.(including computer control packages)	• Explore and describe how electrical circuits can be created and controlled. • Discuss in depth the hazards and safety issues associated with electricity. • Explore and explain how the direction and speed of an electrical motor can be controlled. • Explore and program a simple control device. •	• Explore and describe how switches can be used in a range of circuits to control components, e.g. lights in a lighthouse, a movement sensor in a burglar alarm. • Apply appropriate safety measures when constructing circuits. • Explore and discuss ways in which electricity can be used to control movement. • Explore and use an increasing range of complex control system, e.g., a light sensor.	• Use computer-based systems to control an increasing range of components. • Apply computing and use of electronics to embed intelligence in products that respond to inputs. • Control outputs such as actuators and motors. • Make use of sensors to detect heat, light, sound and movement.
Technical Knowledge: Mechanics	• Deconstruct a simple slider and describe how it works. • Construct a simple slider independently. • Make a lever by joining card strips with paper fasteners.	• Deconstruct a range of sliders and describe how they work. • Construct increasing complex sliders. Join levers to make linkages to create moving parts. • Construct a simple pneumatic system with one moving part.	• Deconstruct and reconstruct a range of sliders and levers. • Vary the position of the pivot point to lift a load using a lever. • Construct a pneumatic with two moving parts. Identify the cam within a simple mechanism and explain how movement is changed.	• Create a range of sliders and levers to produce horizontal and vertical movement. • Combine sliders and levers to produce a range of movements. • Generate questions to investigate and compare the efficiency of pneumatic systems. • Describe the way in which a cam changes rotary motion into linear motion.	• Use a range of technical vocabulary to describe the properties and functions of mechanisms. • Choose and use a range of sliders and levers accurately to create a range of effects. • Analyse and evaluate the efficiency of pneumatic systems. • Discuss the relationship between a cam and follower, an off-centre cam, a peg cam, a pear-shaped cam and a snail cam.	• Make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines. • Construct and use compound gear trains to drive mechanical systems from a high revving motor.

Technical Knowledge: Structures	• Construct a range of simple structures using simple construction kits. • Make a structure more stable by widening the base. • Make a square frame from strip wood using triangular card joints. • Make a simple card hinge. •	• Deconstruct and assemble the net of basic 3D shapes. • Strengthen 2D frames by adding diagonal bracing struts. • Make a rectangular frame from strip wood. • Use materials to make simple joints, glue, tape and paper clips	• Deconstruct and assemble the net of a range of basic 3D shapes. • Join 2D frames to create 3D structures. • Make rectangular frames of different sizes using strip wood, reinforcing with cross braces. • Use a range of materials to make joints.	• Create nets of increasingly complex 3D shapes which include the addition of gluing tabs. • Reinforce and strengthen 3D framework using the concept of 'triangulation'. • Explain in detail why some structures fail. • Use a range of materials to make joints e.g., card strips, elastic bands, thread and ties, and plastic tubing.	• Create nets and templates accurately in a range of sizes. • Use a range of increasing methods to strengthen 3D structures and frames. • Investigate measure and record the load tolerance of different structures and find ways of improving a structures loadbearing capacity. • Build a range of structures using a wide range of effective materials.	• Make use of specialist equipment to mark out materials. • Select the most appropriate method to strength 3D structures and frames. • Apply a range of finishing techniques, including those from art and design, to a broad range of materials including textiles, metals, polymers and woods. • Use a wider more complex range of materials, components and ingredients, taking into account their properties.
Cooking and Nutrition:	• Sort and classify food into food groups, e.g. vegetables, pulses, cereals, dairy etc. • Talk about what happens when food is heated and cooled • Measure and weigh accurately using cups and spoons. • Work safely and hygienically.	• Sort and classify an increasing range of food according to specific food groups, e.g. proteins, carbohydrates, fats etc. • Talk about what needs to be done in order to work safely and hygienically. • Measure and weigh using standard units and scales. • Discuss about the way in which food processing can affect the taste, appearance, texture and colour of food.	• Gain an understanding of the ways in which specific food groups apply to the principles of a health and varied diet. • Identify what needs to be done in order to work safely and hygienically when working on a range of tasks. • Convert measure and weigh using standard and imperial units. • Give reasons for the way in which food processing can affect the taste, appearance, texture and colour of food.	• Understand seasonality, know where and how a variety of ingredients are grown, reared, caught and processed. • Talk about and give reasons for the need to work safely and hygienically. • Talk about the impact of changing proportions within a recipe and use knowledge of food and cooking to generate own recipes. • Talk in scientific terms about the physical and chemical changes that take place when food is cooked, e.g. heated and cooled	• Talk about how the properties of certain foods can affect the final product. • Know and understand the practice needed in terms of food hygiene and kitchen safety. • Select the appropriate methods and equipment for measuring, e.g. time, dry goods, liquids etc. • Compare commercial and domestic processes for producing food, e.g. bread	• Understand the source, seasonality and characteristics of a broad range of ingredients. • Understand the principles of cleaning to prevent cross-contamination, chilling foods thoroughly and reheating food until steaming hot. • Understand and apply the principles of nutrition and health including the implications of excess and deficiency. • Become competent in a range of cooking techniques, e.g. selecting and preparing ingredients, application of heat, seasoning dishes, combining ingredients