NORTHWICK MANOR PRIMARY SCHOOL

Knowing more……..remembering more……. Connecting learning……..

Design and Technology Long-term Overview

Design and Technology Intent:

What do we want for Northwick Manor Pupils?

At Northwick Manor Primary School, it is our aim to develop the next generation of **entrepreneurs, innovators** and **risk-takers** by allowing **opportunities** for creativity and imagination. Design Technology, is a subject that stands at the intersection of the sciences and the arts and is perfectly placed to encourage our pupils to consider the application of their scientific, mathematical and computational knowledge along with aesthetic, social and environmental issues. Our children will consider the user and the purpose of their products when making design decisions that are innovative, authentic and functional.

How do our curriculum drivers influence our teaching of Design Technology?

Our curriculum drivers are: **Aspiration and Ambition, Opportunity and Pupil Power.**

In order to inspire our children, we familiarise them with successful designers. We describe their personal journeys and show that they often started from humble beginnings but their **aspirations and ambitions** drove them forward. We discuss which knowledge-making practices and **opportunities** they took to gain their expertise. After examining the lives of several designers, it is clear that they share many key characteristics: having a vision, being determined to succeed and using their abilities for the greater good. In short, they have tremendous personal **power**, a deep sense of **empowerment**, an inner strength and confidence to carry them forward through the toughest of times. The attitudes that we seek to instil in our pupils are there in abundance in these highly successful designers. This links with our whole school motto, 'Raising our Game' with its 7 core learning attitudes including risk-taking, resilience, readiness to learn, responsibility, resourcefulness, relationships and reflectiveness.

Using quotes from these individuals is particularly powerful and provides a rich learning opportunity.

Resilience:
"I have not failed. I've found 10,000 ways that won't work" ~ Thomas Edison

Readiness to Learn:
"It doesn't make sense to hire smart people and tell them what to do; we hire smart people so they can tell us what to do" ~ Steve Jobs

Risk-taking and Resilience:
"Failure is the opportunity to begin again, only more intelligently" ~ Henry Ford

Relationships and Readiness to Learn: "A brilliant design will always benefit from the input of others" Dame Zaha Hadid

Readiness to Learn:
"One day I took apart my mum's new radio – she almost killed me but I learnt a lot about electronics." ~ Richard Turere, 14-year-old boy who founded 'Lion Lights' as a way to manage lion attacks in Kenya.

This helps the children to realise that these designers have used the 7R's and these have been instrumental in their success. We want the children to realise that the 7 R's are a life-long tool-kit to assist them, as they have assisted many world class designers.

What are our curriculum links?

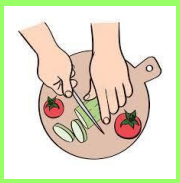
Our curriculum links with the British Values of **'respecting the culture and beliefs of others'** by looking at different products, foods and designers from around the world. The value of **'mutual respect'** is developed by designing for others and considering their needs and also by working collaboratively. We also look at how designers have exercised their right to **'individual liberty'** but in doing so have benefitted society past and present.

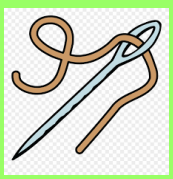
Northwick Manor's extended curriculum is developed further by using the **UN sustainable goals** as the impetus ***so that*** we ensure that pupils know and understand how they can be proactive global citizens and develop as responsible, respectful and tolerant individuals who are able to play their part and become actively involved in public life as adults in an ever-changing world.
Among the seventeen United Nations Sustainable Development Goals is the goal of **Responsible Consumption**, as part of the DT curriculum we have currently chosen this goal as our main area of focus. We use recycled materials wherever possible and have reduced our use of difficult-to-recycle consumable items (such as batteries and motors) and have included new topics that use Crumble microprocessors that can be used by several different year groups for many years to come. In Food Technology we buy ingredients in bulk rather than children bringing their own, meaning parents aren't left with food products that they will not use.

How is our Design Technology curriculum structured?

We seek to deliver a broad, balanced and differentiated curriculum and aim to include robust cross curricular links which connects learning and strengthens interdisciplinary knowledge. Our units of study are divided into five areas:

Food Technology - Structures - Mechanical Systems - Textiles - Electrical Systems




Food Technology is taught at least once per year in each year group. Electrical systems is covered 3 times at KS2. All other areas are taught across all key stages.

The process of learning in DT involves the following:
Investigate and Research: looking at the work of other designers (both other pupils and the work of industry specialists), deconstruction, food sampling and sensory analysis, scientific experimentation, internet-based research, real life experience, using surveys.
Design: following a given design brief and then later developing and meeting their own design criteria, communicating ideas through sketching and labelling, pictorial presentations, discussion, making templates, cross-sectional and exploded diagrams, using Computer Aided Design
Make: selecting from a wide range of materials (or ingredients applying the principles of nutrition and healthy eating), using a wide range of tools and equipment safely (and hygienically with respect to food), build structures and make them stronger, stiffer and more stable, understand and use mechanical and electrical systems and use computer programs to monitor and control products
Evaluate: consider the success of the product and how the design brief was met, reflecting on the skills that have been acquired and determining what improvements could be made.

Design and Technology National Curriculum Links:
Key stage 1

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 relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment].

When designing and making, pupils should be taught to:

Design

- design purposeful, functional, appealing products for themselves and other users based on design criteria
- generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

Make

- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics

Evaluate

- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria

Technical knowledge

- build structures, exploring how they can be made stronger, stiffer and more stable
- explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.

Key stage 2

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 relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].

When designing and making, pupils should be taught to:

Design

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluate

- investigate and analyse a range of existing products
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- understand how key events and individuals in design and technology have helped shape the world

Technical knowledge

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- apply their understanding of computing to program, monitor and control their products.

Cooking and nutrition

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:

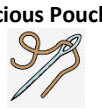
Key stage 1

- use the basic principles of a healthy and varied diet to prepare dishes
- understand where food comes from.

Key stage 2

- understand and apply the principles of a healthy and varied diet
- prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques
- understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

Key Learning: What will pupils get better at?

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Autumn 1	**Food Technology: Fruit Kebabs**  Understanding the importance of fruit in a healthy diet and producing their own fruit kebab.		**Food Technology: Smoothies**  Investigating and evaluating existing products and drawing inspiration to create their own fruit smoothie drink.		.		
	**Key Golden Nuggets** **What do we want pupils to know and what do we want pupils to be able to know how to do by the end of this unit?**						
	To know that a fruit has flesh to eat and seeds inside, it grows on a tree or plant.		To know that smoothies are a healthy drink choice that can contain vitamins and nutrients. To know where fruits are grown and what they grow on. To know that the Innocent smoothie company was set up by a group of friends and has grown to a very successful business. They make contributions to charities.				
	Connecting Learning						
	YR 1 Pizzas YR 2 Smoothies YR3 Sandwiches YR 4 Veg Samosas YR5 Biscuits YR6 Bread		EYFS Fruit Kebabs YR 1 Pizzas YR3 Sandwiches YR 4 Veg Samosas YR 5 Biscuits YR 6 Bread				
Autumn 2 (Yr3 covid staff absence means precious pouches is happening sp 1 2022)		**Mechanical Systems: Axles and wheels**  Investigating wheeled vehicles within the wider environment and	**Mechanical Systems: Wind-up toys** 	**Textiles: Precious Pouches**  Using accurate measuring to decide on the dimensions	**Mechanical Systems: Pop-up books**  Creating a Christmas themed book that	**Mechanical Systems: Cam Toys**  Building their own cam toy using knowledge of the different sorts of	**Textiles: Doorstops**  Using pattern pieces and templates with a wider variety of fabrics

		finding out how they move using wheels and axles. Designing and making a wheeled vehicle of their own.	Investigating how winding mechanisms work and create their own appealing wind-up toy based on a given design criterion.	required to make a pouch for a precious object.	contains various mechanisms and levers	movements produced by different cams.	to make a doorstop with stuffed appendages.
	**Key Golden Nuggets** **What do we want pupils to know and what do we want pupils to be able to know how to do by the end of this unit?**						
		To know that an axle is a rod or shaft that rotates wheels. To know that you can find an axle on a vehicle, a globe, pizza cutter or even a toilet roll holder.	To know that the winding mechanism to make their toy move will include an axle to rotate and handle to wind. To know that the structure and moving mechanism on their toy needs to be strong, stable and secure so that it will move freely.	To know that felt is a fabric made from matting or pressing fibres together To know that when cutting fabric, a seam allowance must be included otherwise the finished item will be too small To know a range of ways that can be used to fasten fabric temporarily e.g. buttons, zips, press-studs, Velcro, magnets To know that fabrics can be held together more permanently by stitching and gluing To know that George de Mestrel invented Velcro and he was inspired by a plant seed head that contained tiny hooks.	To know that a slider mechanism is a rigid bar that moves forwards and backwards along a straight To know how to measure (to the nearest mm), mark out (vertical line pencil line) and cut accurately To know that cardboard can be strengthened by folding and layering To know a range of ways that cardboard can be joined To know that scoring card ensures that it folds accurately	To know that a cam mechanism changes rotatory (round and round) movement to linear (back and forth) movement. To know that a cam is held in place by a cam shaft. To know that cams can be different shapes (square, pear-shaped, snail-shaped etc.) and these shapes produce different movements. To know that cams are used in everyday objects such as cars, washing machines and sewing machines. To know that iteration is the process of doing something again and again to improve something which helps designers improve their products. To know that Roland Emett designed the amazing machines in Chitty Chitty Bang Bang.	To know that fabric is made of thin fibres woven together To know that as well as being flexible, fabrics can have a number of properties such as stretchy/stiff, absorbent/waterproof, semi-opaque/opaque, slippery/high friction etc. To know that the properties of a fabric affect the functionality of the finished product. To know how to create a paper template and cut out fabric and use a variety of joining techniques (running stitch, back stitch and blanket stitch). To know that Two Blind Brothers is a clothing company and social enterprise that employs visually impaired people and raises money for research into blindness.
	Connecting Learning						
		YR 2 Wind Up Toys YR 4 Pop-up Books YR 5 Cam Toys	YR 1 Axles and Wheels YR 4 Pop-up Books YR 5 Cam Toys	EYFS Binka Bookmarks YR2 Beanies YR 6 Doorstops	YR 1 Axles and Wheels YR 2 Wind Up Toys YR 5 Cam Toys	YR 1 Axles and Wheels YR 2 Wind Up Toys YR 4 Pop up books	EYFS Binka Bookmarks YR2 Beanies YR 3 Precious Pouches
Spring 1	**Structures: Rockets**  Investigating rockets and using the associated vocabulary. Building a rocket and joining the different parts using a variety of joining techniques.						**Food Technology: Bread**  Designing and making a small loaf or a batch of yeast risen bread that has been kneaded and knocked back.
	**Key Golden Nuggets** **What do we want pupils to know and what do we want pupils to be able to know how to do by the end of this unit?**						
	To know that they can use glue or tape to join paper and/or card together.						To know that bread flour is 'strong' because it contains high levels of a protein called gluten. To know that kneading is the process that helps the gluten to stick together in long strands and create a 'mesh'. To know that yeast is added because it ferments (breaks down chemicals) producing bubbles of carbon dioxide. To know that proving is the process that allows the yeast time to create the carbon dioxide. To know that bubbles become 'trapped' in the mesh of gluten chains and create a springy texture.

	Connecting Learning						
	YR 1 Axles and Wheels and Playgrounds YR 2 Wind Up Toys YR 4 Pop-up Books YR 5 Cam Toys and Bridges						EYFS Fruit Kebabs YR 1 Pizzas YR 2 Smoothies YR 3 Sandwiches YR 4 Veg Samosas YR 5 Biscuits
Spring 2		**Food Technology: Pizza**  Creating a homemade pizza, paying close attention to good hygiene and being able to explain the source of some of the ingredients. Children will be able to discuss food hygiene and safety.		**Electrical Systems: Film-making**  Investigating the work of film- makers and developing a stop-go animation using a range of media.	**Electrical Systems: Night light**  Program a Crumble to light up LEDs in their night light. Design and make an electrical circuit that operates with a switch.	**Structures: Bridges**  Understanding the importance of engineering and how it has shaped our world. Creating a bridge made of cardboard using team-work and scientific knowledge.	
	**Key Golden Nuggets** **What do we want pupils to know and what do we want pupils to be able to know how to do by the end of this unit?**						
		To know that olive oil comes from olives, flour from wheat, passata from tomatoes and cheese from milk. To know how to make healthy choices by adding fruit or vegetables to our pizzas. To know that we wash our hands before cooking to ensure we do not transfer germs form our hands on the food. To cut soft vegetables using the bridge method. To use a hand grater to grate cheese.		To know that computer modelling can be used to simulate the frame by frame movement of a figure. To know that there are many ways many to animate including 2D animation (cartoons), 3D animation (CGI graphics), stop-motion animation (flick books) and to discuss examples To know that animation requires many skills including storyboarding, character and prop design and creation and recording and editing skills To know that Nick Park is an animator who created Wallace and Gromit	NB These Golden Nuggets are similar to Year 6's as Crumble is a new to school. The crumble is a microprocessor (tiny computer) that can be controlled using a programme (set of instructions). To know computer programmes can be written in many different (computer) languages. To know that coding is used to control hundreds of everyday items such as mobile phones, washing machines, coffee machines and televisions. To know that different pieces of code can create different effects and give examples e.g. lights flashing, lights fading with Crumble and different cycles on a washing machine To know that Tim Berners Lee is the computer programmer who created the internet	To know that there are many different bridge designs including: beam, arch, suspension and cantilever. To know how to create a series of prototypes (card and paper models) and then stress test them to see which shapes are strongest. To know that folding and layering increase the strength of cardboards and metals To know that triangular shapes and I-beams have high structural strength. To know that Dame Zaha Hadid was an Iraqi-born architect and the first Muslim woman to receive the Sterling Prize for Architecture.	
	Connecting Learning						
		EYFS Fruit Kebabs YR 2 Smoothies YR 3 Sandwiches YR 4 Veg Samosas YR 5 Biscuits YR 6 Bread		YR4 Night-lights with Crumble Year 6 Moving Eyes Crumble	YR 3 Film-making Year 6 Moving Eyes Crumble	EYFS Rockets YR 1 Playgrounds	
Summer 1	**Textiles: Binka Bookmark**  Investigating simple sewing techniques and adding a range of embellishments to make their work look appealing and be able to say why they have chosen them.						
	**Key Golden Nuggets** **What do we want pupils to know and what do we want pupils to be able to know how to do by the end of this unit?**						
	To know how to sew using a simple under and over running stitch. To know that by adding an embellishment such as a bead can make their product appealing.						
	Connecting Learning						

	YR2 Beanies YR3 Precious Pouches YR 6 Doorstops						
Summer 2		**Structures: Playgrounds**  Investigating existing play equipment and discuss how it is made and how it moves. Designing and making a model of a piece of play equipment.	**Textiles: Beanies**  Producing their own pattern for a soft toy after investigating a range of soft toys and puppets to find out how they have been put together.	**Food Technology: Sandwiches**  Designing and making a healthy sandwich snack with an understanding of how key ingredients have been produced and manufactured.	**Food Technology: Vegetable Samosas**  Blending spices together to create authentic Indian flavours and producing a vegetable samosa.	**Food Technology: Biscuits**  Evaluating a range of biscuit products and find out about biscuits around the world. Using the rubbing in methods children make biscuit dough and bake a batch of biscuits.	**Electrical Systems: Crumble Moving Eyes**  Programming a Crumble microprocessor to control a servo motor to create a jungle themed picture with moving eyes.
	**Key Golden Nuggets** **What do we want pupils to know and what do we want pupils to be able to know how to do by the end of this unit?**						
		To know that park playground equipment can be used in a variety of ways. Push, pull and rotate. To know that they can join 2 materials together using, tape, glue, staples, string or pipe cleaners.	To know that we use a pattern to help us make an accurate design. To know that they can join 2 pieces of fabric together using a sewing stitch. To know that they can use embellishments to make features on their puppet character.	To know a range of healthy sandwich ingredients To know the main food groups that sandwich ingredients belong to e.g. bread – carbohydrate, ham - protein To know how a range of sandwich fillings are produced e.g. eggs are farmed, tuna fish is caught and salad vegetables To know that a 'Zwicky Box' is a useful way to organise ideas and come up with new products To know how to work safely when using a knife (tucking the fingers underneath in a claw) and hygienically when handling food (wash hands, wear apron, keep sandwich fillings in the fridge)	To know that a range of foods contain an outer casing and a filling such as pasties, pies, spring rolls, samosas To know that a cross sectional drawing makes it easy to see what is happening inside and so can show the inside and outside of a product at the same time To know some of the spices in garam masala such as cumin, peppercorns, cloves, coriander seeds, nutmeg and cinnamon and be able to identify them from pictures To know that these spices are grown in Asia	To know that because they are easy to transport, biscuits were often eaten on journeys: sailors ate 'hard tack' and Victorian train passengers ate McVities digestives and so served a customer need. To know how to 'rub in' - to coat the flour particles with butter, resulting in a crumbly texture. To know that sugar adds flavour (especially brown sugar to gingerbread) and also helps biscuits brown when cooked. To know that sugar comes from sugar beet (grown in cooler countries such as the UK) and sugar cane (grown in the tropics).	(Some Golden Nuggets are shared with Year 4 as Crumble is new to school review 2023-24) To know that crumble is a microprocessor (tiny computer) that can be controlled using a programme (set of instructions). To know computer programmes can be written in many different (computer) languages. To know that coding is used to control hundreds of everyday items such as mobile phones, washing machines, coffee machines and televisions. To know that different pieces of code can create different effects and give examples e.g. lights flashing, lights fading with Crumble and different cycles on a washing machine To know that Steve Wozniak wrote the code and designed the circuits for the first Apple computers but that Steve Jobs his business partner had the vision to make Apple a global brand.
	Connecting Learning						
		EYFS Rockets YR5 Bridges	EYFS Binka Bookmarks Yr3 Precious Pouches YR 6 Doorstops	EYFS Fruit Kebabs YR 1 Pizzas YR 2 Smoothies YR 4 Veg Samosas YR 5 Biscuits YR 6 Bread	EYFS Fruit Kebabs YR 1 Pizzas YR 2 Smoothies YR 3 Sandwiches YR 5 Biscuits YR 6 Bread	EYFS Fruit Kebabs YR 1 Pizzas YR 2 Smoothies YR 3 Sandwiches YR 4 Veg Samosas YR 6 Bread	YR3 Film-making YR4 Night-lights with Crumble