Design and Tecnology Engineering 2022-2023

Curriculum Intent:

In the Foundation Stage, Design and Technology is covered in both the prime areas and the specific areas. We encourage the development of skills; knowledge and understanding that help EYFS children make sense of their world through asking questions, listening to instructions and explaining their understanding. Children are encouraged to explore and use a variety of media and materials during a combination of adult directed and child-initiated activities. Children are given opportunities to use different media and materials to express their own ideas. Children begin to make plans and construct with a purpose in mind, using a variety of resources. They are encouraged to use what they know about different media and materials in original ways, not being afraid to explore and try new things. The children learn how to use simple tools and techniques appropriately, effectively and safely. The children Identify and discuss foods that are healthy and learn how to prepare some foods safely and hygienically.

By the end of Key Stage One, Through a variety of creative and practical activities, pupils will 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].

By the end of Key Stage Two, 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].
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.

Our vision and aims:

At Nansledan school we believe DT should provide pupils with a real-life context for learning. We aim to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. Our DT is planned in a progressive manor and enables pupils to meet the end of key stage attainment targets in the National curriculum and the aims within the units also align with those in the National curriculum. Design and technology is a crucial part of school life and learning and it is for this reason that as a school we are dedicated to the teaching and delivery of a high quality DT curriculum; through well planned and resourced projects and experiences. . Pupils will learn to take risks, be reflective, innovative, enterprising and resilient. It is our intent for Design and Technology to be taught in all year groups through one topic per term. DT units will be linked to the class project, providing cross-curricular opportunities. As a subject, DT can draw upon subject knowledge and skills from Mathematics, Science, History, Computing and Art. At Nansledan, design and technology is inclusive and will prepare pupils to deal with tomorrow's rapidly changing world. It encourages pupils to become independent, creative problem solvers and thinkers as individuals and part of a team. Through DT, the pupils will combine practical skills with an understanding of aesthetic, social and environmental issues, as well as functions and industry. They will be taught a range of skills and techniques which will progress from Early years through to year 6.

EYFS National Curriculum Expectations
Expressive Arts and Design (Exploring and Using Media and Materials) Children safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. **Physical Development (Moving and Handling)** Children handle equipment and tools effectively, including pencils for writing. **Expressive Arts and Design (Being Imaginative)** Children use what they have learnt about media and materials in original ways, thinking about uses and purposes. They represent their own ideas, thoughts and feelings through design and technology, art, music, dance, role play and stories. **Early Learning Goals: Expressive arts and design** • Explore a variety of artistic effects to express their ideas and feelings • Explore different materials freely, to develop their ideas about how to use them and what to make • Join different materials and explore different textures • Create collaboratively, sharing ideas, resources and skills

Continuous Provision Area	Key Learning opportunities linked to design and technology
Creative Area	To respond in a range of ways to experiences To create representations To observe, think, communicate, talk and express ideas To plan an idea and carry it out To experiment with different media To explore processes and techniques such a mixing, blending and shading
Block Area	To use what they know about materials in original ways To represent their own ideas using symbolic representation To use their imagination, along with own experiences to create settings and stories
Writing Area	To use what they know about materials in original ways To use their imagination, along with own experiences to create settings and stories To handle tools with increasing control and show a preference for a dominant hand
Small Construction Area	To use what they know about materials in original ways To represent their own ideas using symbolic representation To use their imagination, along with own experiences to create things. To explore linking, connecting, attaching and other forms of construction.
Malleable Area	To respond in a range of ways to experiences To observe, think, communicate, talk and express ideas To plan an idea and carry it out To experiment with different media
Reading Area	To represent their own ideas, thoughts and feelings through stories - To use their imagination, along with own experiences to create settings and stories
Maths Area	To use what they know about materials in original ways To represent their own ideas using symbolic representation To use their imagination, along with own experiences to create settings and stories
Domestic Role Play	To respond in a range of ways to experiences To observe, think, communicate, talk and express ideas
Outside Construction and building	To handle tools, objects and construction materials safely and with increasing control To handle equipment and tools effectively
Mud Kitchen	To handle equipment and tools effectively and uses with the purpose intended
Outside Water Investigation	To handle equipment and tools effectively and uses with the purpose intended
Outside Sand Area	To handle resources, objects and materials safely, with increasing control

Key Stage 1 National Curriculum Expectations	
Design Pupils should be taught to: • 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** Pupils should be taught to: • 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** Pupils should be taught to: • explore and evaluate a range of existing products. • evaluate their ideas and products against design criteria.	**Technical Knowledge** Pupils should be taught to: • 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. **Cooking and Nutrition** Pupils should be taught to: • use the basic principles of a healthy and varied diet to prepare dishes. • understand where food comes from

Key Stage 2 National Curriculum Expectations

Design
Pupils should be taught to:
• use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at 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
Pupils should be taught to:
• 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
Pupils should be taught to:
• 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
Pupils should be taught to:
• 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.

Nansledan DT Key Area Coverage in KS1 and 2

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Structures			Structures	Structures	Structures
Textiles	Textiles	Textiles		Textiles	
	Mechanisms	Mechanical systems	Mechanical systems		Mechanical systems
			Electrical Systems		Electrical Systems
Cooking and Nutrition	Cooking and Nutrition	Cooking and Nutrition		Cooking and Nutrition	

Structures

Year 1	**Design** • Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design.	**Make** • Making stable structures from card, tape and glue • Learning how to turn 2D nets into 3D structures • Following instructions to cut and assemble the supporting structure of a windmill. • Making functioning turbines and axles which are assembled into a main supporting structure.	**Evaluate** • Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't. • Suggest points for improvements.	**Technical Knowledge** • To understand that the shape of materials can be changed to improve the strength and stiffness of structures. • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). • To understand that axles are used in structures and mechanisms to make parts turn in a circle. • To begin to understand that different structures are used for different purposes. • To know that a structure is something that has been made and put together.
Year 4	**Design** • Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight.	**Make** • Creating a range of different shaped frame structures, using nets to support children. • Making a variety of free-standing frame structures of different shapes and sizes. • Selecting appropriate materials to build a strong structure and cladding. • Reinforcing corners to strengthen and stiffen a structure. • Creating a design in accordance with a plan. • Learning to create different textural effects with materials	**Evaluate** • Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs.	**Technical Knowledge** • To understand what a frame structure is. • To know that a 'free-standing' structure is one which can stand on its own.
Year 5	**Design** • Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.	**Make** • Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure.	**Evaluate** • Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure.	**Technical Knowledge** • To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form

		• Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties.	• Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties.	and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood.
Year 6	**Design** • Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs.	**Make** • Building a range of play apparatus structures drawing upon new and prior knowledge of structures. • Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures	**Evaluate** • Improving a design plan based on peer evaluation. • Testing and adapting a design to improve it as it is developed. • Identifying what makes a successful structure	**Technical Knowledge** • To know that structures can be strengthened by manipulating materials and shapes.
KS3	• 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].			

Mechanisms and Mechanical Systems

Year 2	**Design** • Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria.	**Make** • Making linkages using card for levers and split pins for pivots. • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. • Cutting and assembling components neatly.	**Evaluate** • Evaluating own designs against design criteria. • Using peer feedback to modify a final design.	**Technical Knowledge** • To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. • To know that there is always an input and output in a mechanism. • To know that an input is the energy that is used to start something working. • To know that an output is the movement that happens as a result of the input. • To know that a lever is something that turns on a pivot. • To know that a linkage mechanism is made up of a series of levers
Year 3	**Design** • Designing a toy which uses a pneumatic system. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Learning that different types of drawings are used in design to explain ideas clearly.	**Make** • Creating a pneumatic system to create a desired motion. • Building secure housing for a pneumatic system. • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy. • Selecting materials due to their functional and aesthetic characteristics. • Manipulating materials to create different effects by cutting, creasing, folding and weaving.	**Evaluate** • Using the views of others to improve designs. • Testing and modifying the outcome, suggesting improvements. • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client.	**Technical Knowledge** • To understand how pneumatic systems work. • To understand that pneumatic systems can be used as part of a mechanism. • To know that pneumatic systems operate by drawing in, releasing and compressing air.
Year 4	**Design** • Designing a shape that reduces air resistance. • Drawing a net to create a structure from. • Choosing shapes that increase	**Make** • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design.	**Evaluate** • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	**Technical Knowledge** • To understand that all moving things have kinetic energy. • To understand that kinetic energy is the energy that something

	or decrease speed as a result of air resistance. • Personalising a design.			(object/person) has by being in motion. • To know that air resistance is the level of drag on an object as it is forced through the air. • To understand that the shape of a moving object will affect how it moves due to air resistance.
Year 6	**Design** •Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement. • Understanding how linkages change the direction of a force. • Making things move at the same time. • Understanding and drawing cross-sectional diagrams to show the inner-workings of my design.	**Make** • Measuring, marking and checking the accuracy of the jelutong and dowel pieces required. • Measuring, marking and cutting components accurately using a ruler and scissors. • Assembling components accurately to make a stable frame. • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles. • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set.	**Evaluate** • Evaluating the work of others and receiving feedback on own work. • Applying points of improvement to their toys. • Describing changes they would make/do if they were to do the project again	**Technical Knowledge** • To understand that the mechanism in an automata uses a system of cams, axles and followers. • To understand that different shaped cams produce different outputs
KS3	• 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].			

Electrical Systems (KS2 only)

Year 4	**Design** • Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.	**Make** • Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria.	**Evaluate** • Evaluating electrical products. • Testing and evaluating the success of a final product.	**Technical Knowledge** • To understand that electrical conductors are materials which electricity can pass through. • To understand that electrical insulators are materials which electricity cannot pass through. • To know that a battery contains stored electricity that can be used to power products. • To know that an electrical circuit must be complete for electricity to flow. • To know that a switch can be used to complete and break an electrical circuit
Year 6	**Design** • Designing a steady hand game - identifying and naming the components required. • Drawing a design from three different perspectives. • Generating ideas through sketching and discussion. • Modelling ideas through prototypes. • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.	**Make** • Constructing a stable base for a game. • Accurately cutting, folding and assembling a net. • Decorating the base of the game to a high-quality finish. • Making and testing a circuit. • Incorporating a circuit into a base.	**Evaluate** • Testing own and others finished games, identifying what went well and making suggestions for improvement. • Gathering images and information about existing children's toys. • Analysing a selection of existing children's toys.	**Technical Knowledge** • To know that batteries contain acid, which can be dangerous if they leak. • To know the names of the components in a basic series circuit, including a buzzer.
KS3	• 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].			

Cooking and Nutrition

Year 1	**Design** • Designing smoothie carton packaging by-hand or on ICT software	**Make** • Chopping fruit and vegetables safely to make a smoothie.	**Evaluate** • Tasting and evaluating different food combinations. • Describing appearance, smell and taste. • Suggesting information to be included on packaging	**Technical Knowledge** • Understanding the difference between fruits and vegetables. • To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber). • To know that a blender is a machine which mixes ingredients together into a smooth liquid. • To know that a fruit has seeds and a vegetable does not. • To know that fruits grow on trees or vines. • To know that vegetables can grow either above or below ground. • To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).
Year 2	**Design** • Designing a healthy wrap based on a food combination which work well together.	**Make** • Slicing food safely using the bridge or claw grip. • Constructing a wrap that meets a design brief.	**Evaluate** • Describing the taste, texture and smell of fruit and vegetables. • Taste testing food combinations and final products. • Describing the information that should be included on a label. • Evaluating which grip was most effective.	**Technical Knowledge** • To know that 'diet' means the food and drink that a person or animal usually eats. • To understand what makes a balanced diet. • To know where to find the nutritional information on packaging. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that nutrients are substances in food that all living things need to make energy, grow and develop. • To know that 'ingredients' means the items in a mixture or recipe. • To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy. • To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'
Year 3	**Design** • Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the	**Make** • Knowing how to prepare themselves and a workspace to cook safely in, learning the basic rules to avoid food	**Evaluate** • Establishing and using design criteria to help test and review dishes. • Describing the benefits of seasonal fruits and vegetables and the	**Technical Knowledge** • To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons. • To know that cooking instructions are known as a

	taste, texture, smell and appearance of the dish.	contamination. • Following the instructions within a recipe.	impact on the environment. • Suggesting points for improvement when making a seasonal tart.	'recipe'. • To know that imported food is food which has been brought into the country. • To know that exported food is food which has been sent to another country. • To understand that imported foods travel from far away and this can negatively impact the environment. • To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre. • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health. • To know safety rules for using, storing and cleaning a knife safely. • To know that similar coloured fruits and vegetables often have similar nutritional benefits.
Year 5	**Design** • Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • Writing an amended method for a recipe to incorporate the relevant changes to ingredients. • Designing appealing packaging to reflect a recipe.	**Make** • Cutting and preparing vegetables safely. • Using equipment safely, including knives, hot pans and hobs. • Knowing how to avoid cross-contamination. • Following a step by step method carefully to make a recipe	**Evaluate** • Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups.	**Technical Knowledge** • To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. • To know that I can adapt a recipe to make it healthier by substituting ingredients. • To know that I can use a nutritional calculator to see how healthy a food option is. • To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects.
KS3	• 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].			

Textiles

Year 1	**Design** • Using a template to create a design for a puppet.	**Make** • Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing steps for construction.	**Evaluate** • Reflecting on a finished product, explaining likes and dislikes.	**Technical Knowledge** • To know that 'joining technique' means connecting two pieces of material together. • To know that there are various temporary methods of joining fabric by using staples. glue or pins. • To understand that different techniques for joining materials can be used for different purposes. • To understand that a template (or fabric pattern) is used to cut out the same shape multiple times. • To know that drawing a design idea is useful to see how an idea will look.
Year 2	**Design** • Designing a pouch.	**Make** • Selecting and cutting fabrics for sewing. • Decorating a pouch using fabric glue or running stitch. • Threading a needle. • Sewing running stitch, with evenly spaced, neat, even stitches to join fabric. • Neatly pinning and cutting fabric using a template	**Evaluate** • Troubleshooting scenarios posed by teacher. • Evaluating the quality of the stitching on others' work. • Discussing as a class, the success of their stitching against the success criteria. • Identifying aspects of their peers' work that they particularly like and why.	**Technical Knowledge** • To know that sewing is a method of joining fabric. • To know that different stitches can be used when sewing. • To understand the importance of tying a knot after sewing the final stitch. • To know that a thimble can be used to protect my fingers when sewing.
Year 3	**Design** • Designing and making a template from an existing cushion and applying individual design criteria	**Make** • Following design criteria to create a cushion or Egyptian collar. • Selecting and cutting fabrics with ease using fabric scissors. • Threading needles with greater independence. • Tying knots with greater independence. • Sewing cross stitch to join fabric. • Decorating fabric using appliqué. • Completing design ideas with stuffing and sewing the edges (Cushions) or embellishing the collars based on design ideas (Egyptian collars).	**Evaluate** • Evaluating an end product and thinking of other ways in which to create similar items.	**Technical Knowledge** •To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. •To know that when two edges of fabric have been joined together it is called a seam. •To know that it is important to leave space on the fabric for the seam. •To understand that some products are turned inside out after sewing so the stitching is hidden

Year 5	**Design** • Designing a stuffed toy, considering the main component shapes required and creating an appropriate template. • Considering the proportions of individual components.	**Make** • Creating a 3D stuffed toy from a 2D design. • Measuring, marking and cutting fabric accurately and independently. • Creating strong and secure blanket stitches when joining fabric. • Threading needles independently. • Using appliqué to attach pieces of fabric decoration. • Sewing blanket stitch to join fabric. • Applying blanket stitch so the spaces between the stitches are even and regular.	**Evaluate** • Testing and evaluating an end product and giving point for further improvements.	**Technical Knowledge** • To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. • To understand that it is easier to finish simpler designs to a high standard. • To know that soft toys are often made by creating appendages separately and then attaching them to the main body. • To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely.
KS3	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].			