

SANDHILL PRIMARY SCHOOL DT PROGRESSION OF SKILLS 2023 onwards

	YEFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Structures	<p>Junk Modelling Making verbal plans and material choices. Developing a junk model. Improving fine motor/scissor skills with a variety of materials. Joining materials in a variety of ways (temporary and permanent). Joining different materials together. Describing their junk model, and how they intend to put it together. Giving a verbal evaluation of their own and others' junk models with adult support. Checking to see if their model matches their plan. Considering what they would do differently if they were to do it again. Describing their favourite and least favourite part of their model. To know there are a range to different materials that can be used to make a model and that they are all slightly different. Making simple suggestions to fix their junk model.</p> <p>Boats Designing a junk model boat. Using knowledge from exploration to inform design Making a boat that floats and is waterproof, considering material choices Making predictions about, and evaluating different materials to see if they are waterproof. Making predictions about, and evaluating existing boats to see which floats best. Testing their design and reflecting on what could have been done differently. Investigating the how the shapes and structure of a boat affect the way it moves. To know that 'waterproof' materials are those which do not absorb water.</p>	<p>Learning the importance of a clear design criteria. Including individual preferences and requirements in a design. 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. 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. 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. To know that a client is the person I am designing for. To know that design criteria is a list of points to ensure the product meets the clients needs and wants. To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity. To know that windmill turbines use wind to turn and make the machines inside work. To know that a windmill is a structure with sails that are moved by the wind. To know the three main parts of a windmill are the turbine, axle and structure.</p>			<p>Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. Creating a range of different shaped frame structures. 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 a structure. Creating a design in accordance with a plan. Learning to create different textural effects with materials. Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own. To know that a pavilion is a a decorative building or structure for leisure activities. To know that cladding can be applied to structures for different effects. To know that aesthetics are how a product looks. To know that a product's function means its purpose. To understand that the target audience means the person or group of people a product is designed for. To know that architects consider light, shadow and patterns when designing.</p>		<p>Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs. 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 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. To know that structures can be strengthened by manipulating materials and shapes. To understand what a 'footprint plan' is. To understand that in the real world, design , can impact users in positive and negative ways. To know that a prototype is a cheap model to test a design idea</p>
Structures vocabulary	Model, join, attach, design, waterproof, float, predict, absorb	Axle, bridge, design, design criteria, model, net packing, structure, template, unstable, stable, strong, weak			3D shapes, design criteria, natural, cladding, innovative, Re- enforce, structure		apparatus design criteria equipment playground landscape features cladding
		Explaining how to adapt mechanisms, using bridges or guides to control the movement.	Selecting a suitable linkage system to produce the desired motion. Designing a wheel.	Designing a toy which uses a pneumatic system. Developing design criteria from a design brief.		Designing a pop-up book which uses a mixture of structures and mechanisms. Naming each	

<p>Mechanisms/ Mechanical systems</p>		<p>Designing a moving story book for a given audience. Following a design to create moving models that use levers and sliders. Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed. Reviewing the success of a product by testing it with its intended audience. To know that a mechanism is the parts of an object that move together. To know that a slider mechanism moves an object from side to side. To know that a slider mechanism has a slider, slots, guides and an object. To know that bridges and guides are bits of card that purposefully restrict the movement of the slider.</p>	<p>Selecting materials according to their characteristics. Following a design brief. Evaluating different designs. Testing and adapting a design To know that different materials have different properties and are therefore suitable for different uses To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder. To know that it is important to test my design as I go along so that I can solve any problems that may occur.</p>	<p>Generating ideas using thumbnail sketches and exploded diagrams. Learning that different types of drawings are used in design to explain ideas clearly. 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. 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. 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. To understand how sketches, drawings and diagrams can be used to communicate design ideas. To know that exploded-diagrams are used to show how different parts of a product fit together. To know that thumbnail sketches are small drawings to get ideas down on paper quickly</p>		<p>mechanism, input and output accurately. Storyboarding ideas for a book. Following a design brief to make a pop up book, neatly and with focus on accuracy. Making mechanisms and/or structures using sliders, pivots and folds to produce movement. Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement. To know that mechanisms control movement. To understand that mechanisms can be used to change one kind of motion into another. To understand how to use sliders, pivots and folds to create paper-based mechanisms. To know that a design brief is a description of what I am going to design and make. To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.</p>	
<p>Mechanisms/ Mechanical systems vocabulary</p>		<p>Sliders, mechanism, adapt, design criteria, design, input, model, template, assemble, test</p>	<p>Design, design criteria, wheel, ferris wheel, pods, axle, axle holder, frame, mechanism</p>	<p>Mechanism, lever, pivot, linkage system, pneumatic system, input, output, component, thumbnail sketch, research, adapt, properties, reinforce, motion</p>		<p>Design, input, motion, mechanism, criteria, research, reinforce, model</p>	
<p>Electrical systems (KS2 only)</p>				<p>Carry out research based on a given topic to develop a range of initial ideas. Generate a final design for the electric poster with consideration to the client's needs and design criteria. Design an electric poster that fits the requirements of a given brief. Plan the positioning of the bulb (circuit component) and its purpose Create a final design for the electric poster. Mount the poster onto corrugated card to improve its strength and allow it to withstand the weight of the circuit on the rear.</p>			<p>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'. 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.</p>

				<p>Measure and mark materials out using a template or ruler.</p> <p>Fit an electrical component (bulb). Learn ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge).</p> <p>Learning to give and accept constructive criticism on own work and the work of others. Testing the success of initial ideas against the design criteria and justifying opinions. Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs.</p> <p>To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit. To understand common features of an electric product (switch, battery or plug, dials, buttons etc.). To list examples of common electric products (kettle, remote control etc.). To understand that an electric product uses an electrical system to work (function). To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits</p>			<p>Making and testing a circuit. Incorporating a circuit into a base. 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. 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.</p>
Electrical systems (KS2 only) vocabulary				<p>information design, design, public, design criteria, research, initial ideas, sketch, bulb, self assessment, peer assessment, feedback, develop, final design, electrical system, electric product, circuit, circuit component, bulb, battery, crocodile wires</p>			<p>Assemble, battery, battery pack, benefit, bulb, bulb holder, buzzer, circuit, circuit symbol, component, conductor, copper design, design criteria, evaluation, fine motor skills, fit for purpose, form, function, gross motor skills, insulator, LED, user</p>
Food	<p>Designing a soup recipe as a class. Designing soup packaging. Chopping plasticine safely. Chopping vegetables with support. Tasting the soup and giving opinions. Describing some of the following when tasting food: look, feel, smell and taste. Choosing their favourite packaging design and explaining why. To know that soup is ingredients blended together. To know that vegetables are grown. To recognise and name some common vegetables. To know that different vegetables taste different. To know that eating vegetables is good for us. To discuss why different packages might be used for different foods.</p>	<p>Designing smoothie carton packaging by-hand or on ICT software. Chopping fruit and vegetables safely to make a smoothie. Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging. 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.</p>	<p>Designing a healthy wrap based on a food combination which work well together. Slicing food safely using the bridge or claw grip. Constructing a wrap that meets a design brief. 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. 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</p>		<p>Designing a biscuit within a given budget, drawing upon previous taste testing judgements. Following a baking recipe, from start to finish, including the preparation of ingredients. Cooking safely, following basic hygiene rules. Adapting a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet). Evaluating a recipe, considering: taste, smell, texture and appearance. Describing the impact of the budget on the selection of ingredients. Evaluating and comparing a range of food products. Suggesting modifications to a To know that the amount of an ingredient in a recipe is known as the 'quantity.' To know that it is important to use oven gloves when removing hot food from an oven.</p>	<p>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. 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. Identifying the nutritional differences between different products and recipes. Identifying and describing healthy benefits of food groups. To understand where meat comes from - learning that beef is from cattle and how beef is reared and</p>	

		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	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'.		To know the following cooking techniques: sieving, creaming, rubbing method, cooling. To understand the importance of budgeting while planning ingredients for biscuits.	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.	
Food vocabulary	Soup, vegetable, carrot, parsnip, broccoli, potato, broad beans, cauliflower, leek, peas	Fruit, vegetable, seed, leaf, root, stem, smoothie, healthy, carton, design, flavour, peel, slice	Balanced diet, balance, carbohydrate, dairy, fruit, ingredients, oils, sugar, protein, vegetable, design criteria		Design criteria, research, texture, innovative, aesthetic, measure, cross-contamination, diet, processed, packaging	Beef, reared, processed, ethical, diet, ingredients, supermarket, farm, balanced	
Textiles	Discussing what a good design needs. Designing a simple pattern with paper. Designing a bookmark. Choosing from available materials. Developing fine motor/cutting skills with scissors. Exploring fine motor/threading and weaving (under, over technique) with a variety of materials. Using a prepared needle and wool to practise threading. Reflecting on a finished product and comparing to their design. To know that a design is a way of planning our idea before we start. To know that threading is putting one material through an object.		Designing a pouch. 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. 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. 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.	Designing and making a template from an existing cushion and applying individual design criteria. 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). Evaluating an end product and thinking of other ways in which to create similar items. 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.			Designing a waistcoat in accordance to a specification linked to set of design criteria. Annotating designs, to explain their decisions. Using a template when cutting fabric to ensure they achieve the correct shape. Using pins effectively to secure a template to fabric without creases or bulges. Marking and cutting fabric accurately, in accordance with their design. Sewing a strong running stitch, making small, neat stitches and following the edge. Tying strong knots. Decorating a waistcoat, attaching features (such as appliqué) using thread. Finishing the waistcoat with a secure fastening (such as buttons). Learning different decorative stitches. Sewing accurately with evenly spaced, neat stitches. Reflecting on their work continually throughout the design, make and evaluate process. To understand that it is important to design clothing with the client/target customer in mind. To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. To understand the importance of consistently sized stitches.
Textiles vocabulary	Hessian, fabric, thread, weave, sew, knot		Decorate, fabric, fabric glue, knot, needle, needle threader, running stitch, sew, template, thread	Appliqué, cross-stitch, fabric, running stitch, patch, thread, embellish, template, cotton, silk, polyester, wrinkle, tear, water-resistant, breathable, matt, shiny, biodegrade, pinking			Annotate, decorate, design criteria, fabric, target customer, waistcoat, waterproof
Digital World (KS2 only)					Writing design criteria for a programmed timer (Micro:bit). Exploring different mindfulness strategies.	Researching (books, internet) for a particular (user's) animal's needs. Developing design criteria based on research.	

					<p>Applying the results of my research to further inform my design criteria.</p> <p>Developing a prototype case for my mindful moment timer.</p> <p>Using and manipulating shapes and clipart by using computer-aided design (CAD), to produce a logo.</p> <p>Following a list of design requirements.</p> <p>Developing a prototype case for my mindful moment timer.</p> <p>Creating a 3D structure using a net.</p> <p>Programming a micro:bit in the Microsoft micro:bit editor, to time a set number of seconds/minutes upon button press.</p> <p>Investigating and analysing a range of timers by identifying and comparing their advantages and disadvantages.</p> <p>Evaluating my Micro:bit program against points on my design criteria and amending them to include any changes I made.</p> <p>Documenting and evaluating my project.</p> <p>Understanding what a logo is and why they are important in the world of design and business.</p> <p>Testing my program for bugs (errors in the code).</p> <p>Finding and fixing the bugs (debug) in my code.</p> <p>To understand what variables are in programming.</p> <p>To know some of the features of a Micro:bit.</p> <p>To know that an algorithm is a set of instructions to be followed by the computer.</p> <p>To know that it is important to check my code for errors (bugs).</p> <p>To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device.</p> <p>To understand the terms 'ergonomic' and 'aesthetic'.</p> <p>To know that a prototype is a 3D model made out of cheap materials, that allows us to test design ideas and make better decisions about size, shape and materials.</p>	<p>Generating multiple housing ideas using building bricks.</p> <p>Understanding what a virtual model is and the pros and cons of traditional and CAD modelling.</p> <p>Placing and manoeuvring 3D objects, using CAD.</p> <p>Changing the properties of, or combining one or more 3D objects, using CAD.</p> <p>Understanding the functional and aesthetic properties of plastics.</p> <p>Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range.</p> <p>Stating an event or fact from the last 100 years of plastic history.</p> <p>Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices.</p> <p>Explaining key functions in my program (audible alert, visuals).</p> <p>Explaining how my product would be useful for an animal carer including programmed features.</p> <p>To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record.</p> <p>To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose.</p> <p>To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met.</p> <p>To understand key developments in thermometer history.</p> <p>To know events or facts that took place over the last 100 years in the history of plastic, and how this is changing our outlook on the future.</p> <p>To know the 6Rs of sustainability.</p> <p>To understand what a virtual model is and the pros and cons of traditional vs CAD modelling.</p>	
<p>Digital World (KS2 only) vocabulary</p>					<p>Research, advantage, disadvantage, criteria, design, ergonomic, timer, program, loop, coding, block, variable, pause, bug, debug, instructions, net, template, develop, join, assemble, test, form, function, prototype, process, cheap, user</p>	<p>Monitoring device, electronic sensor, thermoscope, thermometer, research, design brief, design criteria, development, inventor, vivarium, programming loop, programming comment, alert, ambient, Boolean, duplicate, copy, value, variable, model, sustainability, plastic, microplastics, decompose, plastic pollution, man-made, synthetic</p>	

