

Design Technology Progression Ladder

Pitmaston Primary School



This document gives a clear overview of the progression of substantive and disciplinary knowledge that our pupils are taught in Design Technology, throughout their primary education at Pitmaston Primary School.

Our curriculum is designed so that key, fundamental knowledge is often revisited, allowing deliberate opportunities for retrieval practice, therefore embedding key learning and skills.

Vocabulary is built upon each year, whilst still allowing prior language to be referred to across the key stages.

The design of our curriculum is intended to be inspiring for pupils and allow them to use their creativity and imagination to design and make products that solve real life problems within a variety of contexts and utilising digital technology where relevant. As they move through school children will acquire a broad range of subject knowledge, learn about key inventors and designers and the way they have impacted on daily life and the wider world. Children will make links to the disciplines of mathematics, science, computing and art, drawing on prior knowledge and applying skills to creative, real life and technical tasks.



EYFS	Nursery Pupils will know how to:	Reception Pupils will know how to:
Understanding of the World	<ul style="list-style-type: none"> • Explore how things work • Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice. 	<ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Expressive Arts and Design	<ul style="list-style-type: none"> • Make imaginative and complex stories using ‘small worlds’ with blocks and construction kits. • Explore different materials freely, develop their ideas about how to use them and what to make. • Develop their own ideas and then decide which materials to use to express them. • Join different materials and explore different textures. • Use drawing to represent ideas. 	<ul style="list-style-type: none"> • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills.
Mathematics	<ul style="list-style-type: none"> • Make comparisons between objects relating to size, length, weight and capacity • Compare quantities using language: ‘more than’, ‘fewer than’. • Talk about and explore 2D and 3D shapes. • Understand position through words alone. 	<ul style="list-style-type: none"> • Count objects, actions and sounds. • Compare length, weight and capacity. • Select, rotate and manipulate shapes to develop spatial reasoning skills.
Literacy	<ul style="list-style-type: none"> • Engage in extended conversations about stories, learning new vocabulary. 	<ul style="list-style-type: none"> • Write short sentences with words with known letter-sound correspondences using a capital letter and full stop.
Communication & Language	<ul style="list-style-type: none"> • Use a wider range of vocabulary. • Understand ‘why’ questions • Be able to express a point of view and to debate when they disagree with an adult or a friend, using words as well as actions. 	<ul style="list-style-type: none"> • Learn new vocabulary. • Articulate their ideas and thoughts in well-formed sentences • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.
Personal, Social and Emotional Development	<ul style="list-style-type: none"> • Select and use activities and resources, with help when needed. • Find solutions to conflicts and rivalries. 	<ul style="list-style-type: none"> • Show resilience and perseverance in the face of challenge. • Think about the perspectives of others.
Physical Development	<ul style="list-style-type: none"> • Choose the right resources to carry out their own plan. • Collaborate with others to manage large items. • Use one-handed tools and equipment... • Use a comfortable grip with good control when holding pens and pencils. • Show a preference for a dominant hand. • Start taking part in some group activities which they make up for themselves, or in teams. 	<ul style="list-style-type: none"> • Develop their small motor skills so that they can use a range of tools competently, safely and confidently.



Year 1	Design	Make	Evaluate	Technical Knowledge	Cooking and Nutrition
Vocabulary:	Trees, Vines, Above, Below, Ground, Vegetable, Fruit, Smoothie, Ingredients, Prepare, Knife, Blender, Mechanism, Lever, Sliders, Models, Up, Down, Movement, Construct, Review, Evaluate, Criteria, Test, Intended Audience, Purpose, Structure, Requirements, Design, Stable, Stiffness, Strength, Cylinders, Assembling, Turbine, Machines, Altering, Reinforcing, Wheels, Forwards, Diagram, Techniques, Joining. Fruit, Vegetable, Vine, Texture, Appearance, Taste, Smell, Smoothie, Peel, Slice, Healthy				
Unit 1: Mechanisms- story book Unit 2: Food and cooking- fruit and vegetable smoothie Unit 3: Structures- windmills	<p>Design a purposeful and functional structure and mechanism – a story book and a windmill.</p> <p>Communicate ideas through by drawing ideas on a template and talking about it with a partner.</p> <p>Design a smoothie carton based on a chosen ingredient combination.</p> <p>Design an appealing product that matches the design criteria.</p>	<p>Join materials using tape, glue and split pins to make strong structures and moving parts.</p> <p>Cut materials safely using scissors.</p> <p>Safely use a butter knife to cut fruit and vegetables (bridge method).</p> <p>Know how to hold food using a bridge hold and position the knife away from fingers.</p>	<p>Explore moving parts in books to help design own moving part.</p> <p>Explain likes and dislikes about the moving story book.</p> <p>Test the moving parts in story books and suggest how they could be improved.</p> <p>Explore combinations for ingredients and say which is the favourite.</p> <p>Test the wheel structure turns freely and whether the structure is strong and stable.</p>	<p>Understand that a lever is made of two parts; a handle and pivot and is a mechanism to make things move.</p> <p>Know that a slider is a mechanism and can be used to make a moving picture.</p> <p>Know that a wheel is a mechanism and can be used to make a moving picture.</p> <p>Explore how the structure could be made stronger and more stable.</p> <p>Understand that cylinders are a strong type of structure that are often used in windmills and lighthouses.</p>	<p>Know that fruit and vegetables can be blended to make them smooth.</p> <p>Identify whether food is a fruit or a vegetable.</p> <p>Name a number of fruits and vegetables and explain how to determine if something is a fruit.</p> <p>Understand that fruit and vegetables grow in one of three places: on trees or vines, above the ground or below the ground.</p> <p>Taste fruits and vegetables, describe their appearance, texture, smell and taste.</p>



Year 2	Design	Make	Evaluate	Technical Knowledge	Cooking and Nutrition
Vocabulary:	Stable, Stability, Unstable, Flat base, Strong, Stiff, Stiffness, Needle, Thread, Knot, Running Stitch, Template, Wheel, Axle, Axle holder, Pod, Frame, Mechanism, Structure, Materials, Pouch, Rotate, Tabs, Joints, Eye, Point, Bridge, Claw Grip, Texture, Aroma, Combinations, Protein, Oils, Spreads, Carbohydrates, Dairy.				
Unit 1: Structure- Baby Bear's chair Unit 2: Textiles- pirate pouches Unit 3: Mechanism- Ferris wheel	Design a functional chair that is strong and stable. Develop a design through drawing and talking. Design appealing decorations for my pouch based on the design criteria. Design a Ferris wheel, labelling the materials and parts of the wheel (axle, frame and spoke). Know how to use ICT to create an inspiration board.	Understand how to build a strong and stiff structure by folding paper. Thread a needle, tie a knot in the thread and sew a running stitch to make a pirate's pouch. Use tabs to connect card or wood to create joins in the structure. Construct a wheel that rotates and finish the Ferris wheel, checking that it can rotate freely on the frame. Safely chop and slice food using the bridge and claw grip method.	Evaluate a range of existing items that can be used as a chair. Test the strength of the structure and check against the design criteria. Evaluate my pouch and explain how it matches my design. Explore and explain what I like about existing Ferris wheel designs. Explain how designs can be improved to make them stronger. Conduct research and test out the most popular flavours and combinations for wraps. Describe the taste, texture and aroma of ingredients.	Understand the meaning of the words strength, stiffness and stability and know there are different ways paper can be folded to improve its strength and stiffness. Know that the running stitch needs to be neat, held in place with a knot at the end know the names of the parts of a needle (eye and point). Explain how axles help wheels to move a vehicle. Know and select materials which would be suitable for the different parts of a Ferris wheel. Know that George W.G. Ferris designed the first Ferris wheel in 1893.	Understand there are 5 food groups: fruit and vegetables, starchy carbohydrates, proteins, dairy and oils and spreads. Design a healthy wrap following the criteria, using food from more than one food group. Understand what makes a balanced diet and know what 'hidden sugars' are. Explain where to find nutritional information on a drinks container.



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Year 3	Design	Make	Evaluate	Technical Knowledge	Cooking and Nutrition
Vocabulary:	Mechanism, Lever, Pivot, Linkage system, Pneumatic System, Input, Output, Component, Syringe, Tubing, Compression, Plunger, Thumbnail sketch, Exploded diagram, Cross sectional, Attract, Component, Electrostatic, Motion, Repel, Climate, Diet, Natural, Processed, Seasons, Imported				
Unit 1: Mechanism- Pneumatic systems Unit 2: Food and Cooking- eating seasonally Unit 3: Electrical systems- static electricity	<p>Develop design criteria to ensure a toy is appealing and suitable for a young child.</p> <p>Use different types of sketches to develop and communicate the ideas for my toy (thumbnail sketches and exploded diagrams).</p> <p>Draw and label my game design and use arrows to show the movement.</p> <p>Design a game that works using static electricity.</p> <p>Design a dish using seasonal fruits or vegetables.</p> <p>Design a Chinese style dish using seasonal ingredients.</p>	<p>Select the right materials for the housing of the pneumatic system.</p> <p>Safely use scissors to cut the card for the hinges and moving part.</p> <p>Know how to manipulate materials to create different effects by cutting, creasing and folding.</p> <p>Join with glue and tape to securely attach components to each other and to a stable base.</p> <p>Understand how to use, store and clean a knife safely.</p> <p>Follow a recipe from start to finish.</p> <p>Make a fruit crumble using seasonal fruit and prepare a Chinese style dish.</p>	<p>Explore a number of everyday products that use pneumatics.</p> <p>Check my mechanism runs smoothly in the housing.</p> <p>Describe how Chinese fruits and vegetables taste and explain how they taste different to fruits grown in the UK.</p> <p>Investigate static electricity in a range of objects.</p> <p>Use the feedback of others to change and improve my game design.</p> <p>Test my game against the design criteria.</p>	<p>Understand that a pneumatic system is a mechanism that runs on air or compressed gas and that pneumatic systems force air over a distance to create movement.</p> <p>Know that a linkage system is a series of links, wheels or gears to transmit motion.</p> <p>Know that balloons and syringes can be used to create different types of pneumatic systems.</p> <p>Know that John Boyd Dunlop created the first pneumatic tyre in 1888.</p>	<p>Understand that climate effects food growth. and not all fruit and vegetables can be grown in the UK.</p> <p>Know that importing food impacts the environment and is one of the reasons why we should eat seasonal foods grown in the UK.</p> <p>Know that in the UK we often import food from other countries when it is not in season.</p> <p>Know the basic rules of food contamination.</p>



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Year 4	Design	Make	Evaluate	Technical Knowledge	Cooking and Nutrition
Vocabulary:	Electrical component, Graphite Circuit, Battery, LED bulb, Insulator, Conductor, Switch, Design Criteria, Intended Percipient, Copper Tape, Positive, Negative, Fastenings, zips, Velcro, toggles, ties, press studs, clasps, buttons, Fabric, Vegetarian, Gluten free, Dairy free, Adapting, Alternative ingredients, Crops				
<p>Unit 1:Electrical systems- Greeting cards</p> <p>Unit 2: Food and Cooking- Adapting a recipe</p> <p>Unit 3: Textiles- fastenings on a book sleeve</p>	<p>Generate ideas that match the design criteria.</p> <p>Communicate my design by drawing a simple electrical circuit, using drawings of circuit components.</p> <p>Design a greeting card for an occasion of my choice.</p> <p>Develop the design criteria to make a high quality greeting card that suits the intended purpose.</p> <p>Label the design to ensure I have everything I need to be able to make it.</p> <p>Research alternative ingredients by looking at existing (adapted) recipes.</p> <p>Understand how to adapt a recipe to fit the design criteria e.g. gluten free or vegetarian diet.</p> <p>Design a book sleeve which contains a fastening.</p>	<p>Select materials and combine them to create an aesthetically pleasing front cover design for my card, that matches the occasion.</p> <p>Refer back to the design sheet to ensure it matches what I am making.</p> <p>Secure the circuit components (battery, copper tape) in place with tape.</p> <p>Safely chop and prepare food to be cooked.</p> <p>Bake bread with alternative ingredients to suit dietary requirements.</p> <p>Assemble the book sleeve using pins and sew the seam using a running stitch.</p> <p>Attach the fastening to the book sleeve and add detail and decorations.</p>	<p>Explore a range of greeting cards and explain how lights are used within the design.</p> <p>Test the electronic greeting card and evaluate it against my design criteria.</p> <p>Use the feedback of others to consider modifications to improve my card.</p> <p>Describe how adapted recipes and ingredients may taste and suggest ways to improve a recipe.</p> <p>Evaluate the taste, smell, texture and appearance of bread made with different ingredients.</p> <p>Investigate fastenings on existing products, such as coats, bags and lunchboxes and explain how they open and close.</p>	<p>Understand that circuits are made up of different electronic components and know the names of key circuit components used to create a functioning series circuit.</p> <p>Understand that graphite is a conductor and can be used as part of a circuit and that breaks within a circuit will stop it from working.</p> <p>Know that the positive side of the LED branches towards the positive side of the battery.</p> <p>Know that Sir Rowland Hill developed the pre-paid postage stamp.</p> <p>Know that a fastening joins two pieces of fabric and the main types of fastening are (zips, Velcro, toggles, ties, press studs, clasps and buttons).</p> <p>Explain the advantages and disadvantages of each fastening type.</p> <p>Know that George de Mestral invented the Velcro fastener in 1941.</p>	<p>Recognise where and how a variety of ingredients are grown.</p> <p>Know that there are occasions when recipes need to be adapted to meet the needs of individuals.</p> <p>Suggest alternative ingredients for gluten free, dairy free and vegetarian dishes.</p>



Year 5	Design	Make	Evaluate	Technical Knowledge Cooking and Nutrition
Vocabulary:	Arch bridge, Beam bridge, Suspension bridge, Tension, Compression, Truss bridge, Prototype, Pressure, Tenon saws, Hook bridge, Bracing, Blanket stitch, Annotate, Stuffed toy, Stuffing, Template, Patterns, Appendages, Fabric (Knitted material made from plant fibres, animal fur or synthetic material), Sow, Template, Stuffing, Cross Stitch, Running Stitch, Applique, Seam, Temperature monitor, Sensor, Program, Alert, Thermometer			
Unit 1: Structure-bridges Unit 2: Digital World- monitoring devices Unit 3: Textiles-stuffed toys	<p>Generate a prototype of a bridge to test my design.</p> <p>Develop design criteria for a smart temperature monitor based on research.</p> <p>Research animals to determine which species to design the product for.</p> <p>Design a stuffed toy and include annotations to detail the materials and techniques they will include.</p>	<p>Measure and mark the wood accurately and use Tenon saws and bench hooks safely to cut out the parts needed for the bridge.</p> <p>Assemble the Truss bridge using triangles to reinforce the structure.</p> <p>Use sand paper to achieve a high quality finish.</p> <p>Assemble the frame and use glue guns to join the Truss bridge.</p> <p>Write a program using Micro:bit to monitor ambient temperature and control (through code) a visual alert when the temperature rises above or falls below a specific range.</p> <p>Pin the fabric and cut the template to form the stuffed toy.</p> <p>Thread a needle, tie a knot and sew a blanket stitch to join two pieces of fabric.</p> <p>Know how to repair any holes or gaps in the stuffed toy and finish it to a high standard.</p>	<p>Identify stronger and weaker structures.</p> <p>Test my bridge and identify areas of weakness, reinforcing the structure with triangles.</p> <p>Explain the functions in the program and explain how my product would be useful for an animal carer.</p> <p>Evaluate my stuffed toy by comparing the final product to the original design.</p> <p>Identify poor sewing technique and explain how to rectify it, for example, pull tighter or sew closer stitches.</p>	<p>Identify arch and beam bridges.</p> <p>Explain what compression and tension means and identify where tension and compression might be experienced on a bridge.</p> <p>Know how compression and tension forces can be used to make structures stronger.</p> <p>Understand how to reinforce more complex structures to improve strength, stability and stiffness.</p> <p>Know that Isambard Kingdom Brunel designed a number of bridges in the UK, including the Clifton suspension bridge and was also a pioneer in railway design.</p> <p>Describe the key developments in thermometer history, including the work of Gabriel Fahrenheit and Anders Celsius.</p> <p>Know the three different stitches (blanket, running and cross stitch) and how to create a hidden seam and seal stuffing.</p>



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Year 6	Design	Make	Evaluate	Technical Knowledge	Cooking and Nutrition
Vocabulary:	Axle, Chassis, Pulley, Cam, Bench hooks, Clamps, Hack saws, Dowelling, Motor, Circuit, Set square, Waistcoat, Materials, Waterproof, Comfortable, Secure, Patterns, Running Stitch, Template, Fastening, Knot, Back, Waist, Sketch, Amend, Seam, Computer Aided Design, Virtual models, Starter, Main course, Dessert, Complement, Hygiene				
Unit 1: Mechanical systems- WW2 vehicle Unit 2: textiles- waistcoat Unit 3: Food and Cooking-Come dine with me, a three course meal	<p>Draw exploded and cross-sectional diagrams of the WW2 vehicle design.</p> <p>Use TinkerCAD to create 3D Computer Aided Design virtual models for my vehicle.</p> <p>Sketch ideas for waistcoat design, annotating the details, including any fastenings, colour of fabric and thread.</p> <p>Include details to match the design brief thinking about the colour and style of Brazilian festival dress.</p> <p>Choose from a range of textile features to include in my design (fastening, stitching techniques and applique).</p> <p>List the ingredients and equipment needed for my recipe.</p> <p>Design a 3 course meal.</p>	<p>Measure, mark and saw dowelling and wood accurately, selecting appropriate equipment.</p> <p>Set up bench hooks, clamps and hack saws and use set squares to mark accurately.</p> <p>Use fabric scissors to accurately cut out the panels for the waistcoat.</p> <p>Pin the fabric pieces together, ensuring the waistcoat is inside out, ready for sewing.</p> <p>Sew a strong running stitch, ensuring the stiches are small, neat and follow the edge.</p> <p>Attach beads and buttons by looping thread through the holes a number of times and then hold it in place with a secure knot.</p> <p>Follow a recipe and work to a given timescale.</p> <p>Measure and use the correct quantities for each ingredient and work hygienically with independence.</p>	<p>Investigate a range of existing toy vehicles.</p> <p>Test my product meets the design criteria, making amendments to improve the final product.</p> <p>Understand key industries that utilise 3D CAD modelling and can explain why.</p> <p>Analyse a range of waistcoat designs and consider the properties of materials they are made from.</p> <p>Evaluate a recipe considering: taste, texture, smell and origin of the food group and write up suggestions to improve dishes.</p>	<p>Understand that axles and chassis form the base of my vehicle.</p> <p>Create an electrical circuit and attach a motor to the axle to power the vehicle.</p> <p>Understand that a pulley and cam can be used to create a mechanical system. Know that Henry Ford founded the Ford Motor Group in 1903 and developed the assembly technique of mass production.</p> <p>Understand that the template forms a basis for my pattern and that I can adapt the pattern (amending measurements) to meet my design requirements.</p> <p>Know to sew the waistcoat inside out so that the stitching is on the inside of the clothing (creating a hidden seam). Stella McCartney is a British fashion designer known for her sustainable and vegan fashion.</p>	<p>Research a recipe by ingredient.</p> <p>Understand that not all courses complement each other.</p> <p>Understand and describe the process of 'Farm to Fork' for one ingredient in my recipe.</p>