Knowledge Progression

Year 5/6 Design and Technology

	Designing	Making	Evaluating	Technical Knowledge (textiles, structures, mechanical and electrical systems)	Cooking and Nutrition
Key Vocabulary	Design, Design-criteria, target audience, consumer, create, think, research, market-research, explain, make, modify, improve, refine, aesthetic, finishing, finishing techniques, explore, investigate, evaluate, analyse, prove, product, functional, strength, weakness, name, describe, measure, illustrate, annotate, exploded-diagram, pattern pieces, computer-aided design, prototype, recognise, explain, tools, hack-saw, bench hook, hand drill, hot glue-gun, structure, join (flange, slots and cuts, slots and tabs, glue gun), saw, tape, test, hinge, protect, stronger, stiffer, support, sturdy, framework, dowel, moving parts (cams), Chichen Itza.			Felt, thread, needle, pin, stitch, running stitch-, back-stitch, whip-stitch, blank-stitch, sewing machine, sewing line, measure, mark, cut, score, attach, join, glue, cams, dowels, linear motion, rotatory motion, finishing techniques, structure, framework, stiffer, stronger, sturdy, free-standing, join, assemble, slots, holes, electric circuits, motor, motor mount, toggle switch, pulley, axle, axle supports.	Food, ingredient, hygienic, recipe, hob, oven, price per head, budget, technique, weigh, grams, kilograms, measure, millilitre, litre, chop and finely chop (bridge and claw), grate and finely grate, peel, spread, mix, pour, stir, drain, cook (boil), fry, simmer, melt (bain-marie), bake, crack beat and separate eggs, shape spoon, whisk, sieve/sift, cream, fold, roll, shape, divide garnish, season, sweet and savoury dishes, balanced and unbalanced diet, Eatwell Plate proportions, proportions per meal, nutrition, sweet, savoury, sensory, flavour, aroma, texture, appearance, vitamins, minerals, sensory, protein, dairy, carbohydrate, seasonality, sustainable, reared, caught, processed.
Previous knowledge/ Learning	**IN LKS2, OUR CHILDREN WILL:** *DT1* - Used research to design a purposeful, functional and appealing product (mechanical information poster, kite, torch and juggling balls) whilst planning a written step-by-step production plan. Produced a labelled product design with detailed descriptions about choices around materials, components, functions and aesthetics. E.g. labelling why their material was both suitable and appealing. *DT2* - Developed, modelled and communicated their ideas through: annotated sketches, cross-sectional diagrams and prototypes, proving that their designs met a set criterion *DT3* - Drew upon and discussed ideas from the designs of others and persevered whilst refining their designs.	**IN LKS2, OUR CHILDREN WILL HAVE:** *DT4* - Followed a step-by-step plan for their mechanical information poster, kite, torch and juggling balls, choosing the right equipment and materials for each stage. *DT5* - Knew which tools were most appropriate for a task, selected these and showed knowledge of how to handle it (e.g. scissors vs hacksaw or pritt-stick glue vs hot glue-gun). Furthermore, knew which techniques were most appropriate for a task, used these competently (e.g. choosing to join materials by taping, tying, or gluing) *DT6* - Worked accurately to measure (cm and mm), mark out, cut, score and make holes in materials needed for their models (with assistance when using hacksaws and hand drills). *DT7* - Worked accurately to join and assemble components (with assistance when using the hot glue-gun), paying particular attention to finishing techniques used for aesthetics and detail. Furthermore, applied their previous learning around stiffening and strengthening to build and join strong frame structures and bodies in their kites.	**IN LKS2, OUR CHILDREN WILL HAVE:** *DT8* - Presented their products (mechanical information poster, kite, torch and juggling balls), giving a demonstration and description of how their products worked. *DT9* - In the design stage, engaged in self, peer and against existing-product evaluations, using simple scales (yes or no) with extended explanations to give reasons as to why conclusions were made. Explained how to improve their designs and/or prototypes and if necessary, modified. *DT10* - Completed finished product evaluations to show an awareness of whether their design brief had been met, knowing how and why their model did or did not meet it. Explained how to improve their finished products and if necessary, modified. *DT11* - Researched and explained how Homan Walsh used a kite to help build the Niagara Falls Bridge and how kites have been used to influence to design of aeroplanes. *DT12* - Researched and explained the developments of 'light' throughout history, in particular how Thomas Edison created the light bulb.	**IN LKS2, OUR CHILDREN WILL HAVE:** **Technical** *DT13* - Knew how to strengthen their kite by stiffening a given part or reinforcing a part of the structure. *DT14* - Created a prototype of their mechanical information poster. *DT15* - Cut slots and internal shapes in their mechanical information posters. Used lolly sticks, card and split pins to make levers and linkages when making their mechanical information posters. Further to this, created neat, functional links and hinges. *DT16* - Linked scientific knowledge by using lights and switches to make their torch using series and parallel circuits, diagnosing faults when necessary. **Textile** *DT17* - Used textiles to create simple patterns on their juggling balls (applique: glued or simple stitches.) whilst measuring (using cm), mark and cut fabric/felt materials accurately. *DT18* - Joined fabrics using running-stitch or cross-stitch when making their juggling ball and understood seam allowance and created a hem using a running stitch or cross stitch when joining their juggling balls together.	**IN LKS2, OUR CHILDREN WILL HAVE:** *DT19* - Knew the correct proportions for a balanced diet and understood that when we don't eat a balanced meal, knowing the characteristics of a poor diet, this can contribute to an unhealthy lifestyle. *DT20* - Knew the difference between sweet and savoury foods. *DT21* - Knew when a food is ready for harvesting (seasonality) and where and how ingredients are grown and captured, explaining how a variety of ingredients are reared and caught. *DT22* - Followed a recipe to plan, prepare and make simple dishes (tomato pesto pasta and bread) safely and hygienically, being assisted when using a heat source (oven and hob). *DT23* - With supervision, chopped (bridge and claw) grated and finely grated, peeled, snipped and tore, spread, juiced, zested, mixed, poured, stirred, drained, cooked (boil), garnished, sieved/sifted, kneaded, divided, shaped, glazed and baked safely and hygienically. *DT24* - With supervision, weighed ingredients (g) using digital and spring balance scales and measured ingredients using spoons, cups and jugs (ml). *DT25* - Explained why you might use a cooking technique (microwave vs hob, grater vs peeler).
N.C. Objectives	1. 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. 2. Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.	1. 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 wide range of materials, textiles and ingredients, according to their functional properties and aesthetic qualities.	1. 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. 2. Understand how key events and individuals in design and technology have helped shape the world.	1. Apply their understanding of how to strengthen, stiffen and reinforce more complex structures. 2. Understand and use mechanical systems in their products (for example, gears, pulleys, cams, levers and linkages) 3. Understand and use electrical systems in their products (for example: series circuits incorporating switches, bulbs, buzzers and motors) 4. Apply their understanding of computing to program, monitor and control their products.	1. Understand and apply the principles of a healthy and varied diet. 2. Prepare and cook a variety of predominately savoury dishes using a range of cooking techniques. 3. Understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.

Powerful Knowledge
Year 5/6 Design and Technology

Key Knowledge – what do we want our children to know before they leave our phase?

Designing	Making	Evaluating	Technical Knowledge	Cooking and Nutrition
POWERFUL KNOWLEDGE: *DT1* - Use market research to inform the design of purposeful, functional and appealing products (automata animal, phone case and temple). *DT2* - Label their product designs, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design, with detail, demonstrating that culture and society are considered in plans and designs. Then, follow and refine their plans. *DT3* - Prove and explain how their product will meet their set criterion. ***HOW DOES THIS LOOK AT TRANMERE?*** **Cycle 1 Autumn 1 and 2: Anglo-Saxons and Vikings (Topic)** -Use consumer research to design a moving Viking longboat toy. 1) Carry out market research on the consumer (young child) 2) Investigate and analyse how pulley systems and motors can be used to make a product move. 2) Generate detailed annotated sketches and cross-sectional diagrams. 3) Prove their design fits the set criterion- engage in design stage evaluations (self and peer) and refine ideas accordingly *See evaluation column for more detail* 4) Create a plan of the making process – outlining an equipment and materials list, and the different stages/steps. **Cycle 1 Spring 1: Express Yourself (Topic) *Twinkl included*** -Use research to design a phone case for own personal use. 1) Create a design-criteria that fits their personal wants/needs through analysing and evaluating a range of existing phone cases. 2) Test a range of stitches (running, back, whip and blanket) to inform design choices. *Exposure to sewing machine* 3) Explore fastenings and recreate some (sew on buttons and make loops) 4) Generate detailed annotated sketches, pattern pieces and prototypes. 5) Prove their design fits the set criterion- engage in prototype evaluations (self and peer) and refine ideas accordingly *See evaluation column for more detail* 6) Create a plan of the making process – outlining an equipment and materials list, and the different stages/steps. **Cycle 2 Autumn 1 and 2: The Mayans (Topic)** -Use research to design their own Chichen Itza. 1) Investigate Mayan temples – structure, design, materials etc. 2) Explore how to strengthen, stiffen and reinforces more complex structures. 3) Generate detailed annotated sketches (computer based), exploded diagrams (computer based) and prototypes. 4) Prove their design fits the set criterion- engage in prototype evaluations (self and peer) and refine ideas accordingly *See evaluation column for more detail* 5) Create a plan of the making process – outlining an equipment and materials list, and the different stages/steps. **Cycle 2 Spring 1: Living Things and their Habitats (Science) *Twinkl included*** -Use market research to design an automata animal for sorting. 1) Carry out market research on the consumer (Y5/Y6 children) 2) Understand and use cams to test movement ideas. 3) Generate detailed annotated sketches and prototypes. 4) Prove their design fits the set criterion- engage in prototype evaluations (self and peer) and refine ideas accordingly *See evaluation column for more detail* 5) Create a plan of the making process – outlining an equipment and materials list, and the different stages/steps.	***POWERFUL KNOWLEDGE:*** *DT4* - In the design stage, create prototypes of their automata animal, phone case and temple before making a final vision, continuously modifying their plans as they go. *DT5* - Follow a step-by-step plan for their AA, PC and temple, competently selecting and using the tools/materials which suit specific practical tasks and enhance the aesthetics. *DT6* - Competently measure (cm and mm), mark out, cut, score and make holes in materials needed for their models (with supervision when using hacksaws and hand drills). *DT7* - Competently join and assemble components (with supervision when using the hot glue-gun), paying attention to finishing techniques used for aesthetics and detail. *DT8* - Build a free-standing temple with permanent joins that are strong and stable; applying their previous learning and understanding of stiffening and strengthening to build and adapt their temple. ***HOW DOES THIS LOOK AT TRANMERE?*** **Cycle 1 Autumn 1 and 2: Anglo-Saxons and Vikings (Topic)** 1) Follow their design, selecting and competently using the right tools (ruler, pencil scissors, hacksaw and bench hook, hot glue gun, sandpaper, glue) and materials (battery holder, battery snap, toggle switch, motor and mount, crocodile leads, cable ties pulleys, wheels, straws, card, dowels, wood, paper, pens) 2) Accurately measure (cm and mm) mark out and cut (hacksaws) with supervision, the wood, dowels and straws needed to make their motor structure. 3) Use appropriate joining techniques (hot glue gun and triangle card jinx) to assemble the structure base, wheels and dowel axels/straws. 4) Assemble and join (rubber bands, cable ties, crocodile clips) the pulley and motor system. 5) Accurately measure (cm and mm), mark out and cut their longboat design template. 6) With Supervision, join their longboat to their pulley-motor system using a hot glue gun. 7) At each stage, consider aesthetics and their audience when finishing their design. **Cycle 1 Spring 1: Express Yourself (Topic) *Twinkl included*** 1) Follow their design, selecting and competently using the right tools (ruler, scissors, needle) and materials (felts, threads, buttons, Velcro) 2) Accurately measure (cm and mm), mark out and cut their phone case templates. 3) Join their template together using the stitches decided upon during the design stage. 4) Join further materials for decoration using appropriate joining techniques (stitching, gluing, stapling). 5) At each stage, consider aesthetics and their audience when finishing their design. **Cycle 2 Autumn 1 and 2: The Mayans (Topic)** 1) Follow their design, selecting and competently using the right tools (hot glue-gun, hacksaws and bench hooks, sandpaper, rulers) and materials (wood, corrugated card) 2) Accurately measure (cm and mm) and mark out the wood and corrugated card pieces needed and with supervision (hacksaws), cut these. 3) With supervision (joining techniques = flange, slots and cuts, slots and tabs, hot-glue gun), assemble their temple, considering aesthetics when doing so. 4) At each stage, consider aesthetics and their audience when finishing their design. **Cycle 2 Spring 1: Living Things and their Habitats (Science) *Twinkl included*** 1) Follow their design, selecting and competently using the right tools (hot glue-gun, hacksaws and bench hooks, sandpaper, hand drills, rulers, cams, glue, scissors, paints, pens) and materials (wood, plastic tubing, dowels, card) 3) Competently measure (cm and mm), mark out and cut the wood frames and dowels for mechanism structure (with supervision) and card pieces for animals (independently). and card pieces to make their animal. 4) With supervision, drills holes in the frame structure and assemble / join together using a hot glue-gun. 5) Assemble the cams system and animal, using appropriate joining techniques (flange, slots and cuts, slots and tabs, glue gun, plastic tubing, hot glue gun or PVA glue). 6) At each stage, consider aesthetics and their audience when finishing their design.	***POWERFUL KNOWLEDGE:*** *DT9* - Know and explain how to test and evaluate their AA, PC and temple (prototype evaluations). *DT10* - In the design stage, explore and evaluate free-standing Mayan temples and existing phone cases and explain what gives them strength, reinforcement, stability, aesthetic value and drew sales. Then, record modifications in design edits – adding to their drawings and labels. *DT11* - In the design stage, engage in self, peer and when appropriate, consumer evaluations, using a numbered scale (1-10) with extended explanations to give reasons as to why conclusions were made. *DT12* - Complete finished product evaluations to show an awareness of whether their design brief has been met, knowing how and why their model did or did not meet it and present their finished products (automata animal, temple and phone case), giving a demonstration and description, whilst also suggesting alternative plans: outlining the positive features and the draw backs. ***HOW DOES THIS LOOK AT TRANMERE?*** **Cycle 1 Autumn 1 and 2: Anglo-Saxons and Vikings (Topic)** -Within the design stage and the post make stage, use a numbered scale (1-10) with extended explanations to evaluate (self, peer and consumer) their moving Viking longboat design against existing products, individual-self and peer opinions to judge against the **criteria below:** **Cycle 1 Spring 1: Express Yourself (Topic) *Twinkl included*** - Within the design stage and the post make stage, use a numbered scale (1-10) with extended explanations to evaluate (self, peer and consumer) their phone case prototype against existing products, individual-self and peer opinions to judge against the **criteria below:** **Cycle 2 Autumn 1 and 2: The Mayans (Topic)** - Within the design stage and the post make stage, use a numbered scale (1-10) with extended explanations to evaluate (self, peer and consumer) their Mayan Temple against existing products, individual-self and peer opinions to judge against the **criteria below:** **Cycle 2 Spring 1: Living Things and their Habitats (Science) *Twinkl included*** - Within the design stage and the post make stage, use a numbered scale (1-10) with extended explanations to evaluate (self, peer and consumer) their automata animals against existing products, individual-self and peer opinions to judge against the **criteria below:** **Within the design phase considerations:** -Has their product been successful? Does it work as it should? Does it appeal to its audience? Is it fit for purpose? Is it aesthetically pleasing? If so, why? If not, why? - Can you explain why your product will or will not be successful, and develop improvements which should be made to specifically target these areas? Look here specifically at the design criteria to recognise where their prototype does or does not fit the bill then modify. **Post make phase considerations:** - Can you describe your work and the process involved in creating it justifying your choices? - Are you pleased with the finished design? Is it strong and stable? Has the stitching been done carefully, neatly and methodically? - Were the materials used appropriate? Were they functional/aesthetically pleasing? - Can you explain how you developed your finished product based upon feedback from the design phase? - Did you test your product before presenting it to the consumer?	***POWERFUL KNOWLEDGE:*** **Technical** *DT13* – Create a prototype for their phone case, temple, Viking longboat and automata animal using J cloths, paper or card. *DT14* - Use cams and a framework (wood and card) to create an automata animal. *DT15* - Use electrical pulley-motors and switches to enhance a Viking longboat toy that relies upon a framework (wood and card). *DT16* - Cut materials with precision to the nearest mm and refine the finish with appropriate tools (such as sanding wood after cutting), paying close attention to aesthetics when cutting, assembling and creating joins. *DT17* - Cut slots and cut accurately and safely to make a marked line. *DT18* - Use a hand drill to create tight and loose fit holes. *DT19* - Use IT to design, create, evaluate, monitor and control a product and its advertising website. **Textile** *DT20* - Pin and tack fabric pieces together before stitching then decorate textiles appropriately. Explore fastenings and recreate some (sew on buttons and make loops) *DT21* - Have exposure to a sewing machine. They can sew in a straight, uniform line using one. *DT22* - Pay close attention to aesthetics when cutting, assembling and creating joins. *DT23* - Select an appropriate stitching for the job and hand, explaining why this was chosen over others. ***HOW DOES THIS LOOK AT TRANMERE?*** **Cycle 1 Autumn 1 and 2: Anglo-Saxons and Vikings (Topic)** -Make a prototype -Use electrical motors and switches to enhance a Viking longboat toy. -Cut slots and cut accurately and safely to make a marked line. -Use a hand drill to create tight and loose fit holes. -Pay close attention to aesthetics when cutting, assembling and creating joins. -Build frameworks for their Viking longboat using a range of materials (wood, card). **Cycle 1 Spring 1: Express Yourself (Topic) *Twinkl included*** -Make a prototype -Cut felt templates with precision to the nearest mm. -Pay close attention to aesthetics when cutting, assembling and creating joins with their felt. - exploring and using fastenings (sew on buttons and make loops) -Pin and tack fabric pieces together before stitching. -Decorate their case appropriately. -Have exposure to a sewing machine. They can sew in a straight, uniform line using one. -Test a range of stitches (running, back, whip and blanket) to inform design choices. **Cycle 2 Autumn 1 and 2: The Mayans (Topic)** -Make a prototype -Cut wood and corrugated card with precision to the nearest mm and refine the finish with appropriate tools (e.g. sanding wood) -Cut slots in wood accurately and safely to make a marked line. -Pay close attention to aesthetics when cutting, assembling and creating joins with wood. **Cycle 2 Spring 1: Living Things and their Habitats (Science) *Twinkl included*** -Make a prototype -Use cams correctly and accurately to make their animal move. -Cut wood and card materials with precision to the nearest mm and refine the finish with appropriate tools (e.g. sanding wood) -Cut slots in wood accurately and safely to make a marked line. -Use a hand drill to create tight and loose fit holes. -Pay close attention to aesthetics when cutting, assembling and creating joins in their wood and card. -Build frameworks for their automata animal using a range of materials (wood, card). **ICT Summer 2: Skills Showcase** Pupils will use IT to design, create, evaluate, monitor and control a product and its advertising website. See IT planning for details	***POWERFUL KNOWLEDGE:*** *DT24* - Know the correct proportions for a balanced meal and how a poor diet can contribute towards health conditions such as obesity and heart disease. *DT25* - Understand the difference between a savoury and a sweet dish. *DT26* - Know where various foods and ingredients are from, globally, and when they are in season ready for harvest. Furthermore, explain how a variety of ingredients are reared, caught and processed. *DT27* - Explain how food ingredients should be stored and give reasons (specifically the correct storage and heating of meat and fish and of rice using knowledge of spores, bacteria and causes of food poisoning.) *DT28* - Research and plan a, budgeted (price per head), seasonal, savoury recipe, following this to prepare and make complex dishes (spaghetti meatballs and French custard tarte) safely and hygienically, being assisted when using a heat source (oven and hob). *DT29* - With supervision, chop and finely chop (bridge and claw), grate and finely grate, peel, spread, mix, pour, stir, drain, cook (boil), fry, simmer, melt (bain-marie), bake, crack beat and separate eggs, shape spoon, whisk, sieve/sift, cream, fold, roll, shape, divide garnish and season safely and hygienically. *DT30* - With supervision, weigh ingredients using digital scales and spring balances and measure ingredients using spoons, cups and jugs. *DT31* - Explain why you might use a cooking technique (e.g., Bain-marie). ***HOW DOES THIS LOOK AT TRANMERE?*** **Cycle 1 Spring 2: Fit for Life (topic) *Twinkl included*** 1) Research how different foods are reared, caught and processed. 2) Create a seasonality calendar for fruit and veg in the UK and taste some foods in season. 3) Research and understand the correct proportions to make a balanced meal. 4) Specifically look into plate proportions of proteins (how much, its importance, how its reared and processed, how its stored). 5) Plan a budgeted, healthy, balanced meal (Spaghetti Bolognese) that contains the correct proportions of the different food groups. 6) Focusing on the key skills (supervised) – weighing, measuring, chopping and finely chopping (bridge and claw), grating and finely grating, cracking and beating an egg, peeling, spreading, mixing, pouring, stirring, draining, garnishing and seasoning, prepare and make their dish. 7) With assistance, cook (boil), fry and simmer using the hob, focusing on safety procedures and controlling temperature. **Cycle 2 Spring 1 and 2: WW2 (topic) *Twinkl Unit Included*** 1) Research, sample and explore foods from around the world. (source, seasonality, how it's used). 2) Research and explore the ways people in different countries create balanced meals (meal proportions). 3) Compare and contrast the differences between meals in Britain during WW2 and now. (Use the Eatwell plate). 4) Research traditional French dishes (sweet and savoury) 5) Plan a budgeted, traditionally French dessert dish (French custard tarte). 6) Focusing on the key skills – weighing, measuring, whisking, cracking beating and separating an egg, creaming, folding, sieving/sifting, rolling and shaping, prepare and make their dish. 7) With assistance, melt (bain-marie) and bake using the hob and oven, focusing on safety procedures and controlling temperature. 8) Explain why techniques were chosen (e.g., bain-marie over microwave)