Vernon Park Primary School: Design and Technology Concepts and Progression of Knowledge, Skills and Vocabulary

At Vernon Park Primary School, we aim to provide all children, parents and the wider school community with a safe, caring and inclusive environment where high-quality learning experiences enable all children to be the best that they can be.

Kindness and Empathy, Friendship and Respect, Honesty and Responsibility, Tolerance and Fairness, Support and Inclusion, Challenge and Resilience.

INTENT

Design Technology encourages children to express themselves creatively, problem solving as they work and responding reactively to create technology for the future.

Key Concepts of D&T at Vernon Park Primary School

Master practical techniques.

Take inspiration from design.

Design, make, evaluate and improve

At Vernon Park we will teach these three key concepts throughout KS1 and KS2. These are the big ideas that underpin the subject. Key concepts are explored throughout the topics.

The three key concepts in design & technology are:

- **Master practical techniques.** This concept involves developing the skills needed to make high quality products through focused tasks (FTs)
- **Take inspiration from design.** This concept involves appreciating the design process that has influenced the products we use in everyday life. Through investigative and evaluative activities (IEAs)
- **Design, make, evaluate and improve.** This concept involves developing the process of design thinking and seeing design as an iterative process. Children create functional products with users and purposes in mind through design, make and evaluate assignment (DMEA).

Each key concept has its knowledge associated. This knowledge can be put into categories. Here are the knowledge categories explained:

Technical Knowledge:

- Technical knowledge involves knowing about the technical theories that underpin design. This helps designers to imagine products that, in the real world, will do what they intended them to do. For example, knowing about the theory of triangulation allows designers to create structures that are strong stable; knowing about the theory of electrical systems allows them to produce workable products.
- Technical knowledge also includes learning about design challenges, such as how best to join materials. Without knowing, for example, that scoring card before folding make for a cleaner fold, one cannot realise one's designs.

- Technical knowledge is distinct from practical knowledge in that it is focused on theory; practical knowledge is based on one's ability to apply theory successfully.

The areas of technical knowledge we teach include:

- Structures (frame, solid, shell, arch)
- Mechanisms (slider, lever, wheel and axle; linked lever, pneumatics and hydraulics; pulleys, gears and cams)
- Electrical systems (paper, circuits, electronic motions)
- Artificial intelligence and app control (programming, sensors, monitoring)
- Food and nutrition (food preparation, sources of food, seasonal foods, safety and hygiene, health and nutrition)

Practical Knowledge:

- Practical knowledge involves applying technical knowledge to projects. It requires practice and developed fine motor skills, designers need automatic recall of technical and practical knowledge to successfully realise their designs. Without practical knowledge pupils will struggle to understand the limitations of their designs and therefore, be more likely to produce unrealistic design proposals.

The areas of practical knowledge we teach include:

- Cutting
- Joining
- Measuring
- Scoring
- Assembling
- Strengthening
- CAD (computer-aided design)
- Cross-section and exploded diagrams

Design Inspiration:

- Design and technology is primarily concerned with making useful inventions that have a purpose and intended users. The ideas for most inventions come from things that are already in existence and, over time, inventors gradually improve them. By focusing on the knowledge of existing products, we aim to help pupils to appreciate that inspiration comes from what is already around us.

Design Process:

- Design is an iterative process. This is an important part of the discipline of design.

We use the following iterative process: think, make, break, repeat. The 'break' part of the process involves looking at the weaknesses of the design as it develops and making adjustments accordingly – a stage that is also called evaluation.
We use the term 'evaluation' throughout the design process rather than something that is done at the end.

Golden Threads of D&T at Vernon Park Primary School

Systems Structures Textiles Food Mechanisms

EYFS	KS1	LKS2	UKS2
Design process: Design, make, evaluate and improve			
· Gain some experience of designing, making and evaluating products for a specified user and purpose.	· Design products that have a clear purpose and an intended user. · Make products, refining the design as work progresses. · Use software to design.	· Design with purpose by identifying opportunities to design. · Make products by working efficiently (such as by carefully selecting materials). · Refine work and techniques as work progresses, continually evaluating the product design. · Use apps to design and represent product designs.	· Design with the user in mind, motivated by the service a product will offer (rather than simply for profit). · Make products through stages of prototypes, making continual refinements. · Ensure products have a high-quality finish,using art skills where appropriate. · Use prototypes, cross-sectional diagrams and computer aided designs to represent designs.
Key vocabulary: names of equipment and utensils	Key vocabulary: mock-up, design brief, design criteria, make, evaluate, user, purpose, Function, features, suitable, quality	Key vocabulary: user, purpose, function, prototype, design criteria, innovative, appealing, design brief planning, design criteria, purpose, user, annotated	Key vocabulary: design specification, innovative, research, evaluate, design brief, prototype, annotated sketch, annotated drawings, exploded diagrams

	names of tools, equipment, utensils and materials used	sketch, sensory Evaluations user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, aesthetics,	annotate, design criteria, annotate, design decisions, functionality, innovation, authentic, user, purpose, evaluate, mock-up, prototype
 **Design inspiration: Take inspiration from design**			
· Explored moving objects through play. · Ask questions about how objects have been created.	· Explore objects and designs to identify likes and dislikes. · Suggest improvements to existing designs. · Explore how products have been created.	· Identify some of the great designers in all of the areas of study to generate ideas for designs. · Improve upon existing designs, giving reasons for choices. · Disassemble products to understand how they work.	· Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices. · Create innovative designs that improve upon existing products. · Evaluate the design of products so as to suggest improvements to the user experience.
Key vocabulary:	Key vocabulary: design, make, evaluate, purpose, user, criteria, functional,design criteria, product, function	Key vocabulary: decision, evaluating, design brief design criteria, innovative, prototype user, purpose, function, prototype, design criteria, innovative, appealing,	Key vocabulary: design decisions, functionality, innovation, authentic, user, purpose, design specification, design brief purpose, user, innovation, research, functional, innovative,

		design brief, research, evaluate, ideas, constraints, investigate	functionality, innovation, authentic, user, purpose, evaluate, mock-up, prototype
 **Practical knowledge: Master Practical Techniques**			
Mechanisms			
· Assemble vehicles with moving wheels using construction kits. · Make simple flaps and hinges with paper and card. · Use simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape.	· Create products using levers, wheels and winding mechanisms.	· Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as linked levers or pneumatics).	· Convert rotary motion to linear using cams. · Use innovative combinations of electronics (or computing) and mechanics in product designs.
Key vocabulary: vehicle, wheel, axle, body,fold cutting, joining, shaping, finishing, fixed, moving, mechanism, turn, spin	Key vocabulary: vehicle, wheel, axle, axle holder, chassis, body, cab slider, lever, pivot, slot, bridge/guide, assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism,	Key vocabulary: components, fixing, attaching, tubing, syringe, plunger, split pin, paper fastener, pneumatic system, input, movement, process, output movement, control, compression, pressure, inflate, deflate, pump, seal, air-tight linear, rotary, oscillating, reciprocating	Key vocabulary: pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor, circuit, switch,, circuit diagram, mechanical system, electrical system, input, process, output, cam, snail cam, off-centre, peg cam, pear shaped cam

Structures			
· Use construction kits to build walls,towers and frameworks. · Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card. · Experience of different methods of joining card and paper.	· Practise drilling, screwing, gluing and nailing materials to make and strengthen products.	· Choose suitable techniques to construct products or to repair items. · Strengthen materials using suitable techniques.	· Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing,
Key vocabulary: cut, fold, join, fix, circle, triangle, square, rectangle, cuboid, cube, cylinder	Key vocabulary: structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved	Key vocabulary: shell structure, three-dimensional (3-D), shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating font, lettering, text, graphics,	Key vocabulary: frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent
Textiles			
· Explore and use different fabrics. · Cut and join fabrics with simple techniques.	· Join fabric in simple ways by gluing and stitching. · Use simple patterns and templates for marking out. · Evaluate a range of textile products.	· Use basic stitching, joining textiles and finishing techniques. · Make and use textiles pattern pieces. · Use simple computer-aided design applications.	· Create objects that employ a seam allowance. · Join textiles with a combination of stitching techniques. · Use the qualities of materials to

			create suitable visual and tactile effects in the decoration of textiles.
Key vocabulary: fabric, names of fabrics: felt, wool, cotton.	Key vocabulary: fabric, names of fabrics, template, pattern pieces, mark out, join, decorate, finish	Key vocabulary: fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance	Key vocabulary: computer aided design (CAD), computer aided manufacture (CAM) font, lettering, text, graphics, menu, scale, modify, repeat, copy, flip seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces names of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings, iron transfer paper
Food			
· Experience of common fruit and vegetables, undertaking sensory activities. · Cutting soft fruit and vegetables using appropriate utensils.	· Cut, peel and grate ingredients safely and hygienically. · Measure or weigh using measuring cups or scales. · Assemble and cook ingredients.	· Prepare ingredients hygienically using appropriate utensils. · Measure ingredients accurately to the nearest gram. · Follow a recipe. · Assemble and cook ingredients.	· Understand the importance of correct storage and handling of ingredients (using knowledge of micro-organisms). · Measure accurately and calculate ratios of ingredients to scale up or down from a recipe. · Demonstrate a range of baking and cooking techniques. · Create and refine recipes, including ingredients, methods, cooking times and temperature
Key vocabulary:	Key vocabulary:	Key vocabulary:	Key vocabulary:

fruit and vegetable names, sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard	name of products, names of equipment, utensils, techniques and ingredients fruit and vegetable names, sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard	name of products, names of equipment, utensils, techniques and Ingredients texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested, healthy/varied diet	ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble
Systems			
		· Create products with series and parallel circuits · Control and monitor models using apps designed for this purpose.	· Create products using electronics kits that employ a number of components. · Write code to control and monitor models or products.
		Key vocabulary: series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, light emitting diode (LED), bulb, bulb holder, USB cable, wire, insulator, conductor, crocodile clip, control, program, system, input device, output device, process	Key vocabulary: series circuit, parallel circuit, names of switches and components, input device, output device, system, monitor, control, program, flowchart