DESIGN & TECHNOLOGY KNOWLEDGE AND SKILLS PROGRESSION OVERVIEW

Kingfisher Hall Academy

Ensuring that our Design & technology is a force for positive Change

Intent

The Design and Technology taught will progressively cover the knowledge, understanding and skills required in the National Curriculum. Design and Technology aims to inspire children through a broad range of practical experiences to create innovative designs which solve real and relevant problems within a variety of different contexts. This iterative process encourages children to identify real and relevant problems, critically evaluate existing products and then take risks and innovate when designing and creating solutions to the problems. As part of the iterative process, time is built in to reflect, evaluate and improve on prototypes using design criteria throughout to support this process. Opportunities are provided for children to evaluate key events and individuals who have helped shape the world, showing the real impact of design and technology on the wider environment and helping to inspire children to become the next generation of innovators, promoting a force for positive change.

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 particular 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 - Pupils should be taught to:

- 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.

Year 1	
Design	➢ Begin to draw on their own experience to help generate ideas and research conducted on criteria. (3D map) ➢ Begin to understand the development of existing products: What they are for, how they work, materials used. (Plastic planters) ➢ Start to suggest ideas and explain what they are going to do. (3D map, fabric face, Nature sculptures) ➢ Understand how to identify a target group for what they intend to design and make based on a design criterion. (Fabric face) ➢ Begin to develop their ideas through talk and drawings. (Planters, 3D map) & Make templates and mock ups of their ideas in card and paper or using ICT
Make	➢ Begin to make their design using appropriate techniques. (3D map, Nature sculpture) ➢ With help measure, mark out, cut and shape a range of materials. (3D map, fabric face) ➢ Explore using tools e.g. scissors and a hole punch safely. (3D map, fabric face) ➢ Begin to assemble, join and combine materials and components together using a variety of temporary methods e.g. glues or masking tape. (3D map, fabric face, Nature sculptures, Plastic planters) ➢ Demonstrate how to cut, shape and join fabric to make a simple product. Use basic sewing techniques. (Fabric face) ➢ Begin to use simple finishing techniques to improve the appearance of their product (Fabric face, Plastic planters)
Evaluate	➢ Start to evaluate their product by discussing how well it works in relation to the purpose (design criteria). ➢ When looking at existing products explain what they like and dislike about products and why. (Nature sculptures) ➢ Begin to evaluate their products as they are developed, identifying strengths and possible changes they might make (Nature sculptures, fabric face)
Technical knowledge	➢ Begin to build simple structures, exploring how they can be made stronger, stiffer and more stable; (3D map) ➢ Start to talk about and begin to understand the simple working characteristics of materials & componants; (3D map, Nature sculptures, Fabric face, plastic planters) ➢ Begin to explore products using mechanisms, such as levers, sliders and wheels (History unit of toys)
Cooking & Nutrition	➢ Begin to understand that all food comes from plants or animals. (Science unit) ➢ Explore the understanding that food has to be farmed, grown elsewhere (e.g. home) or caught. (Science unit) ➢ Start to understand how to name and sort foods into the five groups in 'The Eat well plate' (Science unit) ➢ Begin to understand that everyone should eat at least five portions of fruit and vegetables every day. (Science unit) ➢ Know how to prepare simple dishes safely and hygienically, without using a heat source. Know how to use techniques such as cutting, peeling and grating.

Year 2	
Design	➢ Generate ideas by drawing on their own and other people's experiences. (Moving pictures) ➢ Begin to develop their design ideas through discussion, observation, drawing and modelling. (Moving pictures, bird house) ➢ Identify a purpose for what they intend to design and make. (Moving pictures, Bird house) ➢ Understand how to identify a target group for what they intend to design and make based on a design criterion. (Moving pictures, bird house) ➢ Develop their ideas through talk & drawings and label parts. Make templates & mock ups of their ideas in card and paper or using ICT. (Moving pictures, bird house)
Make	➢ Select tools and materials; use correct vocabulary to name and describe them. (Moving pictures, bird house) ➢ Build structures, exploring how they can be made stronger, stiffer and more stable. (Bird house) ➢ With help measure, cut and score with some accuracy. Learn to use hand tools safely and appropriately. (Moving pictures, bird house) ➢ Start to assemble, join and combine materials in order to make a product. (Moving pictures, bird house) - Start to choose and use appropriate finishing techniques based on own ideas. (Moving pictures, bird house) ➢ Make a picture which aims to have two moving mechanisms. (Moving pictures)
Evaluate	➢ Evaluate their work against their design criteria. (Moving pictures, bird house) ➢ Look at a range of existing products explain what they like and dislike about products and why. (Moving pictures, bird house) ➢ Start to evaluate their products as they are developed, identifying strengths and possible changes they might make. (Moving pictures, bird house) ➢ With confidence talk about their ideas, saying what they like and dislike about them. (Moving pictures, bird house)
Technical knowledge	➢ Build structures, exploring how they can be made stronger, stiffer and more stable. (Bird house) ➢ Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. (moving pictures) ➢ Talk about and begin to understand the simple working characteristics of materials and components; (moving pictures)
Cooking & Nutrition	➢ Understand that food comes from plants or animals. (Science) ➢ Know that food has to be farmed, grown elsewhere (e.g. home) or caught. (Science) ➢ Understand how to name and sort foods into the five groups in 'The Eat well guide' (Science) ➢ Know that everyone should eat at least five portions of fruit and vegetables every day. (Science, Fruit kebabs) ➢ Demonstrate how to prepare simple dishes safely and hygienically, without using a heat source. (Fruit kebabs) ➢ Demonstrate how to use techniques such as cutting, peeling and grating. (sensational salads)

Year 3	
Design	➢ Generate ideas for an item, considering its purpose and the user/s. (Pearlies, magnet maze) ➢ Start to order the main stages of making a product. Identify a purpose and establish criteria for a successful product. (Pearlies, magnet maze, Fossils) ➢ Understand how well products have been designed, made, what materials have been used and the construction technique. (Pearlies) ➢ Learn about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products. (Magnet maze) ➢ Start to understand whether products can be recycled or reused. (Pearlies, magnet maze) ➢ Know to make drawings with labels when designing. (Magnet maze) ➢ When planning explain their choice of materials and components including function and aesthetics (magnet maze)
Make	➢ Select a wider range of tools and techniques for making their product i.e. construction materials and kits, textiles, food ingredients, mechanical components and electrical components. (magnet maze, Pearlies, Fossils) ➢ Explain their choice of tools and equipment in relation to the skills and techniques they will be using. (fossils, magnet maze) ➢ Start to understand that mechanical and electrical systems have an input, process and output. (Science) ➢ Measure, mark out, cut, score and assemble components with more accuracy. (Pearlies, magnet maze) ➢ Start to work safely and accurately with a range of simple tools. (Pearlies, fossils, magnet maze) ➢ Start to think about their ideas as they make progress and be willing to change things if this helps them to improve their work. (magnet maze) ➢ Start to measure, tape or pin, cut and join fabric with some accuracy.(Pearlies)
Evaluate	➢ Start to evaluate their product against original design criteria e.g. how well it meets its intended purpose (Pearlies, magnet maze) ➢ Begin to disassemble and evaluate familiar products and consider the views of others to improve them. (magnet maze) ➢ Evaluate the key designs of individuals in design and technology has helped shape the world. (Pearlies) ➢ Begin to explore and evaluate existing products, explaining the purpose of the product and whether it is designed well to meet the intended purpose; (magnet maze) ➢ Explore what materials/ingredients products are made from (Fossils) ➢ evaluate their product against their original design criteria; (Pearlies, Fossils, magnet maze) ➢ evaluate the key events, including technological developments, and designs of individuals in design and technology that have helped shape the world. (Computing)
Technical knowledge	➢ Build simple structures, exploring how they can be made stronger, stiffer and more stable; (magnet maze) ➢ Talk about and begin to understand the simple working characteristics of materials and components; (magnet maze) ➢ Place the main stages of making in a systematic order using their technical knowledge. (magnet maze)
Cooking & Nutrition	➢ Start to know that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world. (Science & Geography) ➢ Understand how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source. ➢ Begin to understand how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking. ➢ Start to understand that a healthy diet is made up from a variety and balance of different food and drink, as depicted in 'The Eat well plate' Begin to know that to be active and healthy, food and drink are needed to provide energy for the body. (Science)

Year 4	
Design	➢ Begin to generate ideas, considering the purposes for which they are designing (Terrarium, instruments, quiz board, family tree, mosaics) ➢ Confidently make labelled drawings from different views showing specific features. (quiz board) ➢ Develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making, if the first attempts fail. Identify the strengths and areas for development in their ideas and products. (Quiz board, Instruments, terrarium) ➢ When planning, consider the views of others, including intended users, to improve their work. (Quiz board, Instruments) ➢ Learn about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products. (Quiz board, Instruments, mosaics) ➢ When planning, explain their choice of materials and components according to function and aesthetic. (Family tree)
Make	➢ Know how simple electrical circuits and components can be used to create functional products. (quiz board) ➢ Select a wider range of tools and techniques for making their product safely. ➢ Know how to measure, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques. (mosaics, family tree) ➢ Start to join and combine materials and components accurately in temporary and permanent ways. (mosaics, family tree) ➢ Understand how more complex electrical circuits and components can be used to create functional products. (Quiz board)
Evaluate	➢ Evaluate their products carrying out appropriate tests. (Quiz board, terrarium, instruments) ➢ Start to evaluate their work both during and at the end of the assignment. (Quiz board, terrarium, instruments, mosaics, family tree) ➢ Be able to disassemble and evaluate familiar products and consider the views of others to improve them. (Quiz board, terrarium) ➢ Evaluate the key designs of individuals in design and technology has helped shape the world (quiz board, terrarium)
Technical knowledge	➢ Understand how to reinforce and strengthen a 3D framework. (Instruments) ➢ Now sew using a range of different stitches, to weave and knit. (family tree) ➢ Demonstrate how to measure, tape or pin, cut and join fabric with some accuracy. (family tree) ➢ Begin to use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT. (Quiz board) ➢ Build structures, exploring how they can be made stronger, stiffer and more stable; (Instruments) ➢ Talk about and understand the working characteristics of materials and components; (Family tree, terrarium, mosaics, instruments)
Cooking & Nutrition	➢ To know that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world. (Sweet treats) ➢ Know how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking. (Sweet treats) ➢ Know that a healthy diet is made up from a variety and balance of different food and drink, as depicted in 'The Eat well plate' (Sweet treats) ➢ Know that to be active and healthy, food and drink are needed to provide energy for the body. (Sweet treats) ➢ Understand how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source.

Year 5	
Design	➢ Start to generate, develop, model and communicate their ideas through discussion, annotated sketches, exploded diagrams, prototypes, pattern pieces. (Cam toys) ➢ Begin to use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose. (Cam, orrery) ➢ With growing confidence apply a range of finishing techniques, including those from art and design. (clothes, clay) ➢ Draw up a specification for their design- link with Mathematics and Science. (Cam, Juxtapose, orrery) ➢ Use results of investigations, information sources, including ICT when developing design ideas. (Orrery, cam, Juxtapose) ➢ With growing confidence select appropriate materials, tools and techniques. (Orrery, cam, clay, clothes) ➢ Understand how much products cost to make, how sustainable and innovative they are and the impact products have beyond their intended purpose. (Clothes, cam)
Make	➢ Begin to select materials, tools and techniques e.g. cutting, shaping, joining and finishing, accurately. (Clothes, Juxtapose) ➢ 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. (Clothes, cam, orrery) ➢ Understand how mechanical systems such as cams or pulleys or gears create movement. (Cam, orrery)
Evaluate	➢ Start to evaluate a product against the original design specification and by carrying out tests. (Cam, orrery) ➢ Evaluate their work both during and at the end of the assignment. (Clay, cam, orrery, clothes, Juxtapose) ➢ Begin to evaluate it personally and seek evaluation from others. (Clay, cam, orrery, clothes, Juxtapose) ➢ Evaluate the key designs of individuals in design and technology has helped shape the world. (Juxtapose, cam) ➢ Start to compile a competitor analysis report of other products on the market. (Cam, clothes)
Technical knowledge	➢ Understand that mechanical and electrical systems have an input, process and output. (cam) ➢ Begin to measure and mark out more accurately. (Clay, cam, orrery, clothes, Juxtapose) ➢ Demonstrate how to use skills in using different tools and equipment safely and accurately with growing confidence cut and join with accuracy to ensure a good-quality finish to the product. (clay, cam) ➢ Weigh and measure accurately (time, dry ingredients, liquids). (clay) ➢ Use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT (Juxtapose)
Cooking & Nutrition	➢ Understand that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world. (Science) ➢ Begin to understand that seasons may affect the food available. (Science) ➢ Understand how food is processed into ingredients that can be eaten or used in cooking. (Science) ➢ Know how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source. (Science) ➢ Begin to understand that different food and drink contain different substances – nutrients, water and fibre – that are needed for health (Science)

Year 6	
Design	➢ Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces. (Freedom quilt, layered photos, urns) ➢ Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose. (Freedom quilt, urns) ➢ Accurately apply a range of finishing techniques, including those from art and design. (Freedom quilt, layered photos, urns) ➢ Draw up a specification for their design- link with Mathematics and Science. (Dimmer switch) ➢ Plan the order of their work, choosing appropriate materials, tools and techniques. (Freedom quilt, layered photos, urns, Dimmer switch) ➢ Suggest alternative methods of making if the first attempts fail. (Dimmer switch) ➢ Identify the strengths and areas for development in their ideas and products. (Urns) ➢ Know how much products cost to make, how sustainable and innovative they are and the impact products have beyond their intended purpose. (Urns, Quilt)
Make	➢ Confidently select appropriate tools, materials, components and techniques and use them. (Freedom quilt, layered photos, urns, dimmer switch) ➢ Use tools safely and accurately. (Freedom quilt, layered photos, urns, dimmer switch) ➢ Assemble components to make working models. (dimmer switch) ➢ Aim to make and to achieve a quality product. (Freedom quilt, layered photos, urns, dimmer switch) ➢ With confidence pin, sew and stitch materials together to create a product. (Freedom quilt) ➢ Demonstrate and make modifications as they go along. (Dimmer switch) ➢ Construct products using permanent joining techniques. (Freedom quilt) ➢ Know how more complex electrical circuits and components can be used to create functional products and how to program a computer to monitor changes in the environment and control their products (Dimmer switch)
Evaluate	➢ Critically valuate their products, identifying strengths and areas for development, and carrying out appropriate tests. ➢ Evaluate their work both during and at the end of the assignment. ➢ Record their evaluations using drawings with labels. ➢ Evaluate against their original criteria and suggest ways that their product could be improved. ➢ Evaluate the key designs of individuals in design and technology has helped shape the world. ➢ Complete detailed competitor analysis of other products on the market;
Technical knowledge	➢ Know how more complex electrical circuits and components can be used to create functional products and how to program a computer to monitor changes in the environment and control their products. ➢ Know how to reinforce and strengthen a 3D framework. (urns) ➢ Understand that mechanical and electrical systems have an input, process and output. (dimmer switch) ➢ Use finishing techniques to improve the appearance of their product using a range of equipment including ICT. (Layered photos)
Cooking & Nutrition	➢ To know that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world. (School meal) ➢ Understand that seasons may affect the food available. Understand how food is processed into ingredients that can be eaten or used in cooking. (School meal) ➢ Know how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source. Understand how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking. (School meal) ➢ Know different food and drink contain different substances – nutrients, water and fibre – that are needed for health (School meal)

Vocabulary	
KS1	❖ investigating, planning, design, make, evaluate, user, purpose, ideas, design criteria, product, function ❖ cut, fold, join, fix structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved, metal, wood, plastic circle, triangle, square, rectangle, cuboid, cube, cylinder, joining and finishing techniques, tools, fabrics and components, template, pattern pieces, mark out, join, decorate, finish ❖ slider, lever, pivot, slot, bridge/guide, card, masking tape, paper fastener, join, pull, push, up, down, straight, curve, forwards, backwards ❖ fruit and vegetable names, names of equipment and utensils sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard flesh, skin, seed, pip, core, slicing, peeling, cutting, squeezing, healthy diet, choosing, ingredients
LKS2	❖ evaluating, design brief design criteria, innovative, prototype, user, purpose, function, prototype, design criteria, innovative, appealing, design brief, planning, annotated sketch, sensory evaluations ❖ 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, decision, ❖ fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance ❖ mechanism, lever, linkage, pivot, slot, bridge, guide system, input, process, output linear, rotary, oscillating, reciprocating, series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip, control, program, system, input device, output device. ❖ 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
UKS2	❖ function, innovative, design specification, design brief, user, purpose design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional, mock-up, prototype ❖ frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent ❖ seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces, name of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings, ❖ switch, push-to-break switch, light dependent resistor (LDR), tilt switch, light emitting diode (LED), bulb, bulb holder, battery, battery holder, USB cable, wire, insulator, conductor, crocodile clip control, program, system, input device, output device, series circuit, parallel circuit ❖ pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor, circuit, switch, circuit diagram, annotated drawings, exploded diagrams, mechanical system, electrical system, input, process, output ❖ 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