Design and Technology

Design and Technology – Early Years Foundational Knowledge - Expressive Art and Design

The development of children's artistic and cultural awareness supports their imagination and creativity. It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. The quality and variety of what children see, hear and participate in is crucial for developing their understanding, self-expression, vocabulary and ability to communicate through the arts. The frequency, repetition and depth of their experiences are fundamental to their progress in interpreting and appreciating what they hear, respond to and observe.

- *Statutory framework for the early years foundation stage Setting the standards for learning, development and care for children from birth to five March 2021*

Pupil starting points:

It is important that we make no assumptions about what pupils do or do not know on entry to our settings. The relationships we build with our pupils are fundamental to understanding and developing them as individuals with deep knowledge of their context through positive relationships with parents / carers and robust transition procedures such as home visits and baseline systems. The below is an 'indicator' of what we might expect our pupils to know linked to *Birth to 5 Matters* and *Development Matters* and the 2-year-old check.

In Expressive Art and Design, pupils may have experience of: experimenting with ways to enclose a space, creating shapes, playing with colour (for example combining colours), using 3D and 2D structures to explore materials, mark making with a variety of media, exploring paint using body parts as well as brushes and other tools, exploring different materials, making simple models which express their ideas. Through observation and interaction, we can find out what our children already know and can do and can use the below to build on this.

Concept	2-3 years	3-4 years	4-5 years	ELGs	KS1 Design Technology
				Expressive Arts and Design ELG: Creating with Materials Children at the expected level of development will: - Safely use and explore a variety of materials, tools and techniques,	KS1 Design Technology Design • 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
Range of materials	- Explore different materials, using all of their senses to investigate them. - Manipulate and play with different materials. - Use their imagination as they consider what they can do with different materials. - Use block play to begin to build and design.	- Explore different materials freely, to develop their ideas about how to use them and what to make. - Join different materials beginning to explain choice linked to shape and texture / properties. - Uses various construction materials, e.g. joining pieces, stacking vertically and horizontally, balancing, making enclosures and creating spaces.	- Develops their own ideas through experimentation with a diverse range of materials. - Increasingly chooses more appropriate materials for the job e.g. cotton reels / lids for wheels, wool / thread for hair. - Join different materials explaining why they have chosen a specific fixing. - Purposefully chooses construction materials for a specific job.		

Tools and fixings	- Begin to use scissors and Sellotape cutters accurately. - Use basic fixings e.g. PVA glue, Pritt stick, masking tape, Sellotape (but may still get tangled).	- Use scissors accurately. - Begin to use cutlery accurately. - With supervision, use staplers and hole punches safely. - Use masking tape, Sellotape (and cutter), elastic bands, Pritt stick and pva glue accurately. - Begin to use treasury tags. - With supervision, begin to use an age-appropriate hammer and screws (goggles and gloves).	- Accurately use a range of small tools - scissors, cutlery, stapler, hole punch, trowel. - Know how to use an age-appropriate hammer, screws, nails, hand drills, hand vice and a saw safely (goggles and gloves). - Use a range of fixings explaining choices – staples / stapler, hole punch, treasury tags, split pins, different glues, Sellotape, masking tape.	experimenting with colour, design, texture, form and function; Share their creations, explaining the process they have used;	Make • 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 • explore and evaluate a range of existing products • evaluate their ideas and products against design criteria Technical knowledge • 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.
Discussion and evaluation	- Say what they have made. Use key words to assign meaning to their creations e.g. dog, mummy, head, tail, face. - Begin to talk about the colours they have used and why. - Begin to name what they have used to create e.g. box, paper, tape.	- Say what they like about their creations. - Say what was hard and easy about their creations. - Talk about the colours they have used and why. - Use increasingly accurate vocabulary to name what they have used to create e.g. egg box, cereal box, juice bottle, plastic, cardboard. - Begin to talk to others about and share their creations showing increasingly more interest in what others have done. I like xxxx because….	- Share their creations explaining the process they have used e.g. colours, fixings and materials using mostly accurate vocabulary. - Return to and build on their previous learning, refining ideas and developing their ability to represent them. - Say what works well / why they are proud / pleased about their creation and what they might do to make it even better. - Create collaboratively, sharing ideas, resources and skills.		

KS1 and KS2

Year Group	Developing, planning and communicating ideas	Working with tools, equipment, materials and components to make quality products	Evaluating processes and products	Food and Nutrition	Inspiration from the wider world	Disciplinary Vocabulary
Year 1	Begin to draw on their own experience to help generate ideas and research conducted on criteria. Begin to understand the development of existing products: What they are for, how they work, materials used. Start to suggest ideas and explain what they are going to do. Understand how to identify a target group for what they intend to design and make. Begin to develop their ideas through talk and drawings.	Begin to make their design using appropriate techniques. Begin to build structures, exploring how they can be made stronger, stiffer and more stable. Explore and use mechanisms [for example, wheels and axles], in their products. With help measure, mark out, cut and shape a range of materials. Explore using tools e.g. scissors and a hole punch safely. Begin to assemble, join and combine materials and components together using a variety of temporary methods e.g. glues or masking tape. Begin to use simple finishing techniques to improve the appearance of their product. Colour and decorate textiles using a number of techniques (such as dyeing, adding sequins or printing).	Start to evaluate their product by discussing how well it works. When looking at existing products explain what they like and dislike about products and why. Begin to evaluate their products as they are developed, identifying strengths and possible changes they might make.	Begin to understand that all food comes from plants or animals. Explore the understanding that food has to be farmed, grown elsewhere (e.g. home) or caught. Start to understand how to name and sort foods into the five groups in 'The Eat well plate' Begin to understand that everyone should eat at least five portions of fruit and vegetables every day. 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.	Explore objects and designs to identify likes and dislikes of the designs. Suggest improvements to existing designs. Explore how products have been created.	Measure Build Cut Stick Model Fold Glue Plan Materials
Year 2	Start to generate ideas by drawing on their own and other people's experiences. Begin to develop their design ideas through discussion, observation, drawing and modelling. Identify a purpose for what they intend to design and make.	Begin to select tools and materials; use correct vocabulary to name and describe them. Build structures, exploring how they can be made stronger, stiffer and more stable. With help measure to the nearest centimetre, cut and score with some accuracy.	Evaluate their work against their design criteria. Look at a range of existing products explain what they like and dislike about products and why. Start to evaluate their products as they are developed, identifying	Understand that all food comes from plants or animals. Know that food has to be farmed, grown elsewhere (e.g. home) or caught. Understand how to name and sort foods into the five groups in 'The Eat well plate'	Explore objects and designs to identify likes and dislikes of the designs. Suggest improvements to existing designs. Explore how products have been created.	Accurate Criteria Evaluate Design Product Template Score Textile

	Understand how to identify a target group for what they intend to design and make based on a design criteria. Develop their ideas through talk and drawings and label parts. Make templates and mock ups of their ideas in card and paper or using ICT.	Learn to use handle tools safely and appropriately. Start to assemble, join and combine materials in order to make a product. Use materials to practise drilling, screwing, gluing and nailing materials to make and strengthen products. Demonstrate how to cut, shape and join fabric to make a simple product. Use basic sewing techniques – learn how to do running stitch, how to start and end and how to thread a needle. Start to choose and use appropriate finishing techniques based on own ideas. Shape textiles using templates.	strengths and possible changes they might make. With confidence talk about their ideas, saying what they like and dislike about them.	Know that everyone should eat at least five portions of fruit and vegetables every day. Cut, peel or grate ingredients safely and hygienically. Measure or weigh using measuring cups or electronic scales. Assemble or cook healthy ingredients.		
Year 3	With growing confidence generate ideas for an item, considering its purpose and the user/s. Start to order the main stages of making a product. Identify a purpose and establish criteria for a successful product. Understand how well products have been designed, made, what materials have been used and the construction technique. Start to understand whether products can be recycled or reused. Know to make drawings with labels when designing.	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. Explain their choice of tools and equipment in relation to the skills and techniques they will be using. Start to understand that mechanical systems such as levers and linkages or pneumatic systems create movement. Measure to the nearest millimetre, mark out, cut, score and assemble components with more accuracy. Start to work safely and accurately with a range of simple tools.	Start to evaluate their product against original design criteria e.g. how well it meets its intended purpose. Begin to disassemble and evaluate familiar products and consider the views of others to improve them. Evaluate how the key designs of individuals in design and technology has helped shape the world.	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. Understand how to prepare and cook a variety of dishes safely and hygienically including, where appropriate, the use of a heat source. Prepare ingredients hygienically using appropriate utensils. Measure ingredients to the nearest gram accurately. Follow a recipe.	Identify some of the great designers (such as Brunel, Mackintosh, Philip Treacy, Marcel Breuer) in all of the areas of study (including pioneers in horticultural techniques) to generate ideas for designs. Improve upon existing designs, giving reasons for choices. Disassemble products to understand how they work.	Prototype Construction Evaluation Exploded diagram Assemble Disassemble Components Function Levers

	When planning, explain their choice of materials and components including function and aesthetics.	Start to think about their ideas as they make progress and be willing to change things if this helps them to improve their work. Start to measure, tape or pin, cut and join fabric with some accuracy.		Assemble or cook healthy ingredients (controlling the temperature of the oven or hob, if cooking).		
Year 4	Start to generate ideas, considering the purposes for which they are designing- link with Mathematics and Science. Confidently make labelled drawings from different views showing specific features. 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. When planning, consider the views of others, including intended users, to improve their work. When planning, explain their choice of materials and components according to function and aesthetic.	Select a wider range of tools and techniques for making their product safely. Know how to measure to the nearest millimetre, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques. Start to join and combine materials and components accurately in temporary and permanent ways. Know how mechanical systems such as cams or pulleys or gears create movement. Understand how more complex electrical circuits and components can be used to create functional products. Understand how to reinforce and strengthen a 3D framework. Sew using a range of different stitches. Demonstrate how to measure, tape or pin, cut and join fabric with some accuracy. Begin to use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT.	Evaluate their products carrying out appropriate tests. Start to evaluate their work both during and at the end of the assignment. Be able to disassemble and evaluate familiar products and consider the views of others to improve them. Evaluate the key designs of individuals in design and technology has helped shape the world.	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. Understand how to prepare and cook a variety of dishes safely and hygienically including, where appropriate, the use of a heat source. Prepare ingredients hygienically using appropriate utensils. Measure ingredients to the nearest gram accurately. Follow a recipe. Assemble or cook healthy ingredients (controlling the temperature of the oven or hob, if cooking).	Identify some of the great designers (such as Brunel, Mackintosh, Philip Treacy, Marcel Breuer) 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.	Prototype Construction Evaluation Assemble Disassemble Components Pulleys Reinforce
Year 5	Start to generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces. Begin to use research and develop design criteria to inform the design	Select appropriate materials, tools and techniques e.g. cutting, shaping, joining and finishing, accurately. Select from and use a wider range of materials and components, according to their functional properties and aesthetic qualities. Understand how mechanical systems such as cams or pulleys or gears create movement. Begin to measure and mark out more accurately.	Start to evaluate a product against the original design specification and by carrying out tests. Evaluate their work both during and at the end of the assignment. Begin to evaluate it personally and seek evaluation from others.	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. Begin to understand that seasons may affect the food available.	Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices. Create innovative designs that improve upon existing products.	Aesthetics Annotations chassis Cross-sections Gears Cams Malleable Mechanism

	of innovative, functional, appealing products that are fit for purpose. With growing confidence apply a range of finishing techniques, including those from art and design. Draw up a specification for their design- link with Mathematics and Science. Use results of investigations, information sources, including ICT when developing design ideas. With growing confidence select appropriate materials, tools and techniques. Start to understand how much products cost to make, how sustainable and innovative they are and the impact products have beyond their intended purpose.	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. Weigh and measure accurately (time, dry ingredients, liquids). Use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT.	Evaluate the key designs of individuals in design and technology has helped shape the world.	Understand how food is processed into ingredients that can be eaten or used in cooking. Understand the importance of correct storage and handling of ingredients (using knowledge of microorganisms). 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 healthy seasonal ingredients, methods, cooking times and temperatures.	Evaluate the design of products so as to suggest improvements to the user experience.	
Year 6	Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces. Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose. Accurately apply a range of finishing techniques, including those from art and design. Draw up a specification for their design- link with Mathematics and Science.	Confidently select appropriate tools, materials, components and techniques and use them. Use tools safely and accurately. Assemble components to make working models. Aim to make and to achieve a quality product. With confidence pin, sew and stitch materials together to create a product. Make modifications as they go along. Construct products using permanent joining techniques. Know how more complex electrical circuits and components can be used to create functional products. Know how to reinforce and strengthen a 3D framework.	Evaluate 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.	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. Understand that seasons may affect the food available. Understand how food is processed into ingredients that can be eaten or used in cooking. Understand the importance of correct storage and handling of ingredients (using knowledge of microorganisms).	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.	Aesthetics Annotations Cross-sections Ergonomics Gears Cams Mechanism Pneumatics

	Plan the order of their work, choosing appropriate materials, tools and techniques. Suggest alternative methods of making if the first attempts fail. Identify the strengths and areas for development in their ideas and products. Know how much products cost to make, how sustainable and innovative they are and the impact products have beyond their intended purpose.	Understand that mechanical and electrical systems have an input, process and output. Use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT.		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 healthy seasonal ingredients, methods, cooking times and temperatures.		