

Falcons Primary School Design and Technology Skills Progression

At Falcons the children will undertake a variety of creative and practical activities. They will be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They will consider a range of relevant contexts when designing products.

For each design and technology topic the children will undertake a process of research, design, make and evaluate. As they move up the school the processes and complexity of these stages will develop as their skills grow. Details of how these skills will progress are shown below.

The children will further develop their technical knowledge across a range of subject areas: structures, mechanisms, textiles, cooking and nutrition and electrical systems.

EYFS Curriculum Map

Structures Junk models	
Learning Objectives: • To explore and investigate the tools and materials in the junk modelling area. • To develop scissor skills. • To investigate cutting different materials. • To learn how to plan and select the correct resources needed to make a model. • To verbally plan and create a junk model. • To share a finished model and talk about the processes in its creation. • To explore different ways to temporarily join materials together.	Physical Development • Develop small motor skills so that they can use a range of tools competently, safely and confidently. • ELG: Fine Motor Skills: Use a range of small tools, including scissors. Expressive arts and design • Explore, use and refine a variety of artistic effects to express ideas and feelings. • ELG: Creating with Materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. Characteristics of effective learning • Playing and exploring. • Active learning. • Creating and thinking critically.

Structures: Boats	EYFS Outcomes
Learning Objectives: • To understand what waterproof means and to test whether materials are waterproof. • To test and make predictions for which materials float or sink. • To learn about the different features and structures of boats and ships. • To investigate how the shape and structure of boats affects the way they move. • To design a boat. • To create a boat based upon their own design.	Communication and language • Articulate their ideas and thoughts in well-formed sentences. • Connect one idea or action to another using a range of connectives. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • ELG: Speaking: Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. • ELG: Speaking: Offer explanations for why things might happen. Understanding the world • Explore the natural world around them. Characteristics of effective learning • Playing and exploring • Active learning • Creating and thinking critically Expressive arts and design Explore, use and refine a variety of artistic effects to express their ideas and feelings. • ELG: Creating with materials: Share their creations, explaining the process they have used.

Food: Owl Toast	EYFS Outcomes
Learning Objectives: • To explore fruits and vegetables and the differences between them. • To use adjectives to describe how fruits and vegetables look, feel, smell and taste. • To design owl toast. • To create owl toast and talk about the importance of healthy eating. • To practise cutting with a knife. • To learn how to use a knife safely. • To describe the finished product and evaluate the process.	Communication and language • Learn new vocabulary. • Use new vocabulary throughout the day. • ELG: Speaking: Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. Personal, social and emotional development • Know and talk about the different factors that support their overall health and wellbeing: healthy eating. • ELG: Managing self: Manage their own basic hygiene and personal needs, including...understanding the importance of healthy food choices. Understanding the world • Explore the natural world around them. • ELG: The Natural World: Explore the natural world around them, making observations and drawing pictures of animals and plants. Characteristics of effective learning • Playing and exploring • Physical development • Develop small motor skills so that they can use a range of tools competently, safely and confidently. • ELG: Fine Motor Skills: Use a range of small tools, including scissors and cutlery.

Structures

		Year 1	Year 2
		Making a stable pencil pot.	Baby Bear's Chair.
	Design	- Thinking about what others might want from a design. - Considering who they are designing for – identifying the user. - Using basic drawing skills to communicate ideas.	Generating and communicating ideas using sketching and modelling.
Skills	Make	- Requesting equipment appropriate to the purpose (e.g. scissors for cutting, glue for joining, etc.). - Refining their grip to cut competently and confidently. - Cutting straight and evenly spaced lines. - Beginning to cut large shapes and thicker materials like card.	- Making a structure according to design criteria. - Creating joints and structures from paper/card and tape. - Building a strong and stiff structure by folding paper.
	Evaluate	Peer evaluation.	- Testing the strength of own structure. - Identifying the weakest part of a structure. - Evaluating the strength, stiffness and stability of own structure.
Knowledge	Technical	- A structure is something that has been made and put together. - Stable structures do not topple. - Shapes and structures with wide, flat bases or legs are the most stable. - Adding weight to the base of a structure can make it more stable.	- To know that materials can be manipulated to improve strength and stiffness. - To know that a structure is something which has been formed or made from parts. - To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. - To know that a 'strong' structure is one which does not break easily. - To know that a 'stiff' structure or material is one which does not bend easily.
	Additional	To know that a user is the person who will use the product.	
Vocabulary		Base better compare design free standing stable structure unstable user worse	design criteria man-made natural properties structure stable shape model test

		Year 3	Year 4
		Constructing a Stone Age House	Pavilion
	Design	• Designing a Stone Age house with key features to appeal to a specific person/purpose. • Drawing and labelling a Stone Age house design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours.	• Designing a stable pavilion. • Building frame structures designed to support weight.
Skills	Make	• Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs.	• Creating a range of frame structures. • Selecting appropriate materials to build a strong structure and cladding. • Finding ways to strengthen a structure. • Creating a design in accordance with a plan.
	Evaluate	• Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison, to the original design. • Suggesting points for modification of the individual designs.	• Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs.
Knowledge	Technical	• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.	• To understand what a frame structure is. • To know that a 'free-standing' structure is one which can stand on its own.
	Additional	• To know the features of a Stone Age house and their purpose. • To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product.	• To know that aesthetics are how a product looks. • To know that a product's function means its purpose. • To know that architects consider light, shadow and patterns when designing.
Vocabulary		2D 3D design key features net scoring shape stable stiff strong structure tab	3D shapes natural design criteria reinforce structure

		Year 5
		Building Bridges
	Design	• Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.
Skills	Make	• Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saw safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties.
	Evaluate	• Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others.
Knowledge	Technical	• To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood.
	Additional	• To understand the difference between arch, beam, truss and suspension bridges. • To understand how to carry and use a saw safely
Vocabulary		beam bridge arch bridge truss bridge strength corrugation lamination stiffness rigid joints mark out hardwood softwood wood file/rasp sandpaper saw evaluate accuracy

Mechanisms/Mechanical Systems

		Year 1	Year 2
		Wheels and Axles.	Making a moving monster.
	Design	- Beginning to recognise how products and designs in the world around us solve certain needs. - Stating what they intend to make and why – by identifying the purpose. - Talking about ideas with purpose and user in mind.	- Creating a class design criteria for a moving monster. - Designing a moving monster for a specific audience in accordance with a design criteria.
Skills	Make	- Measuring, marking and spacing materials accurately using simple tools and by identifying midpoints. - Cutting straight and spaced lines, larger shapes and simple holes safely and with control. - Joining materials using glue or tape. - Using simple tools to shape materials by cutting and forming.	- Making linkages using card for levers and split pins for pivots. - Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. - Cutting and assembling components neatly
	Evaluate	- Discussing how their products could be improved based on personal preferences. - Comparing their finished products with their original designs.	- Evaluating own designs against design criteria. - Using peer feedback to modify a final design.
Knowledge	Technical	- To know that wheels need to be round to rotate and move. - To understand that for a wheel to move it must be attached to a rotating axle. - To know that an axle moves within an axle holder which is fixed to the vehicle or toy. - An axle allows the wheel to turn without falling off.	- To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. - To know that there is always an input and output in a mechanism. - To know that an input is the energy that is used to start something working. - To know that an output is the movement that happens as a result of the input. - To know that a lever is something that turns on a pivot. - To know that a linkage mechanism is made up of a series of levers.
	Additional	To know many things that move have parts inside to help them work.	To know some real-life objects that contain mechanisms.
Vocabulary		axle axle holder diagram straight line movement mechanism wheel user better worse product	axle design criteria input linkage mechanical output pivot

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		Year 3	Year 4
		Pneumatic toys	Gears and Pulleys
	Design	• Designing a rainforest toy which uses a pneumatic system. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Begin to learn that different types of drawings are used in design to explain ideas clearly.	• Design a simple pulley. • Developing design criteria from a design brief. • Experimenting with different pulley systems. • Learning that different types of drawings are used in design to explain ideas clearly.
Skills	Make	• Creating a pneumatic system to create a desired motion. • Building secure housing for a pneumatic system. • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy. • Selecting materials due to their functional and aesthetic characteristics. • Manipulating materials to create different effects by cutting, creasing, folding and weaving.	• Create a simple gear system. • Creating a pulley system to move a small load. • Build a secure housing for the pulley system. • Selecting materials due to their functional characteristics.
	Evaluate	• Using the views of others to improve designs. • Testing and modifying the outcome, suggesting improvements. • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client.	• Testing and modifying the outcome, suggesting improvements. • Evaluating the work of others and receiving feedback on own work.
Knowledge	Technical	• To understand how pneumatic systems work. • To understand that pneumatic systems can be used as part of a mechanism. • To know that pneumatic systems operate by drawing in, releasing and compressing air.	• To understand how gear and pulley systems work. • To understand that pulley systems can be used as part of a mechanism. • To know that pulley systems can be used to move heavy loads.
	Additional	• To understand how sketches, drawings and diagrams can be used to communicate design ideas. • To know that exploded-diagrams are used to show how different parts of a product fit together.	

		• To know that thumbnail sketches are small drawings to get ideas down on paper quickly.	
Vocabulary		mechanism lever pivot linkage system input output pneumatic system component thumbnail sketch research adapt properties reinforce motion	Pulley gear force mechanism load design brief input output design criteria housing

		Year 5	Year 6
		Pop up books	Automata Toys
	Design	• Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. • Storyboarding ideas for a book.	• Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement. • Understanding how linkages change the direction of a force. • Making things move at the same time. • Understanding and drawing cross-sectional diagrams to show the inner-workings of my design.
Skills	Make	• Following a design brief to make a pop-up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.	• Measuring, marking and cutting components accurately using a ruler and scissors. • Assembling components accurately to make a stable frame. • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles. • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set.
	Evaluate	• Evaluating the work of others and receiving feedback on own work. • Applying points of improvement to their books.	• Evaluating the work of others and receiving feedback on own work. • Applying points of improvement to their toys. • Describing changes, they would make/do if they were to do the project again.
Knowledge	Technical	• To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms.	• To understand that the mechanism in an automata uses a system of cams, axles and followers. • To understand that different shaped cams produce different outputs.

	Additional	• To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.	• To know that an automata is a hand powered mechanical toy. • To know that a cross-sectional diagram shows the inner workings of a product.
Vocabulary		design input motion mechanism criteria research reinforce model	accurate assembly-diagram automata cam component diagram dowel finish follower frame function linkage mechanism model

Cooking and Nutrition

		Year 2	Year 4
		Healthy Eating – a balanced diet	Eating Seasonally
	Design	• Designing a healthy wrap based on a food combination which works well together.	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.
Skills	Make	• Slicing food safely using the bridge or claw grip. • Constructing a wrap that meets a design brief.	• Selecting ingredients based on their form as well as their functional properties. • Suggesting simple safety rules based on their understanding of tool dangers. • Peeling ingredients safely. • Cutting safely with a vegetable knife.
	Evaluate	• Describing the taste, texture and smell of fruit and vegetables. • Taste testing food combinations and final products. • Describing the information that should be included on a label. • Evaluating which grip was most effective.	• Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. • Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. • Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements.
Knowledge	Cooking and Nutrition	• To know that 'diet' means the food and drink that a person or animal usually eats. • To understand what makes a balanced diet. • To know where to find the nutritional information on packaging. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that nutrients are substances in food that all living things need to make energy, grow and develop.	• To recognise the seasonality of foods. • To be able to identify foods with different nutritional properties. • To understand that many foods are imported from other countries. • To be able to follow the instructions within a recipe. • To be able to select seasonal ingredients • To be able to taste seasonal ingredients.

		• To know that 'ingredients' means the items in a mixture or recipe. • To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy. • To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'	
Vocabulary		balanced diet carbohydrate dairy fruit ingredients oils sugar protein vegetable design criteria	Appearance evaluate arid climate country Mediterranean temperate export import seasonal seasons cut peel snip design mock-up taste texture complementary

		Year 6
		Come Dine with Me.
	Design	• Writing a recipe, explaining the key steps, method and ingredients. • Including facts and drawings from research undertaken.
Skills	Make	• Following a recipe, including using the correct quantities of each ingredient. • Adapting a recipe based on research. • Working to a given timescale. • Working safely and hygienically with independence. • To know the following cooking techniques: sieving rubbing method, cooling. • Slicing food safely using the bridge or claw grip. • Peeling foods safely with a peeler.
	Evaluate	• Evaluating a recipe, considering: taste, smell, texture and origin of the food group. • Taste testing and scoring final products.

		• Suggesting and writing up points of improvements when scoring others' dishes, and when evaluating their own throughout the planning, preparation and cooking process. • Evaluating health and safety in production to minimise cross contamination.
Knowledge	Cooking and Nutrition	• To know that 'flavour' is how something tastes. • To know that many countries have 'national dishes' which are recipes associated with that country. • To know that 'processed food' means food that has been put through multiple changes in a factory. • To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. • To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).
Vocabulary		equipment flavours method recipe bridge method cookbook preparation cross-contamination farm to fork storyboard

Textiles

		Year 1	Year 3
		Puppets	Cushions
	Design	Using a template to create a design for a puppet	Designing and making a template from an existing cushion and applying individual design criteria.
Skills	Make	- Cutting fabric neatly with scissors. - Using joining methods to decorate a puppet. - Sequencing the steps taken during construction.	- Following design criteria to create a cushion. - Selecting and cutting fabrics with ease using fabric scissors. - Threading a needle. - Sewing running stitch. - Tying knots. - Sewing cross stitch. - Decorating fabric using appliqué. - Completing design ideas with stuffing and sewing the edges.
	Evaluate	Reflecting on a finished product, explaining likes and dislikes.	Evaluating an end product and thinking of other ways in which to create similar items.
Knowledge		- To know that 'joining technique' means connecting two pieces of material together. - To know that there are various temporary methods of joining fabric by using staples, glue or pins. - To understand that different techniques for joining materials can be used for different purposes. - To understand that a template (or fabric pattern) is used to cut out the same shape multiple times. - To know that drawing a design idea is useful to see how an idea will look.	- To know that sewing is a method of joining fabric. - To understand the importance of tying a knot after sewing the final stitch. - To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. - To know that when two edges of fabric have been joined together it is called a seam. - To know that it is important to leave space on the fabric for the seam. - To understand that some products are turned inside out after sewing so the stitching is hidden.
Vocabulary		decorate design fabric glue model hand puppet safety pin staple stencil template	appliqué cross-stitch design equipment fabric patch running stitch thread seam texture knot template

		Year 5
		Bags
	Design	•Design your own bag •Developing annotated sketches to communicate design ideas. •Creating pattern pieces to use in design.
Skills	Make	•Using a ruler to accurately measure and draw lines and marks. •Using pins effectively to secure a template to fabric without creases or bulges. •Threading needles independently. •Marking and cutting fabric accurately, in accordance with a design. •Sewing a strong running stitch, making small, neat stitches and following the edge. Tying strong knots.
	Evaluate	•Reflecting on the functionality and aesthetics of products. •Discussing reasons for design choices.
Knowledge		•To understand how designers use pattern pieces when creating textile products. •To know that pattern pieces are like nets/templates. •To know that products are sometimes made in parts that are sewn together. •To know that consistently sized stitches improve the aesthetic of a product.
Vocabulary		pattern piece seam seam allowance fabric running stitch prototype user aesthetic innovative functionality

Electrical Systems

		Year 6
		Steady Hand Game
Skills	Design	• Designing a steady hand game - identifying and naming the components required. • Drawing a design from three different perspectives. • Generating ideas through sketching and discussion. • Modelling ideas through prototypes.
	Make	• Constructing a stable base for a game. • Accurately cutting, folding and assembling a net. • Decorating the base of the game to a high-quality finish. • Making and testing a circuit. • Incorporating a circuit into a base.
	Evaluate	• Testing own and others finished games, identifying what went well and making suggestions for improvement.
		• To know that batteries contain acid, which can be dangerous if they leak. • To know the names of the components in a basic series circuit, including a buzzer
Knowledge		
Vocabulary		assemble component fine motor skills fit for purpose form function gross motor skills LED user

Digital World – Year 6

Monitoring Devices

Skills	• Developing design criteria based on research. • Understanding what a virtual model is and the pros and cons of traditional and CAD modelling. • Placing and manoeuvring 3D objects using CAD. • Changing the properties of or combining one or more 3D object using CAD. • Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature moves out of a specified range. • Explaining key functions in their program (audible alert or visuals). • Explaining how the product's programmed features would be useful for an animal carer.
Knowledge	• A device means equipment created for a certain purpose or job and that monitoring devices observe and record. • A sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose. • Conditional statements (and, or, if) in programming are a set of rules which are followed if certain conditions are met.
Vocabulary	CAD device group loop model monitor monitoring device sensor synthetic Tinkercad Ungroup value variable versatile workplane