

Hopton C of E Primary Academy

Design and Technology Progression of Skills and Knowledge Document

Intent:

Design and Technology is an inspiring, rigorous and practical subject. Design and Technology encourages children to learn to think and intervene creatively to solve problems both as individuals and as members of a team. At Hopton, we encourage children to use their creativity and imagination, to design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. We aim to, wherever possible, link work to other disciplines such as mathematics, science, engineering, computing and art. The children are also given opportunities to reflect upon and evaluate past and present design technology, its uses and its effectiveness and are encouraged to become innovators and risk-takers.

Design and technology at Hopton C of E Primary Academy develops children's skills and knowledge in design, structures, mechanisms, electrical control and a range of materials including food. Our aim is to provide the children with a breadth of memorable experiences that inspire children to be creative and encourage them to think about important issues including recyclable materials and the impact this has on our world. By the time our children leave us, they will be well equipped with the skills and the knowledge to research, design, make and evaluate their work and have a greater understanding of how D&T makes an essential contribution to the creativity, culture, wealth and well-being of the world.

How do we teach DT through our school values?

Respect	We show respect by listening to others' ideas and using equipment safely.
Courage	We show courage by trying out new designs and taking risks.
Perseverance	We show perseverance by improving our designs until they work well.
Friendship	We show friendship by working together as a team.
Forgiveness	We show forgiveness by learning from mistakes in our designs.
Responsibility	We show responsibility by using tools and materials carefully and safely.



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Content Overview

<u>CYCLE A</u>			
EYFS/KS1	Castles	Toys	Trains
	<u>Cooking and Nutrition</u> Smoothies	<u>Textiles: Puppets</u> We will be using materials and sewing skills to make our own puppets.	<u>Mechanisms: wheels and axles</u> We will be designing and making our own vehicles.
LKS2	Egyptians	Stone Age, Bronze Age, Iron Age	Titanic
	<u>Textiles: Egyptian Collars</u> Using cross stitch and applique skills to create Egyptian collars	<u>Cooking and Nutrition: Eating Seasonally</u> Using local produce, we will prepare fruit skewers, make fruit crumbles and cook tarts	<u>Digital World: Wearable Technology</u> Design a digital wearable technology and develop a program and housing for a micro-bit.
UKS2	Greeks	Pole to Pole	Victorians
	<u>Structures - Bridges</u> Greek Philosopher- fallen bridge!	<u>Cooking and Nutrition: Come Dine With Me</u>	<u>Mechanism: Gears and Pulleys</u> Eco Gadget Bike



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CYCLE B			
EYFS/KS1	Space	Healthy Me	Fire Fire!
	<u>Mechanisms: Making a Moving Storybook</u> We will be creating a moving storybook.	<u>Cooking and Nutrition: Balanced Diet</u> We will create a healthy, balanced meal.	<u>Structures: A Chair for a Bear!</u> We will test the strength of materials and make a strong and stable chair.
LKS2	Roman's	Tudor's	Anglo Saxons
	<u>Structure: Constructing a Castle</u> We will be designing and creating our own Roman Forts.	<u>Mechanical Systems: Pneumatic toys</u> Designing and making Henry the 8th pneumatic toys. <i>Cooking: a tudor banquet</i>	<u>Electrical Systems</u> Using an electrical system to create an electric poster
UKS2	Early Islam	Vikings	World War 2
	<u>Electrical Systems: Wobble Bots</u> Children will be explore the use of motors and designing and making a motorised product.	<u>Digital World: Navigating the World</u> Children program a navigation tool to produce a multifunctional device for trekkers.	<u>Textiles: A Stuffed Toy</u> We will be designing and making a soft toy for an Evacuee. <i>Cooking: World War 2 banquet</i>



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EYFS Foundations <i>These foundations are developed further through carefully sequenced units of work, where EYFS access is identified within each unit to ensure clear progression into KS1.</i>			
Age 3 to 4	- Explore different materials freely, to develop their ideas about how to use them and what to make. - Develop their own ideas and then decide which materials to use to express them. - Join different materials and explore different textures. - Create closed shapes with continuous lines and begin to use these shapes to represent objects. - Draw with increasing complexity and detail, such as representing a face with a circle and including details. - Use drawing to represent ideas like movement or loud noises. - Respond to what they have heard, expressing their thoughts and feelings.		
Reception	- Return to and build on their previous learning, refining ideas and developing their ability to represent them. - Create collaboratively, sharing ideas, resources and skills.		
ELG	Expressive Arts and Design - Creating with Materials - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function - Share their creations, explaining the process they have used;		
Skills and Knowledge	Years 1 and 2	Years 3 and 4	Years 5 and 6
Structures	Design - Using a simple design brief that outlines the intended use, target user and key feature of the product to create simple design criteria - Creating ideas with design criteria in mind	Design: - Design a castle with key features to appeal to a specific person/purpose - Draw and label a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials need and colours - Design and/or decorate a castle tower on CAD software	Design: - Designing a stable structure that is able to support weight. - Creating a frame structure with a focus on triangulation. - Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used,



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	- Referring to specific parts of existing products when generating ideas Make - Choosing materials, ingredients or components from a wider range of options - Explaining choices based on the properties of materials and components - Looking for ways to make cutting easier (e.g. turning the material, not fully closing scissors) - Choosing known geometric shapes when making - Beginning to shape objects to improve how they work Evaluate - Discussing a range of existing products and saying what they like and dislike about them - Comparing products and explaining why some better meet design criteria than others - Evaluating ideas and creations against simple design criteria Technical Knowledge - Recognising that different structures are used for different purposes - Exploring the features of structures	Make: - Constructing a range of 3D geometric shapes using nets - Creating special features for individual designs. - Making facades from a range of recycled materials. Evaluation: - 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.	considering effective and ineffective designs. 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 saws 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. - Building a range of play apparatus structures drawing upon new and prior knowledge of structures.
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Hopton C of E Primary Academy

Design and Technology Progression of Skills and Knowledge Document

	• Making stable structures from card • Creating supporting structures to aid stability • Using stable objects like cylinders to create structures • Building a strong and stiff structure by folding paper • Folding to strengthen or stiffen materials • Comparing the stability of different shapes • Identifying the weakest part of a structure		• Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures. Evaluation: • 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. • Improving a design plan based on peer evaluation. • Testing and adapting a design to improve it as it is developed. • Identifying what makes a successful structure.
Mechanisms and Mechanical systems	Design • Thinking about what others might want from a design. • Beginning to recognise how products and designs in the world around us solve certain needs. • Considering who they are designing for – by identifying the user.	Design: • Designing a toy which uses a pneumatic system. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Learning that different types of drawings are used in design to explain ideas clearly.	Design: • Noticing wider-reaching problems or needs in the community. • Identifying a wide range of needs and potential barriers through market research. • Writing more complex problem statements that consider multiple factors and constraints. • Creating more complex design criteria that require considering



Hopton C of E Primary Academy

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	• Stating what they intend to make and why – by identifying the purpose. • Talking about ideas with purpose and user in mind. • Talking about existing products when generating ideas. • Using basic drawing skills to communicate ideas. • Explaining how to adapt mechanisms, using bridges or guides to control the movement. • Designing a moving storybook for a given audience. Make • Planning more than one step ahead. • Choosing between a small number of materials, ingredients or components. • Explaining their choices based on personal experiences. • Requesting equipment appropriate to the purpose (e.g. scissors for cutting and glue for joining). • Explaining in simple terms why certain tools must be handled carefully. • Following and recalling simple safety instructions. • Finding the middle of an object.	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. Evaluation • 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.	detailed user needs, environmental impact, materials and cost. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. • Using a series of prototypes to refine and improve their designs. Make: • Consistently apply safety instructions. • Select appropriate scissors to handle delicate cutting tasks and challenging materials. • Cutting patterns and drawings accurately. • In supervised groups, using hot glue guns safely. • Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly. • Choosing PVA glue over hot glue for its safety when joining
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	- Refining their grip to cut competently and confidently. - Cutting straight lines and evenly spaced lines. - Following a design to create moving models that use levers and sliders. - Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed. - Reviewing the success of a product by testing it with its intended audience. - Beginning to cut large shapes and thicker materials like card. - Puncturing holes. - Recognising the edges of paper and card need to be stuck firmly using a glue stick. - Using tools, like scissors, to create shapes. - Beginning to use controlled painting or colouring techniques to finish a product. - Adding texture to create visual interest. Evaluate - Discussing existing products, saying what they like about them.		materials in less intensive projects. Evaluate: - Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. - Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. - Considering alternative materials, tools or techniques that could enhance the product. - Providing feedback that is helpful, specific, and encouraging.
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Hopton C of E Primary Academy

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	• Comparing two products and discussing which is better for a specific purpose. • Discussing how their products could be improved based on personal preferences. • Comparing their finished products with their original designs. • Saying what they like about their peers' designs and products. • Accepting feedback and understanding it is meant to improve their work. • Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed. • Reviewing the success of a product by testing it with its intended audience. • Technical • Recognising and exploring everyday objects that have mechanisms.		
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Electrical systems (KS2 only)		Design: - Carrying out research based on a given topic to develop a range of initial ideas. Make: - Generating a final design for the electric poster with consideration for the client's needs and design criteria. - Planning the positioning of the bulb (circuit component) and its purpose. - Mounting the poster onto corrugated card to improve its strength and withstand the weight of the circuit on the rear. - Measuring and marking materials out using a template or ruler. - Fitting an electrical component (bulb). - Learning ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge). Evaluation: - Learning to give and accept constructive criticism on their work and the work of others. - Testing the success of initial ideas against the design criteria and justifying opinions. - Revisiting the requirements of the client to review developing design	Design - Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. - Developing more independence in generating ideas. - Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about the practicality and originality of their ideas. - Using a series of prototypes to refine and improve their designs. Make - Producing lists of equipment, materials and tools that they need for a task. - Creating a step-by-step plan for making. - Selecting materials, components or ingredients based on research or user needs. - Explaining their choices, referring to their research. - Understanding and explaining the importance of each safety rule. - Applying safety instructions consistently.
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