Longthorpe Primary School Curriculum Map – Design and Technology

Concepts, Knowledge and Skills

Intent:

At Longthorpe, pupils will be inspired by engineers, designers, chefs and architects to enable them to create a range of structures, mechanisms, textiles, electrical systems and food products with a real life purpose. They will understand that Design Technology provides the knowledge and skills needed to address and overcome problems we have yet to meet, and they will recognise the essential contribution of design to "the creativity, culture, wealth and well-being of the nation." (National Curriculum)

We recognise that the purpose of study elements of the National Curriculum for Design and Technology are vital for our children, in order to give them a successful start in their subject learning and in the acquisition of pertinent cultural capital. We provide exciting and high quality design technology lessons which will inspire children to analyse, design, create and evaluate. We recognise the diverse nature of our school and we ensure that over time our planning is inclusive of all the cultures represented. For example, cooking foods used to celebrate Eid, Diwali or Chinese New Year, especially considering and valuing the culture, beliefs and ethnicities of children within each cohort. In Peterborough there is a wealth of information technology and engineering industries who are the potential future employers of many of our children. We consider it important to look for ways to recognise and celebrate this such as teaching children about important local companies such as Peter Brotherhood with their importance to the development of torpedoes. We also seek to inspire children to see the potential of the subject by exploiting our links with our neighbouring secondary school, Jack Hunt and other companies such as Perkins Engines.

Longthorpe aims to teach Design and Technology to all children, irrespective of their attainment, providing a broad and balanced education for all. Teaching staff provide learning opportunities matched to the needs of all children, including those with additional needs.

Implementation:

At Longthorpe, we offer an exciting range of design technology activities to all students, with a curriculum which is accessible for all, irrespective of their attainment. Through our teaching of D&T we will ensure that children are equipped with skills to be prepared for the ever-changing world. Design Technology is generally taught with a focus on the key skills and knowledge as outlined in the National Curriculum and the Design Technology Curriculum Plan. Design Technology will be taught as a main focus, either as part of or separately from the main topic, at least twice in each academic year. Teachers will ensure that children are provided with 'real life' problems that need real solutions and will be given the knowledge and skills to design and create the required product, where they can assume the role of designers using the '*Mantle of the Expert*' methodology. There also needs to be recognition that D&T is inherently a multi-disciplinary subject and draws upon skills learned in other curriculum areas, especially art, science, computing and maths, when designing and making.

Our Design Technology curriculum is designed so that key concepts are revisited in each phase with increasing complexity to ensure a deeper understanding. **There is an expectation that food technology will be revisited every year.**

The key concepts are:
Healthy lives - *children will be taught the basics of hygiene, food preparation, cooking and baking.*
Structures and Materials - *understanding which material to use, how materials can be combined and how we can make structures fit for purpose.*
Inspiration - *By looking at the work of designers, or at the products now available on the market, we have a starting point for our own products and ideas.*
Engineering - *Learning how mechanical or electrical devices work and how they can be incorporated into our designs.*
Culture *A way of life for groups of people:*

- Historical: people, religions, beliefs, styles of celebration design in different groups of people,
- Modern world: digital media, magazines, photography and technology.

Teachers use and follow the Design Technology curriculum map. Design Technology learning will where possible incorporate a problem for which a solution is needed, looking at the work of a designer or existing designs, developing a design to fit the brief, making and then evaluating their product. Children will be referred to as designers during these sessions. Children may also take on the role of inventors through Mantle of the Expert. Teachers will use the skills and knowledge mapped out below to plan these lessons, ensuring there is an equal coverage and focus on the key knowledge and key skills. Teachers will cover the additional skills and knowledge where an individual or a particular cohort requires additional challenge. Teachers will ensure that within their teaching, key vocabulary is taught within the relevant strands and that children have opportunities to master and apply this within their learning. They will ensure that a knowledge organiser (Learning to Learn) is utilised and that a cycle of lessons clearly plans for progression. *Suggested activities are written in italics and these are optional.*

Lesson Expectations:

- A clear design brief - i.e. what is needed, why and who is it for?
- Key Vocabulary will be discussed, with examples where needed.
- Products will be evaluated - both those made designers and children's own creations.
- Specific knowledge and skills required for children to be successful, will be explained or demonstrated.
- Children will make mock ups before using more expensive materials, e.g. designing a wallet from paper before using fabric.
- As design covers every aspect of life, there should often be an overlap with knowledge and skills learned in science, computing or art lessons.
- Famous designers will be referenced wherever possible and relevant.

Intended Impact:

- All children will have a secure knowledge of what is meant by Design and Technology
- All will learn to use a range of tools safely and effectively
- Children will be taught to use and build upon their prior learning, further developing the knowledge and skills in each session.
- Children in KS2 will be able to name a designer and explain what a designer does.
- Children will recognise the importance of following closely and meeting the requirements of their design brief.
- Children will learn to evaluate their own work fairly, recognising what they did well and what they could do to improve their design.
- Children will learn about food hygiene.
- Children will become increasingly independent in the ability to consider safety when using equipment and tools
- Children will apply skills learned in other subjects, but especially science and maths, when working on their design.

Longthorpe Primary School Curriculum Map – Design and Technology

<u>Key Concepts</u>

The key concepts are: *Healthy lives* *Inspiration* *Light, Movement and Sound* *Structures and Materials* Culture

EYFS	Essential Knowledge	Essential Skills	Additional Knowledge	Additional Skills
1. Designing	To name and recognise some common materials such as wood, paper, glass, metal and plastic.	Children will be able to tell an adult what they intend to make. Children will use their own ideas to make something, e.g. when working with paper, card or reclaimed materials.	To be able to describe some features of materials, *e.g. wood is hard, plastic is smooth, metal feels cold.*	Children will draw a picture to show what they intend to make or take images of elements to be used.
2. Making	To know different ways that things can be joined, *including sellotape, glue, knots.* To know the importance of washing their hands.	To be able to use a range of tools independently, *e.g. scissors and hole punch.* To use tools safely and effectively to help with food preparation and baking, *e.g. using knives or scissors to cut on a non-slip surface.*	To recognise when things are stable and to find ways to make things more stable. To recognise dangers in the kitchen such as heat or sharp tools.	To learn to use a wider range of tools*, e.g. treasury tags, split pins and staples.*
3. Evaluating	Children will begin to recognise that their work can always be improved.	Children will be able to suggest what went wrong, e.g. why their model fell over.	Children will evaluate products that they may use e.g. water bottles, peelers against given criteria. Children will begin to look at examples and recognise which features make them better than others.	Children will be able to say what else they could try or what they might do differently next time.
4. Technical knowledge	Children will begin to recognise which familiar materials are stronger than others, *e.g. card is stronger than paper.* Recognise the changes that happen in foods when they are heated or cooked. *e.g. melting chocolate for krispie cakes and the changes that happen when making cakes or biscuits.*	Children will explore construction materials with moving parts such as cogs and wheels.	Children will begin to select appropriate materials or parts to join or strengthen their models.	Children might dismantle objects to find out how they work. To use mathematical skills to read numbers or to count out spoonfuls for a recipe.
Key Vocabulary	Healthy lives Inspiration	Cooking, Baking, Decorating, Measuring, Ingredients, Seasons, Recipe, Healthy, Rub in method Create, Draw, Make, Shape		

	Light, Movement and Sound	Wheel, Hinge, Cog
	Culture	Science, Electricity, Engineer, Maths
	Structures and Materials	Build, Join, Construct, Wood

Longthorpe Primary School Curriculum Map – Design and Technology

Key Stage 1	Essential Knowledge	Essential Skills	Additional Knowledge	Additional Skills
1. Designing	To use drawing to plan and design. To understand the features of a variety of textiles, *e.g. which fabrics are stretchy, make a sock puppet for a puppet show,*	Design a product and describe how it works. To choose specific textiles to plan a product, e.g. *design and make a waterproof coat for teddy.* Children should use computer programmes to design *e.g. use a basic paint program to design a coat for teddy.*	To know your target market, what they will find functional and appealing.	Design a product which moves. To make a functional and appealing product.
2. Making	Understanding how to use a narrow range of tools, e.g. split pins, staples, hole punch, Children need to know the names of the tools and their intended use.	Choose tools and materials from a narrow range and know why they have chosen them. Join materials and components in different ways. To cut food safely, *e.g. cutting salad when making dips and dippers.* To weigh ingredients to use in a recipe, *still using "non-standard" measures such as cups and spoons in Y1, scales in Y2.*	Understanding how to use a wide range of tools. To know the basic principles of a healthy diet and use this knowledge to prepare dishes.	Use own ideas to make a product which moves. Measure materials accurately to the nearest cm. Choose tools and materials and know why they have chosen them. To use slicing, dicing and peeling, *e.g to create a healthy fruit kebab or fruit salad or for vegetable soup.*
3.Evaluating	Be able to use a range of criteria to evaluate something fairly.	Explore a range of products. Explain what has worked well and not so well with their design.	Be able to use a range of criteria to evaluate something fairly and be able to explain product improvements.	Explore and evaluate a range of products. Compare their ideas and products against their design criteria.
4. Technical knowledge	To know how to strengthen and stabilise. To know the basic principles of a healthy diet, *e.g. plan what foods to put in a healthy lunch box.* To understand where food comes from, *e.g. Farm to Fork resources.*	Build structure and explain how they could be made stronger, stiffer and more stable. Make their own model stronger. Explore mechanisms with moving parts, e.*g. toys including toy vehicles, wind up toys and construction toys.*	To know which mechanism will enhance and strengthen their product.	Make their own model stronger recording each result. Explore and use mechanisms, gaining understanding of levers, sliders, wheels and axles, *e.g. create a moon buggy using wheels and axles.*
	Healthy lives Inspiration Light, Movement and Sound Culture Structures and Materials	Cooking, Baking, Decorating, Measuring, Ingredients, Recipe, Diet, Seasons, Recipe, Bake, Set, Hygienic Design, Purpose, Create, Creative, Creativity, Evaluate, Construction, Template, Impact, Flexible, Rigid, Brittle, Net, Opaque, Develop Hinge, Cog, Lever, Pulley, Wheel, Axle, Gears, Power, Friction, Force, Motion Science, Electricity, Engineer, Maths, STEM, Electricity, Circuit, Programming, connect Build, Join, Construct, Wood, Structures, angles, components		

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Lower Key Stage 2	Essential Knowledge	Essential Skills	Additional Knowledge	Additional Skills
1. Designing	To understand which group their product is aimed at.	To design with the user in mind, motivated by the service a product will offer. To evaluate their design following a set criteria. To annotate sketches and drawings.	To understand which group their product is aimed at, using market research to inform their design.	To ensure their product is fit for purpose. To understand seasonality and choose ingredients based on this. To use cross sectional and exploded diagrams, prototypes and computer aided designs.
2. Making	To understand how a wide range of tools work. (See equipment list)	To follow a step by step plan, choosing the right equipment and material. To prepare and cook a variety of seasonal dishes, e.g.: stew/broth, salad, pumpkin soup/pie.	To understand how a wide range of tools and techniques work. To know and apply a range of cooking techniques.	To work accurately to measure, make cuts and make holes, *e.g. design and make a Christmas card with moving parts.*
3. Evaluating	To know why a model has or hasn't been successful. Consider the views of others to improve their work.	To investigate and analyse a range of products. To explain how to improve the finished model. To explain how the original design has been improved.	To know the next steps in improving parts of their model. Understand how key events and individuals in DT have helped shape their world, *e.g. look at the work of graphic designers such as Chip Kidd, then design their own book cover or poster.*	To consider the view of others to improve their work. To present the product in an interesting way.
4. Technical knowledge	To know how to link scientific knowledge of light switches or buzzers. To have knowledge of healthy eating and calories.	To create circuits using electronic kits. To understand and use electrical systems in their products, *e.g. design a game to teach times tables with lights or buzzers for correct answers.* To understand and apply the principles of a healthy diet.	To use electrical systems to enhance the quality of their product.	To apply their understanding of computing to program, monitor and control their products.
Key Vocabulary	Healthy Lives Inspriration Light, Movement and Sound Culture Structures and Materials	Cooking, Baking, Decorating, Measuring, Ingredients, Combine, Diet, Nutrition, Seasonality, Produce, Products, Boil, Dice, Glaze Purposeful, Appropriate, Functional, Appealing, Iterative (step by step), Review and evaluate, Annotate, Innovative, Mock-up, Cross section, Practical, Context, Malleable, Modify, Function, Enlarged view, Synthetic, Translucent, Research Mechanism, Cam, Gearing, Machine, Pulley system, Rotary, Tension, Crank, Winch, Washer, Gear train, Electronics, Conductor, Resistance, bulb, buzzer, Wire, Crocodile clip STEM, Technical knowledge, Generate, Engineering , Graphics, Abrasive, Glass paper, Plastic, Balsa wood, Framework		

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Upper Key Stage 2	Essential Knowledge	Essential Skills	Additional Knowledge	Additional Skills
1. Designing	To combine elements of design from a range of inspirational designers throughout history, giving reasons for choices, *e.g. look at famous designers such as Orla Kierly, Christian Dion and Tom Ford before designing their own reusable shopping bag.*	To use research to design innovative, functional, appealing products. To understand and use mechanical systems in their products, such as gears and pulleys	To know how to represent designs using prototypes, cross sectional diagrams and computer aided designs.	To create innovative designs that improve upon existing products. To create, refine and critique recipes based on aesthetics, taste, aroma and texture.
2. Making	To show an understanding of the qualities of materials, in order to choose appropriate materials to cut and shape. To know a range of stitching techniques; running stitch, cross stitch, blanket stitch, back stitch *For e.g. recycling clothes to make a bag (could relate to make do and mend).*	To cut the materials with precision. To create objects that employ a seam allowance. To demonstrate a range of baking and cooking techniques, *e.g. follow a WWII recipe.*	To know how the nature of materials require different tools E.g.cardboard scissors compared to a hack saw	To refine the finish with appropriate tools e.g. sanding.
3. Evaluating	To know that a high quality finish will impact on the finished product	To evaluate with the user in mind Use L2L critical tools such as PNI Diamond 9 Sphere of relevance	To use cross curricular skills e.g. art, computing, to evaluate their product.	To evaluate prototypes and how refinements have improved them, *e.g. reusable shopping bag.*
4. Technical knowledge	To know how to use a range of practical skills to create products e.g. cutting, drilling, screwing, nailing, gluing, filing and sanding. To know how to write code to control and monitor products. To know how micro-organisms affect food and storage methods which prevent spoiling e.g.pickling, preserving	To convert rotary motion to linear using cams, *e.g. in a simple Jack in the Box style toy.* To be able to control and monitor models and products using code. To understand the importance of correct storage and handling of ingredients. To measure accurately and calculate ratios of ingredients, to scale up or down from a recipe, *e.g. work out how much ingredients would be needed for enough anzac biscuits for the whole class?*	To know how to use innovative combinations of electronics, computing and mechanics in product design To know how changing ingredients, methods, cooking times and temperatures affect your recipe.	To use electronics, computing and mechanics in product design.
Key Vocabulary	Healthy lives Inspiration Light, Movement and Sound Culture Structures and Materials	Micro-organisms, Cooking, Baking, Decorating, Measuring, Ingredients, Combine, Style, Critique, Diet, Nutrition, Seasonality, Calories Refine, precision, techniques, seam, innovative, prototypes, Innovation, Aesthetics, Characteristics of materials, Pattern, Market Research, Ergonomics, Design Brief, Specification, Textile, Enterprise/enterprising Cams, Components, Torque, Pneumatics, Hydraulics, Electronics Technical knowledge, Generate, Engineering , Graphics, Monitoring, Control Technology Reinforce, seam allowance		