

# Brackenwood Junior School



DT

Long Term Plan

2022-23

## Whole School Intent

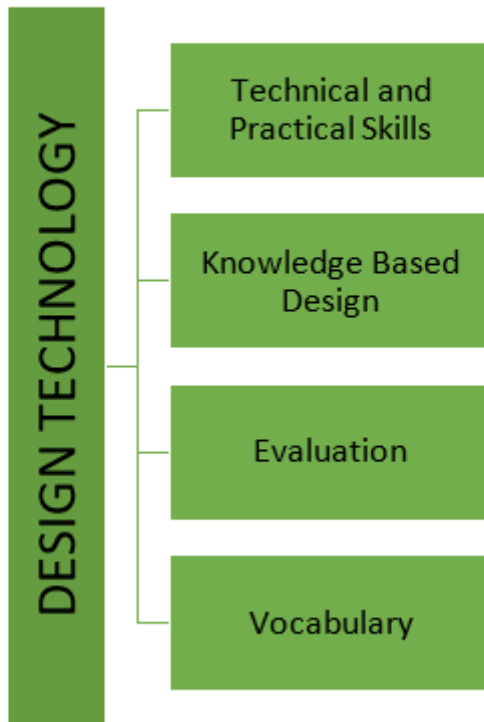
Mechanisms	Cooking and Nutrition	Textiles	Electrical Systems	Construction
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	Autumn	Spring	Summer
Year 3	Money pouch	Photo frames	Locally sourced crumble/sandwich
Year 4	Lanterns	Pneumatic monster (pneumatic system)	Fair trade Graze box + packaging
Year 5	Creating a tippy tap	Rainforest shelter (pulleys)	Palm oil free afternoon tea
Year 6	Light up fairground	T-shirts	Bridges (levers)

# Design and Technology

*Design is not just about what something looks or feels like. Design is about how it works.*

**Our key driving themes are:**



<b>Why should children learn this subject?</b>	<p>Design Technology provides children with the opportunity to develop the skills, knowledge and understanding needed to design and make functional products. By engaging in Design Technology tasks, children have opportunities to become creative and innovative. They acquire a better understanding of materials and their components, mechanisms, control systems and structures. They learn how to evaluate products for quality and effectiveness. In addition, engaging in Design Technology will help the children with learning across the curriculum and there are clear links between this subject and others such as Science, ICT, Maths and Art.</p> <p>Participating in Design Technology activities will enable children to become more confident at problem-solving, risk-taking, evaluating and collaborative working</p>
<b>What will children learn to do in this subject?</b>	<p>At Brackenwood Junior School, children will:</p> <ul style="list-style-type: none"> <li>• Develop creative, technical and practical knowledge.</li> <li>• Design and make high-quality products for a wide range of purposes.</li> <li>• Evaluate and test their work and the work of others.</li> <li>• Understand the principles of nutrition and learn how to cook.</li> <li>• Research existing designs to inform their own work.</li> <li>• Use sketches, diagrams and prototypes to develop and refine their ideas.</li> <li>• Use a wide variety of tools and materials.</li> <li>• Learn to strengthen, stiffen and reinforce structures.</li> <li>• Understand and incorporate mechanical and electrical systems.</li> <li>• Use computing to program, monitor and control their products.</li> </ul>
<b>How will we inspire them?</b>	<ul style="list-style-type: none"> <li>• Researching, designing and making a range of products with a real purpose.</li> <li>• Using the <i>Fun Food Chef</i> to learn about nutrition and how to cook.</li> </ul> <p>Working with a range of different materials (clay pottery, sewing etc.)</p>

## Skills Progression Map

	Year 3	Year 4	Year 5	Year 6
Research and Design	1.Communicate the strengths and weaknesses of existing products	1. Communicate how research of existing products will inform their design	1.Communicate the strength and weaknesses of different products in relation to the specification of the task and how this will inform their design	1. Conduct market research and other research before planning their designs and use this analysis in relation to the specification of the task and how this will inform their design
	2. Design a functional product that meets a range of design requirements 3. Describe their design using an accurate sketch 4. Create a prototype of the design model. 5. Create functional models of their product where applicable	2. Design a functional product that meets a range of design requirements ensuring it is realistic and appropriate 3. Describe their design using an accurate sketch and explanation 4. Devise a template or prototype to decide the strength and reliability of their product	2. After conducting research, create a range of designs through collaborative thinking 3. Describe and analyse a range of designs to create the most effective final design in relation to purpose 4. Create a detailed prototype explaining how their plan meets the design criteria	2. After conducting research, create a range of designs through collaborative thinking exemplifying diversity in the designs 3. Work collaboratively to discuss and compromise on ideas and justify their own opinions to others when creating a final design from different views and cross-sections 4. Use their prototype or template to check if their design will be successful and adapt it where necessary
	6. Detail the tools and equipment needed in relation to previous research 7. With modelling, plan a step-by-step guide which details the order of steps	5. Take into account what another user would want when choosing materials and the tools 6. Plan and step-by-step instructional guide and explain it to others	5. Consider the user's opinion and functionality when selecting appropriate materials and tools, justifying their selection 6. Produce a detailed, step-by-step plan, which explains why their finished product will be a good quality based on their plan	5. Work within constraints (timing, budgeting, H and S) when selecting materials and tools, justifying their selection 6. Produce a detailed, step-by-step plan, which explains why their finished product will be a good quality with consideration to audience, purpose, culture and society.
Make	Year 3	Year 4	Year 5	Year 6
Construction	1. To make a structure according to a design criteria. 2. Create joints and structures from wood and card. 3. Create a range of different shaped frame structures.	1. Make a variety of free-standing frame structures of different shapes and sizes. 2. Select appropriate materials to build a strong structure. 3. Create a design in accordance with a plan. 4. Learn to create different textural effects with materials.	1. Build a wooden bridge structure independently measuring and marking wood accurately. 2. Select appropriate tools and equipment for particular tasks. 3. Use the correct techniques to saw safely. 4. Identify where a structure needs reinforcement and use card corners for support. 5. Understand basic wood functional properties.	1. Draw upon new and prior knowledge of structures. 2. Measure, mark and cut wood accurately to create a range of structures. 3. Use a range of materials to reinforce and add decoration to structures.
Mechanisms		1. Create a pneumatic system to create a desired motion. 2. Build secure housing for a pneumatic system. 3. Use syringes and balloons to create different types of pneumatic systems to	1. Follow a design brief 2. Make mechanisms and/or structures using a pulley system. 3. Use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.	1. Make linkages using card for levers. 2. Experiment with linkages adjusting the widths and lengths of card used. 3. Cut and assemble components neatly. 4. Select materials according to their characteristics.

		<p>make a functional and appealing pneumatic structure.</p> <p>4. Select materials due to their functional and aesthetic characteristics.</p> <p>5. Manipulate materials to create different effects by cutting, creasing, folding and weaving.</p>		<p>5. Follow a design brief with focus on accuracy.</p>
Textiles	<p>1. Follow a design criteria.</p> <p>2. Make and test a paper template with accuracy and in keeping with design criteria.</p> <p>3. Select, measure, mark and cut fabrics using a paper template and fabric scissors.</p> <p>4. Thread a needle.</p> <p>5. Tie knots with support.</p> <p>6. Select a stitch style to join fabric, working neatly sewing small neat stitches.</p> <p>7. Incorporate fastening to a design.</p> <p>8. Decorate fabric using appliqué.</p>			<p>1. Use a template when pinning panels onto fabric.</p> <p>2. Measure, mark and cut fabric accurately and independently, in accordance with a design.</p> <p>3. Thread a needle independently.</p> <p>4. Sew a strong running stitch or blanket stitch, making small, neat stitches and following the edge</p> <p>5. Tie strong knots with greater independence.</p> <p>6. Use applique to attach pieces of fabric decoration.</p> <p>7. Attach objects using thread and add a secure fastening (design).</p> <p>8. Learning different decorative stitches. Sew accurately with even regularity of stitches.</p>
Electrical Systems		<p>1. Fit an electrical component (bulb).</p> <p>2. Make a working electrical circuit and switch.</p>		<p>1. Make and test a functional circuit, incorporating a motor,</p> <p>2. Incorporate a circuit into a base.</p> <p>3. Use technology to program a circuit.</p>
Cooking and nutrition	<p>1. Know how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination.</p> <p>2. Chop fruit safely using the bridge or claw grip.</p> <p>3. Follow the instructions within a recipe.</p>	<p>1. Cooking safely, following basic hygiene rules</p> <p>2. Adapt a recipe.</p>	<p>1. Follow a recipe, including using the correct quantities of each ingredient</p> <p>2. Work to a given timescale</p> <p>3. Cut and prepare food safely</p> <p>4. Use equipment safely, including knives.</p> <p>5. Know how to avoid cross-contamination</p> <p>6. Work with independence.</p> <p>7. Follow a step-by-step method carefully to make a recipe.</p>	
	Year 3	Year 4	Year 5	Year 6
Evaluate	<p>1. Make decisions to change their plan/design throughout the making process</p>	<p>1. Evaluate their product thinking of both appearance and its mechanisms during the process</p>	<p>1. Ensure that their evaluation of their product's effectiveness is ongoing throughout their designing and making process</p> <p>2. Consistently check whether anything can be improved before going through with it</p>	<p>1. Discuss and decide whether it is fit for purpose (during the design, making and evaluating process)</p> <p>2. Decide whether they need to gain more information to make their product better</p> <p>3. Consistently consider whether their product meets the design criteria</p>
	<p>2. Explain what they have changed to improve their product further</p> <p>3. Discuss what others could add/change to improve their product further in relation to the product criteria</p>	<p>2. Explain how their finished product compares to their original design</p> <p>3. Suggest ways to improve their finished product in relation to the product</p>	<p>3. Seek advice to refine and improve their product, re-moulding materials if necessary</p>	<p>4. Test their finished product</p> <p>5. Discuss a range of elements that could improve their product, including alternative resources, budget and technology</p>

		criteria whilst also identifying the positive elements of their design	4. Suggest alternative plans and say what the good points and drawbacks are of a finished product 5. Evaluate the appearance and function against the original criteria	6. Offer constructive evaluation to others to improve their work
<b>Technical knowledge</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
<b>Construction</b>	1. Explore how to create a strong frame 2. Identify stronger and weaker structures 3. Find different ways to reinforce structures 4. Understand how triangles can be used to reinforce frames.		1. Identify features of a shelter 2. Build on prior knowledge of frame structures. 3. Identify suitable materials to be selected and used for a shelter, considering weight, compression, tension 4. Extend the knowledge of wide and flat based objects being more stable. 5. Understand the difference between frame and shell structure	1. Know that structures can be strengthened by manipulating materials and shapes 2. Identify bridge structure in everyday life (truss, drawbridge, etc.) 3. Understand man made and natural structures.
<b>Mechanisms</b>		1. Understand how pneumatic systems work. 2. Learn that mechanisms are a system of parts that work together to create motion. 3. Understand that pneumatic systems can be used as part of a mechanism. 4. Learn that pneumatic systems force air over a distance to create movement.	1. Understand how pulley systems work. 2. Identify mechanisms in everyday objects. 3. Understand that the output is greater than the input effort needed.	1. Know that an input is the motion used to start a mechanism 2. Know that output is the motion that happens as a result of starting the input 3. Know that mechanisms control movement 4. Describe mechanisms that can be used to change one kind of motion into another
<b>Textiles</b>	1. Thread a needle. 2. Tie knots. 3. Sew running stitch. 4. Understand the need to count the thread on a piece of evenweave fabric in each direction to create uniform size and appearance. 5. Understand that there are different types of fastenings and what they are.			1. Thread needles with greater independence. 2. Learn to sew a greater range of stitches e.g. cross stitch, and blanket stitch to join fabric 3. Stitch so the space between the stitches are even and regular 4. Learn different decorative stitches 5. Application and outcome of the individual technique
<b>Electrical Systems</b>		1. Learn how electrical items work 2. Identify electrical products 3. Learn what electrical conductors and insulators are 4. Understand that a battery contains stored electricity and can be used to power products 5. Learn the key components used to create a functioning circuit		1. Understand that breaks in a circuit will stop it from working 2. Explain how a series circuit will work 3. Identify the negative and positive leg of an LED 4. Draw a series circuit diagram and symbols 5. Learn that batteries contain acid, which can be dangerous if they leak 6. Identify and name the circuit components in a light up fairground.
<b>Cooking and nutrition</b>	1. Learn that not all fruits and vegetables can be grown in the UK. 2. Learn that climate affects food growth.	1. Record the relevant ingredients and equipment needed for a recipe 2. Learn to adapt a recipe to make it healthier.	1. Learn that imported foods travel from far away and further understand how this can negatively impact the environment.	

	<p>3. Learn that imported foods are foods which have been brought into the country and exported foods are foods which have been sent to another country.</p> <p>4. Learn that food travels from far away and this can negatively impact the environment.</p> <p>5. Understand where food comes from, describing the process of 'Farm to Fork' for a given ingredient</p> <p>6. Learn that vegetables and fruit grow in certain seasons.</p> <p>7. Learn that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre.</p> <p>8. Learn that vitamins, minerals and fibre are important for energy, growth and maintaining health.</p> <p>9. Learn that cooking instructions are known as a 'recipe'.</p> <p>10. Work with cooking equipment safely and hygienically.</p> <p>11. Learn to use, store and clean a knife safely.</p> <p>12. Learn that it is important to use oven gloves when removing hot food from an oven.</p> <p>13. Learn the cooking techniques of sieving, creaming, rubbing method, cooling.</p> <p>14. Understand the combinations of food that will complement one another.</p>	<p>3. Compare two adapted recipes using a nutritional calculator and then identifying the healthier option.</p>	<p>2. Learn what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).</p> <p>3. Learn that many countries have 'national dishes' which are recipes associated with that country.</p> <p>4. Understand the environmental impact of palm oil on future product and cost of production.</p> <p>5. Learn how to research a recipe by ingredient.</p> <p>6. Understand the combinations of food that will complement one another</p> <p>7. Learn that cross-contamination means that bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean products.</p> <p>8. Learn that 'flavour' is how a food or drink tastes.</p> <p>9. Learn that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides.</p> <p>10. Understand the impact of the cost and importance of budgeting while planning ingredients for afternoon tea.</p>	
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# **National Curriculum Programmes of Study**

## **Purpose of study**

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

## **Aims**

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

## **Attainment targets**

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

**Schools are not required by law to teach the example content in [square brackets].**



## **Subject content**

### **Key stage 1**

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment].

When designing and making, pupils should be taught to:

#### **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

#### **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.

## **Key stage 2**

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].

When designing and making, pupils should be taught to:

### **Design**

- 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**

- 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**

- 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**

- 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**

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:

### **Key stage 1**

- use the basic principles of a healthy and varied diet to prepare dishes
- understand where food comes from.

### **Key stage 2**

- 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.