



# Year 6: Design and Technology 2022-23



## Autumn Term – Electrical systems Electrical hand game

- **Prior learning** – In year 4 the children made torches. They understood that electrical conductors are materials which electricity can pass through and that electrical insulators are materials which electricity cannot pass through. They learned that a battery contains stored electricity that can be used to power products and that an electrical circuit must be complete for electricity to flow. They also discovered that a switch can be used to complete and break an electrical circuit

Overview of unit	Substantive knowledge	Disciplinary knowledge
<ul style="list-style-type: none"> <li>• Explain simply what is meant by 'form' (the shape of a product) and 'function' (how a product works).</li> <li>• State what they like or dislike about an existing children's toy and why.</li> <li>• Learn about skills developed through play and apply this knowledge in a survey of one or more children's toys.</li> <li>• Identify the components of a steady hand game.</li> <li>• Design a steady hand game of their own according to their design criteria, using four different perspective drawings.</li> <li>• Create a secure base for their game, with neat edges, that relates to their design.</li> <li>• Make and test a functioning circuit and assemble it within a case.</li> </ul>	<ul style="list-style-type: none"> <li>• To know that 'form' means the shape and appearance of an object.</li> <li>• To know the difference between 'form' and 'function'.</li> <li>• To understand that 'fit for purpose' means that a product works how it should and is easy to use.</li> <li>• To know that 'form over purpose' means that a product looks good but does not work very well.</li> <li>• To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind.</li> <li>• To understand the diagram perspectives 'top view', 'side view' and 'back'.</li> </ul>	<ul style="list-style-type: none"> <li>• Designing a steady hand game, identifying and naming the components required.</li> <li>• Drawing a design from three different perspectives.</li> <li>• Generating ideas through sketching and discussion.</li> <li>• Modelling ideas through prototypes.</li> <li>• Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.</li> <li>• Constructing a stable base for a game.</li> <li>• Accurately cutting, folding and assembling a net.</li> <li>• Decorating the base of the game to a high-quality finish.</li> <li>• Making and testing a circuit.</li> <li>• Incorporating a circuit into a base.</li> <li>• Testing their own and others' finished games, identifying what went well and making suggestions for improvement.</li> <li>• Gathering images and information about existing children's toys.</li> <li>• Analysing a selection of existing children's toys.</li> </ul>

### Next steps

This is the last electrical systems unit that the children will have at Bentley Heath. In KS3 they will:

- understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs
- test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups
- select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties

### Important subject vocabulary

Assemble – put parts together

Battery – a source of power

Battery pack - a set of any number of (preferably) identical batteries or individual battery cells.

Bulb - a device to convert electricity into light

Bulb holder – a place to hold the bulb in place

Buzzer – makes a sound when connected to energy

Circuit – to move all the way around something

Component – part of a machine or vehicle

Conductor - an object or type of material that allows the flow of charge (electric current)

Insulator – a substance that does not allow the transfer of heat or sound

Series circuit – the path along which a current of electricity flows

Switch – a device for making or breaking an electrical circuit

## Spring Term – Textiles Slippers

**Prior learning** – In year 3 and 4, the children learned about appliqué as a way of mending or decorating a textile by applying smaller pieces of fabric. They discovered that when two edges of fabric have been joined together it is called a seam and it is important to know that it is important to leave space on the fabric for the seam. They discovered that a fastening is something that holds two pieces of material together and how some fastenings are more appropriate for different purposes. They found out that creating a mock-up (prototype) of their design is useful for checking ideas and proportions.

<b>Overview of unit:</b>	<b>Substantive Knowledge:</b>	<b>Disciplinary Knowledge:</b>
<ul style="list-style-type: none"><li>• Consider a range of factors in their design criteria and use this to create a waistcoat design.</li><li>• Use a template to mark and cut out a design.</li><li>• Use a running stitch to join fabric to make a functional waistcoat.</li><li>• Attach a secure fastening, as well as decorative objects.</li><li>• Evaluate their final product.</li></ul>	<ul style="list-style-type: none"><li>• Designing a waistcoat in accordance with a specification and design criteria to fit a specific theme.</li><li>• Annotating designs.</li><li>• Using a template when pinning panels onto fabric.</li><li>• Marking and cutting fabric accurately, in accordance with a design.</li><li>• Sewing a strong running stitch, making small, neat stitches and following the edge.</li><li>• Tying strong knots.</li><li>• Decorating a waistcoat – attaching objects using thread and adding a secure fastening.</li><li>• Learning different decorative stitches.</li></ul>	<ul style="list-style-type: none"><li>• To understand that it is important to design clothing with the client/target customer in mind.</li><li>• To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric.</li><li>• To understand the importance of consistently sized stitches.</li></ul>

- Sewing accurately with even regularity of stitches.
- Evaluating work continually as it is created.

### Next steps

This is the last textiles unit that the children at Bentley Heath will experience before moving to KS3. In KS3 they will:

- identify and solve their own design problems and understand how to reformulate problems given to them
- develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture

### Important subject vocabulary

Annotate – add labels or information to a drawing.

## Summer – Food – special day Come dine with me

**Prior learning** – In year 5, the children learned where meat comes from – learning that beef is from cattle and how beef is reared and processed, including key welfare issues. They found they could adapt a recipe to make it healthier by substituting ingredients. They used a nutritional calculator to see how healthy a food option is. They learned how ‘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 objects.

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<ul style="list-style-type: none"> <li>• Find a suitable recipe for their course.</li> <li>• Record the relevant ingredients and equipment needed.</li> <li>• Follow a recipe, including using the correct quantities of each ingredient.</li> <li>• Write a recipe, explaining the process taken.</li> <li>• Explain where certain key foods come from before they appear on the supermarket shelf.</li> </ul>	<ul style="list-style-type: none"> <li>• To know that ‘flavour’ is how a food or drink tastes.</li> <li>• To know that many countries have ‘national dishes’ which are recipes associated with that country.</li> <li>• To know that ‘processed food’ means food that has been put through multiple changes in a factory.</li> <li>• To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides.</li> <li>• To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).</li> </ul>	<ul style="list-style-type: none"> <li>• Writing a recipe, explaining the key steps, method and ingredients.</li> <li>• Including facts and drawings from research undertaken.</li> <li>• Following a recipe, including using the correct quantities of each ingredient.</li> <li>• Adapting a recipe based on research.</li> <li>• Working to a given timescale.</li> <li>• Working safely and hygienically with independence.</li> <li>• Evaluating a recipe, considering: taste, smell, texture and origin of the food group.</li> <li>• Taste testing and scoring final products.</li> </ul>

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Next steps

This is the last textiles unit that the children at Bentley Heath will experience before moving to KS3. In KS3 they will:

- understand and apply the principles of nutrition and health
- cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet
- become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes
- understand the source, seasonality and characteristics of a broad range of ingredients.

Important subject vocabulary

bridge method- Hold the food to be cut between the fingers and thumb creating a bridge. The knife should go through the bridge to cut the food. This method ensures that fingers are out of the way as the knife cuts through the food.

cross-contamination - the process by which bacteria or other microorganisms are unintentionally transferred from one substance or object to another, with harmful effect.

**Summer Term – Digital world  
Navigating the world**

**Overview of unit:**

**Substantive Knowledge:**

**Disciplinary Knowledge:**

**Prior learning:** In year 5, the children learned that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record. They discovered that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose.

<ul style="list-style-type: none"> <li>• Incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief.</li> <li>• Write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen.</li> <li>• Identify errors (bugs) in the code and suggest ways to fix (debug) them.</li> </ul>	<ul style="list-style-type: none"> <li>• To know that accelerometers can detect movement.</li> <li>• To understand that sensors can be useful in products as they mean the product can function without human input.</li> <li>• To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request.</li> <li>• To know that 'multifunctional' means an</li> </ul>	<ul style="list-style-type: none"> <li>• Writing a design brief from information submitted by a client.</li> <li>• Developing design criteria to fulfil the client's request.</li> <li>• Developing a product idea through annotated sketches.</li> <li>• Placing and manoeuvring 3D objects, using CAD.</li> <li>• Changing the properties of, or combine one or more 3D objects, using CAD.</li> <li>• Considering materials and their functional properties,</li> </ul>
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<ul style="list-style-type: none"> <li>• Self and peer evaluate a product concept against a list of design criteria with basic statements.</li> <li>• Identify key industries that use 3D CAD modelling and why.</li> <li>• Recall and describe the name and use of key tools used in Tinkercad (CAD) software.</li> <li>• Combine more than one object to develop a finished 3D CAD model in Tinkercad.</li> <li>• Complete a product pitch plan that includes key information.</li> </ul>	<p>object or product has more than one function.</p> <ul style="list-style-type: none"> <li>• To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.</li> </ul>	<p>especially those that are sustainable and recyclable (for example, cork and bamboo).</p> <ul style="list-style-type: none"> <li>• Explaining material choices and why they were chosen as part of a product concept.</li> <li>• Programming an N,E, S,W cardinal compass.</li> <li>• Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.</li> <li>• Developing an awareness of sustainable design.</li> <li>• Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch.</li> <li>• Demonstrating a functional program as part of a product concept.</li> </ul>
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Next steps

This is the last digital world unit that the children at Bentley Heath will experience before moving to KS3. In KS3 they will:

- develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools
- understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists
- apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].

Important subject vocabulary

Navigation – knowing your position and planning and following a route.

cardinal compass – north, east, south, west

pedometer - device that measures how far someone has walked

GPS tracker - GPS tracking is the surveillance of location through use of the Global Positioning System (GPS) to track the location of an object remotely.