Year 6: Design and Technology 2022-23

Block 1 – 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
• Explain simply what is meant by 'form' (the shape of a product) and 'function' (how a product works). • State what they like or dislike about an existing children's toy and why. • Learn about skills developed through play and apply this knowledge in a survey of one or more children's toys. • Identify the components of a steady hand game. • Design a steady hand game of their own according to their design criteria, using four different perspective drawings. • Create a secure base for their game, with neat edges, that relates to their design. • Make and test a functioning circuit and assemble it within a case.	• To know that 'form' means the shape and appearance of an object. • To know the difference between 'form' and 'function'. • To understand that 'fit for purpose' means that a product works how it should and is easy to use. • To know that 'form over purpose' means that a product looks good but does not work very well. • To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind. • To understand the diagram perspectives 'top view', 'side view' and 'back'.	• 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. • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'. • 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. • Testing their own and others' finished games, identifying what went well and making suggestions for improvement. • Gathering images and information about existing children's toys. • Analysing a selection of existing children's toys.

<u>Next steps</u>

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

Block 2 – Textiles
Slippers

Prior learning – In year 3 and 4, the children learned abou 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.

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
• Consider a range of factors in their design criteria and use this to create a waistcoat design. • Use a template to mark and cut out a design. • Use a running stitch to join fabric to make a functional waistcoat. • Attach a secure fastening, as well as decorative objects. • Evaluate their final product.	• Designing a waistcoat in accordance with a specification and design criteria to fit a specific theme. • Annotating designs. • Using a template when pinning panels onto fabric. • 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. • Decorating a waistcoat – attaching objects using thread and adding a secure fastening. • Learning different decorative stitches. • Sewing accurately with even regularity of stitches. • Evaluating work continually as it is created.	• To understand that it is important to design clothing with the client/target customer in mind. • To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. • To understand the importance of consistently sized stitches.

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.

Block 3- 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:
• Find a suitable recipe for their course. • Record the relevant ingredients and equipment needed. • Follow a recipe, including using the correct quantities of each ingredient. • Write a recipe, explaining the process taken. • Explain where certain key foods come from before they appear on the supermarket shelf.	• To know that 'flavour' is how a food or drink 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).	• Writing a recipe, explaining the key steps, method and ingredients. • Including facts and drawings from research undertaken. • 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. • 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 in productions. • Evaluating health and safety in production to minimise cross contamination.

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.

Block 4 – 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.		
• Incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief. • Write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen. • Identify errors (bugs) in the code and suggest ways to fix (debug) them. • Self and peer evaluate a product concept against a list of design criteria with basic statements. • Identify key industries that use 3D CAD modelling and why. • Recall and describe the name and use of key tools used in Tinkercad (CAD) software. • Combine more than one object to develop a finished 3D CAD model in Tinkercad. • Complete a product pitch plan that includes key information.	• To know that accelerometers can detect movement. • To understand that sensors can be useful in products as they mean the product can function without human input. • To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. • To know that 'multifunctional' means an object or product has more than one function. • To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.	• Writing a design brief from information submitted by a client. • Developing design criteria to fulfil the client's request. • Developing a product idea through annotated sketches. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combine one or more 3D objects, using CAD. • Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). • Explaining material choices and why they were chosen as part of a product concept. • Programming an N,E, S,W cardinal compass. • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Developing an awareness of sustainable design. • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. • Demonstrating a functional program as part of a product concept.

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.