DT **Year 6** **Autumn 2**

Theme: Fairground rides
Strand: Electrical and mechanical components

NC objectives covered:

- 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 and prototypes.
- 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
- Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]

Prior Knowledge needed:

- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
- Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.
- Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches

Learning in this topic:

TECHNICAL KNOWLEDGE: Develop the creative, technical and practical expertise needed to perform everyday tasks confidently

- The children will explore a range of products used for **walking, hiking, and mountaineering** considering what is available on the market, the materials used and the type of products that contain **electrical components.**
- The children will consider the type of **customers, the market, and their needs.**
- The children will be given opportunities to handle products and explore how they work, and the materials used.
- Building upon their scientific understanding the children will explore different models of **circuits** and the outputs they can generate.

DESIGN AND MAKE: 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

- Using their research the children will generate and develop designs of a new mountaineering product that contains an **electrical element** (e.g. gloves that contain a light sensor torch for climbing in the dark, a wrist band with an alarm etc).
- The children will explore and use an increasing range of **complex control system** and consider how the **control components** will be used and the output achieved.
- The children will create models and communicate their ideas **through discussion, annotated sketches, cross-sectional and exploded diagrams and prototypes**.
- Throughout the design process the children will modify and improve their designs.
- The children will consider appealing products that are **fit for purpose**, aimed at particular individuals or groups.

EVALUATE: critique, evaluate and test their ideas and products and the work of others (including in the real world)

- The children will consider developments in D&T, and how consider the impact their designs will have on individuals, society and the environment.
- They will test, evaluate and refine ideas and products against a specification, taking into account the views of intended users.
- The children will use their research to analyse the work of past and present professionals and others to develop and broaden understanding.

Curriculum Concepts and Themes:

- Electrical circuits
- Product design
- Electrical safety

Curriculum Skills Progression:

- Explore and describe how switches can be used in a range of circuits to control components, **e.g. lights in a lighthouse, a movement sensor in a burglar alarm.**
- Apply appropriate safety measures when constructing circuits.
- Explore and discuss ways in which electricity can be used to control movement.
- Explore and use an increasing range of complex control system, **e.g., a light sensor.**
- Use computer-based systems to control an increasing range of components
- Apply computing and use of electronics to embed intelligence in products that respond to inputs.
- Control outputs such as motors.
- Make use of sensors to detect heat, light, sound and movement.
- Use a variety of approaches, **e.g. biomimicry and user-centred design to generate creative ideas and avoid stereotypical responses.**
- Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer- aided manufacture.
- Produce ordered sequences and schedules for manufacturing products, detailing resources required.
- Produce costings using spreadsheets for products they design and make.
- Understand developments in D&T, its impact on individuals, society and the environment.
- Test, evaluate and refine ideas and products against a specification, taking into account the views of intended users.
- Analyse the work of past and present professionals and others to develop and broaden understanding.

Direct links to made other subjects:

Science – electricity.

Geography - mountains

Inspirational Start:

(hook to capture the imagination)
Through research and object investigation, the children will explore a range of existing electrical and non-electrical products from mountaineering, walking and hiking ranges. E.g. gloves, hats, torches etc.

Mid-way Milestone:

The children will explore circuits to create prototypes using different components and sensors. They will experiment with different levels of power etc. and the effect this has on the output.

Extraordinary End:

(a recognised end point to work towards)

To create a final design and elements of a working product to show in a showcase of their work. This will include mood boards, research, designs, prototypes and demonstrations.

DT	**Year 6**	**Spring 1**
Theme: The Vikings **Strand: Structures**		

Learning in this topic:

Producing Creative Work and Ideas

Children to consider and outline the design brief and specifications for their boat.
Create initial design ideas considering the head and tail of the boat, how to make the dragon's head detachable, the sail and shields appearance and structure and the paddles.
Consider and identify the materials that will be used for each part of the boat.
Outline step-by-step how they will make their boat.

Proficiency in art mediums (drawing, painting, sculpture etc.)

Children to gather materials that they will use for their boat considering the design brief and specifications.
Children to sketch their designs and create prototypes of specific parts of the boat.
Children to use a range of materials and tools to cut, bond and join their materials together. Children have the option to use saw and hot glue gun (risk assessment created and shared with children).

Analyse and Evaluate Art using design language

Children will test their model against the brief given and evaluate its effectiveness. They will outline any changes/modifications made and give justification for these. Children will outline strengths of their boat and weakness (when discussing weaknesses consider the reason why this happened e.g. the material I used for the base did not float or the tail of the boat was too heavy). Based on these strengths and weaknesses, children should outline the changes and improvements that they would make if they were to make their boat again.

Knowledge of artists and designers and their impact on history/culture

Children to study and research Vikings and their use of Viking longboats. Children to investigate what they were made from, their size, how they moved, what were they used for and their characteristics. Children to label a Viking boat outlining each part's name and purpose.

NC objectives covered:	-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 -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 -apply their understanding of how to strengthen, stiffen and reinforce more complex
Prior Knowledge needed:	-Historical knowledge of the Vikings (linked to Topic) -Understanding of boats, their purpose, general design, structure and specifications -Different materials which can be used and their purpose and functions
Curriculum Concepts and Themes:	- • Raids • Invasion • Kingdoms • Settlements • Trade • Ruling/Power • Monarchy • Exploration
Curriculum Skills Progression:	• Create nets and templates accurately in a range of sizes. • Use a range of increasing methods to strengthen 3D structures and frames. • Investigate measure and record the load tolerance of different structures and find ways of improving a structures load-bearing capacity. • Build a range of structures using a wide range of effective materials. • Make use of specialist equipment to mark out materials. • Select the most appropriate method to strength 3D structures and frames. • Apply a range of finishing techniques, including those from art and design, to a broad range of materials including textiles, metals, polymers and woods. • Use a wider more complex range of materials, components and ingredients, taking into account their properties. • Develop and communicate ideas using annotated sketches, detailed plans, 3D and mathematical modelling, oral and digital presentations and computer- based tools. • Select from and use a wider, more complex range of materials, components and ingredients, taking account of their properties. • Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture. • Use a broad range of manufacturing techniques including handcrafted skills and machinery to manufacture products precisely. • Follow procedures for safety and hygiene and understand the process of risk assessment. • Understand developments in D&T, its impact on individuals, society and the environment. • Test, evaluate and refine ideas and products against a specification, taking into account the views of intended users. • Analyse the work of past and present professionals and others to develop and broaden understanding.
Direct links to made other subjects:	History (see overview) English- Information texts about the Vikings and specifically Viking Longboats

Inspirational Start: (hook to capture the imagination) Leaning about the Viking invasion of Lindesfarm.	**Mid-way Milestone:** Sharing design ideas, drawings and progress with their peers.	**Extraordinary End:** (a recognised end point to work towards) Testing out their Viking boats on water together. Photographs to be taken.