Brough Primary School – Curriculum Intention Plan 2024 - 2025

Subject: Design and Technology **Year Group:** Year 5/6	**Area of learning: Electrical Systems - Monitoring and Control (more complex circuits)** *Focus - Creating more complex circuits and using monitoring technology.*
Links to previous work/Remember when	• Children will have had experience of making simple electrical systems in year 3/4 - making a night light. They will also have covered simple electrical systems and circuits in Year 3/4 science lessons. • The children will have had many different opportunities to evaluate existing products, design products using a set of design criteria and and evaluate their own product. • They will have had limited experience using CAD earlier in the year when designing their bird houses. • They will have had limited experience of using computer aided monitoring and control systems in computing lessons (this did not happen in the spring term as we did not have access to the Crumble software that was needed). We now have access to BBC Micro:Bit which we will use to complete this unit.
Term	**Key Skills to be taught**
Summer 2025 What the children should know at the end of this series of lessons	- Investigate and analyse a range of existing products. - 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 and computer-aided design - apply their understanding of computing to program, monitor and control their products. - Evaluate their ideas and products against their own design criteria.

Vocabulary

Monitoring, control, Micro:Bit, control system, sensor, input, output, temperature, light level, data, code/program, microcontroller, LED, environmental, alert.

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	Sequence of learning	Learning Objectives/Outcomes	suggested Lesson Outline
	1	**Learning Objective:** To understand how monitoring and control systems are used in real-world contexts. **Key Knowledge:**	**Recap** – ***Children record*** *Starter discussion -* *https://www.bbc.co.uk/bitesize/articles/zx3q7ty#zrt7xbk* *What is monitoring? (looking at what is happening in the environment around you)* *What is control? (changing something about your environment)* *Show examples:* *: Monitoring - Smart heating (Nest thermostat), Automatic street lighting.* *: Control - flood warning systems, school fire alarm/CO2 monitors.* *Group activity - Match systems to "input" (sensor) and "output" (action)* *Possible Activity - complete a chart with systems, sensors and outputs* *Plenary - where can we see this technology in everyday life?*
	2	**Learning Objective:** To learn to use the Micro:Bit to monitor an aspect of the environment. **Key Knowledge:**	**Recap** – Recap what are inputs/outputs? What does control and monitoring mean? ***Children record*** *Introduce Micro:Bit and what the different parts are for (powerpoint available in possible resources folder).* *Complete the sunlight sensor micro:bit lesson to show how to turn the LED display into a sensor to react to light.* *Challenge - to make a moon appear when light levels are too low.*
	3	**Learning Objective:** To learn to use the Micro:Bit to	**Recap** – How can we use the sensors to show when light levels were low or high? What could we use this for?

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		monitor an aspect of the environment. **Key Knowledge:**	***Children record*** Recap on what the various parts of the micro:bit are for. Children recap programming the micro:bit to show a sun when light levels are high and a moon when light levels are low. Complete the light alarm lesson to further develop the sunlight sensor lesson or use one of the motion sensor lesson ideas to try out using a different sensor. Test around the classroom and discuss ways in which this could be used in real life situations.
	4	**Learning Objective:** To plan and design a solution to monitor an aspect of the environment (e.g. temperature, light, pressure). **Key Knowledge:**	**Recap** – What are sensors? What is a microcontroller? What would we use monitoring for in real life? ***Children record*** *Explain that we want to test how we would know if our bird boxes were being used.* *What could we monitor? (light, temperature, movement)* *What would we need to consider? (not disturbing the birds, placement of the sensors, attachment to the computer/ipad, cost, etc)* *What would be our design criteria? Make these together with the children.* *E.g. Must not disturb the birds* *Must create an alert* *Must monitor an environmental condition* *Must use computer programmed monitoring* *Children to draw their birdbox with their micro:bit monitor and label how it will work. Label what sensor they will use and what they will monitor.* ***(If possible do as Computer Aided Design)*** *Discuss different ideas as a class.*

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	5	**Learning Objective:** To build and program the Micro:Bit to carry out the environmental monitoring task.	**Recap: Recap on what monitoring means. What is a sensor? What environmental conditions can be monitored with a microcontroller.** **Children record:** Children create the code for their planned idea using MakeCode. Create a model birdhouse to test the design - could use cardboard, Lego, etc. Test - does it monitor as expected? Does it alert properly? Debug - Fix any problems and refine design.
	6	**Learning Objective:** To evaluate the effectiveness of their solution and reflect on the design process.	**Recap: What environmental condition did they choose to monitor? How did they do this?** **What is monitoring? What is a microcontroller?** **Children record:** Evaluate designs against the design criteria. Did their design work? Did the code work? Did it alert effectively? What would they have done differently? What could they do to improve their design?

Learning Outcome/product
How would the children know if their bird house was being occupied?

Assessment records	**List only those children who have not achieved the expected outcomes.**