



Knowledge and Skills Mind Map (DT) - Year 5 Summer Term

Knowledge - 
Skill - 

1. Can I investigate and understand how electrical alarm systems work?

Prior Knowledge (Year 4 Spring): Designed/made/evaluated an electrical sign

Vocabulary: system, input device, output device, switch, buzzer, LED, battery, wire

- Know that an electrical system is made up of different parts working together (e.g. input, process and output)
- Know that an input device detects or triggers a change (e.g. a switch being pressed or a door opening)
- Know that an output device produces a result (e.g. a buzzer sound-ing or an LED lighting up)
- Know that alarm systems are designed for a user and purpose (e.g. to warn people of danger or protect belongings)
- Know that electrical components must be connected in a complete circuit to function (e.g. battery, wires and output device connected in a loop)

Task: Explore a range of electrical alarm systems (e.g. house alarms, bike alarms, security alarms), guiding discussion on who the system is for (e.g. homeowners, cyclists, school staff) and its purpose (e.g. safety, protection, warning). Identify input devices (e.g. switch), output devices (e.g. buzzer, LED) and how they work together as a system. In books, children draw a simple system diagram of an alarm, labelling the input (e.g. switch), output (e.g. buzzer/light) and power source (e.g. battery), with brief explanations such as “the switch triggers the alarm” or “the buzzer sounds to warn people.”

Designing:

- Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of electrical circuits or circuit diagrams

Technical Knowledge:

- Understand and use electrical systems in their products
- Know and use technical vocabulary relevant to the project

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‘Can I design, make and eval-
uate an electrical alarm sys-
tem that responds to a
change in the environment?’

3. Can I design an electrical alarm system for a specific user and purpose?

- **Prior Knowledge:** Know that input and output devices can be combined in a circuit to create a simple system.

- **Vocabulary:** design specification, design brief, user, purpose, system, input device, output device, circuit diagram

- Know that a design brief explains what the product is and who it is for (e.g. an alarm for a school shed to protect equipment)
- Know that a design specification outlines what the product must do (e.g. must make a sound when activated, must use a switch, must be secure)
- Know that electrical systems include inputs, processes and outputs working together (e.g. a switch triggers a buzzer)
- Know that ideas can be communicated using annotated sketches and circuit diagrams (e.g. showing how components connect)

- Know that design decisions should meet the needs of the user and purpose (e.g. loud alarm for security, simple switch for ease of use)

Task: Discuss the design brief of creating an electrical alarm system, identifying the user (e.g. school staff, cyclist, homeowner) and purpose (e.g. warning, protection, detection). Guide children to develop simple design criteria such as having a working input and output and producing a clear warn-ing signal. In books, children write a short design specification (e.g. must include a switch and buzz-er/LED, must work using a complete circuit, must be suitable for the user), then draw an annotated circuit diagram or system diagram, clearly labelling input device, output device and connections, with notes such as “the switch activates the buzzer” or “this part completes the circuit.”

Designing:

- Develop a design specification for a functional product that responds automatically to changes in the environment
- Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of electrical circuits or circuit diagrams

2. Can I explore and use input and output devices in electrical systems?

- **Prior Knowledge (last lesson):** Know that electrical systems include inputs and outputs that work together to perform a function.

- **Vocabulary:** input device, output device, push-to-make switch, toggle switch, LED, buzzer, battery, wire, series circuit

- Know that input devices control a system by detecting or triggering a change (e.g. a push-to-make switch completes a circuit when pressed)
- Know that output devices produce an effect in a system (e.g. a buzzer makes a sound, an LED produces light)
- Know that electrical components must be connected correctly in a circuit to work (e.g. battery, wires, switch and output in a complete loop)
- Know that different types of switches control circuits in different ways (e.g. toggle stays on/off, push-to-make only works when pressed)
- Know that a system can be tested to check if it works effectively

Task: Explore and test a range of input and output devices by building simple circuits using components such as switches, LEDs and buzzers. Guide discussion on how each input controls the output and how the system works as a whole. In books, children draw and label a simple circuit diagram showing a battery, wires, an input device (e.g. switch) and an output device (e.g. buzzer or LED), with brief explanations such as “the switch controls the circuit” or “the LED lights when the circuit is complete.”

Designing: Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of electrical circuits or circuit diagrams

Making: Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product

Technical Knowledge: Understand and use electrical systems in products; Understand the use of computer control systems in products; Know and use technical vocabulary relevant to the project



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Electrical Systems:

Monitoring and Control
'Can I design, make and evaluate an electrical alarm system that responds to a change in the environment?'

4. Can I plan and make an electrical alarm system?

- **Prior Knowledge:** Know that a design specification and circuit diagram help plan how an electrical system will work.
- **Vocabulary:** series circuit, battery, wire, switch, buzzer, LED, crocodile clip, system, electrical components
- Know that a plan helps organise the steps needed to make a product (e.g. listing tools, equipment and components)
- Know that electrical components must be connected securely to create a reliable system (e.g. fixing wires firmly using crocodile clips or connectors)
- Know that selecting appropriate components affects how well the system works (e.g. choosing a buzzer for sound or LED for light)
- Know that a working circuit must be complete and correctly assembled (e.g. battery connected to input and output devices in a loop)
- Know that electrical systems can be controlled to respond to a change (e.g. a switch activating an alarm)

Task: Recap the design specification and circuit diagrams. Support children in creating a clear step-by-step plan, listing tools, equipment and components (e.g. battery, wires, switch, buzzer/LED). Children then build their electrical alarm system, focusing on assembling components accurately and making secure connections. Encourage testing throughout to check the system works. In books, children record their plan and create a labelled diagram of their final system, showing how the components are connected and how the input controls the output.

Making:

- Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components
- Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product
- Create and modify a computer control program to enable their electrical product to respond to changes in the environment

Technical Knowledge:

- Understand and use electrical systems in their products
- Understand the use of computer control systems in products
- Apply their understanding of computing to program, monitor and control their products
- Know and use technical vocabulary relevant to the project

5. Can I evaluate my electrical alarm system and suggest improvements?

Prior Knowledge: Know that an electrical system can be made by assembling components and following a plan.

Vocabulary: evaluate, system, input device, output device, function, user, purpose

- Know that evaluation involves checking how well a product works against its design specification
- Know that an electrical system should function reliably (e.g. the alarm activates when the switch is triggered)
- Know that testing helps identify problems or areas for improvement (e.g. loose wires or incorrect connections)
- Know that systems should meet the needs of a specific user and purpose (e.g. clearly alerting someone for safety or security)
- Know that improvements can be made by modifying the system (e.g. improving connections or changing components)

Task: Test the completed electrical alarm systems, checking whether they respond correctly (e.g. the buzzer or LED activates when the input is triggered). Guide discussion on how well the system works for the intended user and purpose. In books, children write an evaluation explaining how well their alarm meets the design specification, what works well (e.g. "the buzzer sounds clearly when the switch is pressed") and what could be improved (e.g. "I need to secure the wires more to make it reliable").

Evaluating:

- Continually evaluate and modify the working features of the product to match the initial design specification
- Test the system to demonstrate its effectiveness for the intended user and purpose

Technical Knowledge:

- Apply their understanding of computing to program, monitor and control their products
- Know and use technical vocabulary relevant to the project