Scheme of Work

Design & Technology: **Electronic Products**

Year 8 - Mapboard Project

Aim of Unit

The main aim of this unit is for pupils to learn how to apply and combine their understanding of electrical and mechanical control and structures when designing and making. They can also develop and practise graphic communication techniques.

In this unit pupils will tackle a design and make project in which they will produce a 'mapboard' that uses simple control of lights and switches.

Pupils will gain the knowledge, skills and understanding they need to complete the project by following different stages of the design process. They:

- Investigate, design and construct a simple electronic control circuit that will include switches (inputs) and LED's (outputs) in a parallel circuit layout.
- Classify two different types of circuit including series and parallel.
- Use a range of tools and equipment necessary to construct a frame for the mapboard.
- Test and evaluate their product using a number of appropriate criteria to do so.

There are also opportunities for pupils to:

- Solder components and wires together effectively and safely when constructing simple electrical control circuits.
- Use a range of graphic techniques to create lettering and recognise their relative merits in different situations.
- Select appropriate lettering styles for a particular purpose.
- Use CAD/CAM (computer-aided design and manufacture), where appropriate, to produce high-quality lettering and other graphics, *e.g. logos.*

Where the unit fits in

The unit is expected to take 14-16 hours. In the SOW outline each lesson lasts 2 hours and so has been broken down into 8 lessons. It is the first of three projects at key stage 3 and introduces pupils to a range of electronic components and circuits, whilst reinforcing the theory of how electricity works. This will give pupils a thorough grounding for the subject in proceeding years and projects.

Expectations - At the end of the unit:

All pupils will: work with some electrical components, including switches and LED's; produce lettering for a particular purpose; make a mapboard that is suited to its purpose, recognising what works well.

most pupils will: draw on and use their understanding of electrical control, including the use of switches, LED's and resistors; work with a range of tools, equipment, materials and components, including electrical and mechanical control components, with some precision; test and evaluate their product, showing that they understand the situation in which their design will have to function; produce a finished mapboard that is eye-catching, works as planned, combines materials realistically and informs the user about what they are trying to find; choose appropriately from a range of graphic elements and lettering.

some pupils will: make effective use of ICT to produce high-quality lettering and other graphics, *eg logos*; use modelling software to support the design of their control system, modifying their approach in the light of progress; produce a finished mapboard that is innovative and works effectively.

Language for learning

Through the activities in this unit, pupils will be able to understand, use and spell correctly words relating to:

- electrical components and their assembly, *eg electrical, series, parallel, light-emitting diode, LED, resistor, current, sensor, output, solder, soldering iron*

Speaking and listening – through the activities pupils could:

- organise, sequence and link what they say so listeners can follow it.
- share information and discuss ideas in groups, and solve problems.

Reading – through the activities pupils could:

- follow the sequence of actions, processes or ideas being described.

Writing – through the activities pupils could:

- avoid common errors and confusions.

Vocabulary and spelling – through the activities pupils could:

- understand and use correctly terms of qualification and comparison.

Scheme of Work: outline

Wk	Aim/Content	POS	Learning Outcomes	Homework	Resources	Differentiation
1	Introduce class to Electronics and new project. Pupils learn how mapboard works. They will complete a design brief and think about possible ideas.	1b, 1h, 5d, 7a, 7c.	1. Understand the term design brief. 2. Recall a number of basic components. 3. Respond to the design brief, producing a range of appropriate design ideas.	Complete 4 design ideas.	H&S, Hazards sheet. Design brief sheet. Pens and paper. Comp bag for class. Electronics sheet	6 images for able pupils. 3 images for less able.
2	Recap on components, intro to series & parallel circuits, applied to mapboard. Mapboard cover layout. Graphic text.	1d, 1e, 1g, 1h, 3a, 5d, 5f, 5g.	1. demonstrate understanding of the terms series & parallel, and how they relate to the mapboard project. 2. demonstrate simple graphic techniques e.g. styled text, pencil rendering.	Produce a front cover for your project.	Components sheet, markers and marker boards, Paper, Coloured paper.	Focus only on parallel for less able pupils.
3	Class continue producing mapboard cover, start practical work, stick cover on hardboard, drill holes.	1d, 1f, 1g, 1h, 2a, 2c, 2e, 4a, 4b, 4c, 5d, 5f.	1. demonstrate graphic techniques. 2. demonstrate a responsible attitude towards the safe use of the pillar drill. 3. select and use the correct components for each practical task.	Learn keywords.	Component sheet 2, component card pack, hardboard, pritt-stick, drill, 5&8mm drill bits.	More words for more able pupils – less for less able.
4	Relate systems to mapboard. Practical activities – soldering LED's to resistors, placing LED's and switches in holes.	2a, 2b, 2c, 5a, 5d, 5e, 5f.	1. recognise the inputs, processes and outputs in the mapboard. 2. demonstrate a responsible attitude towards the safe use of the soldering equipment.	Produce Soldering process sheet.	Circuit sheet 1, Control systems worksheet, soldering equipment, component bags.	Easier sentence structure on worksheets for LAP.
5	Recap on systems, practical tasks – wiring & soldering switches, wiring & soldering LED's.	2a, 2b, 2c, 5a, 5d, 5e, 5f.	1. demonstrate a responsible attitude towards the safe use of the soldering equipment. 2. recall the process for wiring and soldering different components, and understand the reason and sequence.	Learn keywords.	Systems sheet, keyword test, soldering equipment, components.	More support with practical tasks for LAP. Test starts easy, gets harder.
6	Recap on materials, components. Systems discussion/activity. Practical tasks (wiring/soldering, LED's to switches, battery connector).	1b, 1c, 2a, 2b, 2c, 2d, 4b, 4c, 5a, 5d, 5e, 5f.	1. recall the properties of the materials that are relevant the mapboard. 2. demonstrate an understanding of why components are combined to produce certain outcomes.	Produce a specification.	Materials worksheet, marker boards and pens, component cards, systems worksheet, soldering equipment, components.	Easier sentence structure on worksheets for LAP.
7	Recap on resistors, components. Production schedule, practical work (finishing mapboard). Points made in specification.	1b, 2a, 2b, 2c, 2d, 4b, 4c.	1. recall the term production schedule and understand its relevance. 2. demonstrate the ability to produce an accurately laid out flow chart. 3. demonstrate consideration for mapboard requirements.	Complete production schedule sheet.	Resistor value sheet, comp card game, Production schedule sheet. Soldering equip, strip heater, acrylic.	Less resistors to work out. Extension task for pupils who finish.
8	Last Lesson – finish practical work, mapboard evaluation, Yr 7 electronics test.	1b, 2a, 2b, 2c, 2d, 3b, 3c, 4b, 4c.	1. produce a specification using relevant points. 2. evaluate their mapboard honestly, using relevant points taken from the spec. 3. demo and understanding of the unit.	None set	Evaluation exercise sheet, soldering equipment, components, eval sheet, test sheet, stapler.	Easier test for LAP. Different expectations given for evaluation response.