| Electrical systems | **Design brief and explore existing products** | **Explore and practise techniques (prototype)** | **Design a product** | **Make lesson:** | **Evaluate:** |
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| Year 4:<br>(Refer to CUSP Y4 Electrical systems module)<br><br>Taught alongside Science electricity module. | In **Science lesson 1** children will have the opportunity to identify different products that use electricity.<br><br>Introduce Samuel Bagno (inventor of the motion sensor). Think about the different components he would have used and how these work. | In **Science lesson 2 children** have the opportunity to begin to explore switches and their different purpose.<br><br>Children to create a simple circuit with a switch.<br><br>Look at different switches:<br>Plug switch- on and off<br>Torch- press button switch on and off<br>Simple circuit rocker switch- on and off<br>Trigger switch- they do turn on and off but they also allow variable speed with how far you press the trigger.<br>Rotary switch (food processor)- on with 2 speeds to operate at and off.<br>Hidden push switch (toy)- when pushed the switch is on.<br>Variable rotary switch- turn on and decrease and increase the volume (similar to dimmer switch) | Children to have an opportunity to design their own version of the piranha lake game.<br><br>Children to design their own game board and the components that are going to be included.<br><br>https://vimeo.com/685860508/a5ca92403d from 10 minutes for instructions | Children have the opportunity to make their game. | Take photograph of end product and label.<br><br>Suggest ways the product can be improved.<br>Children to explain how they met the design brief and begin to identify areas they didn't meet.<br>Children to identify a new skill they have learnt |

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| | | Main isolating switches (used in industry)- not easy to turn on and off for safety reasons.<br>Motion sensor switch- security light | | | |

## Vocabulary:

| Core Knowledge | Explanation |
|---|---|
| switch | A switch is a device for making or breaking the connection in an electrical circuit. |
| circuit | An electrical circuit is a complete path of wires and equipment along which an electric current flows. |
| component | A component is one of the parts of an electrical circuit such as a bulb, battery or switch. |
| current | A current is the movement of water, air or electricity in a particular direction. |

| Technical Vocabulary | Definition |
|---|---|
| interruption | an occasion when someone or something stops something from happening for a short period |
| unbroken | continuous with no pauses |
| conductor | a material that allows electricity to pass through it |
| multi-purpose | having many different uses |

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| **Year 6:**<br>(Refer to CUSP Y6 Electrical systems module)<br><br>**Taught alongside Science electricity module.** | In **Science lesson 2** familiarise with vocabulary and symbols to use when creating circuits.<br><br>Discuss the components, symbols used to represent these (could be a matching activity?). Children to build a circuit with a switch.<br><br>Share the design brief and explore the American inventor of Christmas tree lights (Albert Sabacca). What considerations would he have | In **Science lesson 2** children should be exposed to objects that use different types of switches. Discuss how the switches can change functionality:<br>*Electric toothbrush- simple on/off switch, needs to be robust to be used daily and suitable for damp conditions<br>*Standing lamp- on/off switch that needs to be robust as often powered by use of the foot<br>*Portable vacuum (Dyson)- operates suction and a rolling brush at the same time. Trigger switch.<br>*Oven switch- has several functions can turn the oven on and set to different modes | In **Science lesson 3** children have the opportunity to explore what happens when we build a circuit with 2 components e.g. buzzer, bulb, motor. Children show make both work together and then make each work individually. Why do they think the bulb gets brighter when the motor is switched off? Why does the motor work quicker when the bulb is switched off?<br><br>Within this lesson children will also explore circuit diagnostics so links to Science lesson 3. | Children to make a torch fan (see lesson 3 DT CUSP electrical systems).<br><br>(will need to be an additional 1 off lesson along with evaluation, could be completed in 2 lessons). | Take photograph of end product and label.<br><br>Children to explain how they met the design brief and begin to identify areas they didn't meet.<br>Children to identify a new skill they have learnt |

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| | needed when creating Christmas lights? | | | | |

## Vocabulary:

| Core Knowledge | Explanation |
|---|---|
| switch | A switch is a device for making or breaking the connection in an electrical circuit. |
| parallel circuit | In parallel circuits, electrical components are connected alongside one another, forming extra loops. Since there are different loops, the current will split as it leaves the cell and pass through one of the loops. In a parallel circuit, if a lamp breaks or a component is disconnected from one parallel wire, the components on different branches keep working. And, unlike a series circuit, the lamps stay bright if you add more lamps in parallel. |
| series circuit | In a series circuit, components are connected in one loop. The electrical current passes through all the different components, one after the other, without any branches. If a lamp breaks or a component is disconnected, the circuit is broken and all the components stop working. |
| component | A component is one of the parts of an electrical circuit such as a bulb, battery or switch. |

| Technical Vocabulary | Definition |
|---|---|
| functionality | the purpose that something is designed for or expected to perform |
| multi-function | having many different functions |
| brief | a written description of what a new project or product should do, what is needed to produce it, how long it will take etc. |
| simultaneous | happening or being done at exactly the same time |