St Paul's Primary School, Newcastle. Glorifying Almighty God, and serving our community.

TO MASTER PRACTICAL SKILLS	TO DESIGN, MAKE, EVALUATE AND IMPROVE	TO TAKE INSPIRATION FROM DESIGN THROUGHOUT HISTORY
Class: 6 AUTUMN		Title: Electricals and Electronics

Topic summary: Create circuits using Raspberry Pi a small computer that employs a number of components including switches, resistors, and LEDS. Create programs to control the LEDS to create various light shows. Sir Joseph Wilson Swan was a British scientist of the 19th and early 20th centuries, who is famous for inventing the incandescent light bulb and was local to this area.

DT Objectives

- Create circuits using electronics kits that employ a number of components (such as LEDS, resistors transistors and chips).
- Design with the user in mind, motivated by the service a product will offer (rather than simply for profit).
- Make products through stages of prototypes, making continual refinements.
- Ensure products have a high- quality finish, using art skills where appropriate.
- Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices.
- Create innovative designs that improve upon existing products.
- Evaluate the design of products so as to suggest improvement to the user experience.

Unit of work end points

- Apply your knowledge of circuits to make products and your knowledge of programming to control them
- Explain the difference between hardware and software
- Explain the inputs, processes and outputs in your programs.
- Experiment with a variety of different ways to create a circuit that makes an LED light up
- Combine control of 6 LEDS to create various light shows

Deeper learning:

- Investigate encryption and code breaking. Focussing on decomposition, problem solving and collaboration skills

Key vocabulary	
Secure Digital (SD) card	The Operating system for the Pi. This helps to turn it from a bunch of hardware into a computer using software,
Breadboard	Piece of plastic that houses lots of strips of metal. These metal strips are used to transfer electrons around a circuit.
Mounting Board	Pi and Breadboard should be attached to this.
GPIO Map.	Map placed over the GPIO pins
Resistors	Used to make the voltage appropriate for certain components.
LEDs	Light emitting diodes - .are diodes that emit light when electrons pass through
Switches	Control the flow of electrons around a circuit.

Questions?

What is the difference between software and hardware?
Can you create the algorithm for your circuit?
What are the two states of a switch?
When the switch is open is the circuit off or on?
Why is the circuit known as AND?
Why is the circuit known as an ORR?
How can we use the broadcast command to trigger events?
Can you draw an annotated drawing of your circuit?
Describe the difference between an 'and' and 'orr' circuit?