MindSET-do

Year 7 – Circuits and Arduino 70min Lesson 3

Learning Intentions	Lesson Outcomes
• Students recognise the need for a complete circuit to allow the flow of electricity • Students explore the features of a breadboard circuit including, wires, resistors, LED lights and battery packs • Students explore the features of an Arduino and follow and modify algorithms to turn RGB LEDs on and off • Students experiment with loops and create solutions to challenges	• Revise Computational Thinking • Learn the components of a circuit • Describe how an electrical circuit works and safety considerations • Assemble a breadboard circuit with resistor and LED lights • Create algorithms for Arduino to turn RGB LEDs on and off • Work collaboratively to complete the tasks

Australian Curriculum Content Descriptors	Australian Curriculum General Capabilities
Digital technologies Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (ACTDIP029)	**Critical and creative thinking** – generating ideas, possibilities and actions **Critical and creative thinking** – generating ideas, possibilities and actions **Personal and social capability** – Social management **ICT capability** – managing and operating ICT

Assessment

Formative assessment

Observations and feedback on understanding of electrical circuits and coding algorithms.

Phase/Slide	Learning Activity	Resources
Slide 1 - 3	• Greetings • Introduction • Acknowledgement of Traditional Custodians • Lesson outcomes	PowerPoint
Slide 4-5 Engage	• Revise Computational thinking • Discuss the concepts and approaches they will use in the lesson today	PowerPoint

Phase/Slide	Learning Activity	Resources
Slide 6 – 9 Engage	• What makes the light go on? • Explain electrical energy • Explain what makes a circuit work • Explain voltage flow	PowerPoint
Slide 10 – 13 Explain	• Explain a basic circuit – include information on symbols for resistor and LED • Explain a short circuit • Explain an open circuit • Describe the difference between conductors and insulators	PowerPoint
Slide 14 – 21 Explain	• Discuss safety issues with the activity • Explain what a breadboard is and its functions • Explain what a resistor is and its functions • Explain what an LED and RGB LED is and its functions • Describe and model how to wire up the circuit	PowerPoint
Slide 22 Explore	• Ask students to look at the circuit and hypothesise what colour the RBG LED will light up • Ask students to explain their decision	Example circuit on the PowerPoint
Slide 23 - 24 Explore Evaluate	• Assist students to wire up the board using the diagram • 1 x RGB LED wired to be Red • 1 x RGB LED wired to be Green • 1 x RGB LED wired to be Blue • Set challenges for the students to solve in groups	PowerPoint Arduino kits for students
Slide 25 - 26 Engage	• Getting to know the Arduino • Reset breadboard to original design of one LED and pull out the battery back from the breadboard • Show Arduino board and discuss major principles	PowerPoint
Slide 27 Explain	• Analogue vs digital • Analogue can vary and be any value between set limits of voltage • Digital can be on or off/5 volts or 0 volts/**HIGH or LOW**	PowerPoint

Phase/Slide	Learning Activity	Resources
Slide 28-35 Explain	• Using code to turn the lights on and off • Open Arduino software on computers • Explain the loop • Explain to compile code and upload to Arduino • Explain to check it is programed for Arduino Uno • Explain input and output	PowerPoint Computer with Arduino IDE
Slide 36 Explore	• Write code in software as displayed on PowerPoint • Discuss what happened • Discuss any troubleshooting	PowerPoint Example circuit using Arduino board, resistor and RGB LED light Arduino kits for students Computer with Arduino IDE
Slide 37-38 Elaborate	• Set students to complete challenge #1 and #2 by rewiring their breadboard and Arduino and modifying the algorithm from the initial task • Challenge #3 the students to choose something different for the RGB LED lights to do • Students need to write down their new challenge and the changes needed to be made to the code	PowerPoint Arduino kits for students Computer with Arduino IDE
Slide 39 Evaluate	• Time permitting – students walk around classroom and see how other groups have set up their own circuit	PowerPoint
Slide 40-42 Evaluate	• Work in groups, write down 5 things that have been the most important things you have learnt today • Write down code used today • Pack up the kits • Acknowledgements • Any questions	PowerPoint Workbooks Arduino kits for students