MindSET-do

Year 6 – Flashing Lights 90mins Lesson 4

Learning Intentions

Science

- Students recognise the need for a complete circuit to allow the flow of electricity
- Students investigate different conductors and insulators
- Students explore the features of a breadboard circuit including, wires, resistors, LED lights and USB power source

Digital Technologies

- Students investigate how the components of an Arduino and electrical circuit are coordinated to handle data
- Students follow and modify algorithms used to turn RGB LEDs on and off
- Students experiment with different ways of representing repeated instructions to make repetition (loops) in an algorithm
- Students plan and implement solutions using algorithms in Arduino program

Lesson Outcomes	Australian Curriculum General Capabilities
• Revise the components of an electrical circuit • Describe how an electrical circuit works and safety considerations • Assemble a circuit with Arduino board, resistor and 3 x RGB LED lights • Program a flashing light program with Arduino software to music • Work collaboratively to complete the tasks	**Critical and creative thinking** – inquiring – identifying, exploring and organising information and ideas **Critical and creative thinking** – generating ideas, possibilities and actions **Critical and creative thinking** – reflecting on thinking and processes **Critical and creative thinking** – analysing, synthesising and evaluating reasoning and procedures **Personal and social capability** – Social management **ICT capability** – managing and operating ICT

Australian Curriculum Content Descriptors

Science - Science Understanding

Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources (ACSSU097)

Digital Technologies - Knowledge and Understanding

Examine the main components of common digital systems and how they may connect together to form

networks to transmit data (ACTDIK014)

Digital Technologies - Processes and Production Skills

Design, modify and follow simple algorithms involving sequences of steps, branching, and iteration (repetition) (ACTDIP019)

Implement digital solutions as simple visual programs involving branching, iteration (repetition), and user input (ACTDIP020)

Assessment

Formative assessment

Observations and feedback on understanding of electrical circuits using Arduino, breadboard, wiring, resistors, RGB LEDs and USB power source

Copies of students programming sketches from light show challenge to music

Observations and feedback on understanding of digital systems using Arduino, simple algorithms and ability to implement digital solutions to programming RGB LEDs to music

Phase/Slide	Learning Activity	Resources
Slide 1 - 3	• Greetings • Introduction • Acknowledgement of Traditional Custodians • Lesson outcomes	PowerPoint
Slide 4 - 5 Engage	• Today we will be programming an Arduino to make RGB LED lights to flash on and off in time to a song • Show students an example of what they will be programming	PowerPoint Example circuit using Arduino board, resistors and RGB LED lights flashing on and off to music
Slide 6 - 7 Explain	• Identify the Computational thinking skills used in today's lesson • Important to persevere when things get difficult today • Be creative	PowerPoint
Slide 8-9 Elaborate	• Revision – what are the main things to remember when setting up your breadboard, RGB LEDs and Arduino? • What should you remember when programming?	PowerPoint

Phase/Slide	Learning Activity	Resources
Slide 10 - 14 Explain	• Rules of programming • Code using today • Set up code • Main code • Revision on what a code will do	PowerPoint
Slide 15 - 16 Explore	• Challenge • Students wire up their breadboard and Arduino • Students select a song • Students create an algorithm for their program • Students run and debug their programs	PowerPoint Arduino kits for students A range of songs Computer with Arduino IDE
Slide 17 Evaluate	• Students present their light show to music • Ask students to ask other groups about the changes they made to their codes and why they made the changes • Ask students if there are any challenges that they would like to try with RGB LED lights in the future?	PowerPoint Student made circuit using Arduino board, resistor and RGB LED lights Computer with Arduino IDE
Slide 18 - 22 Evaluate	• Complete the online quiz • Pack up the kits • Any questions	PowerPoint Link to online Quiz