

Lesson Structure

90 minute lessons

| Year 6 – Controlling Light | | | |
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| LESSON NUMBER | FOCUS | AUSTRALIAN CURRICULUM GENERAL CAPABILITIES | AUSTRALIAN CURRICULUM CONTENT DESCRIPTORS |
| 1 | CONTROLLING LIGHT 40 - 60 MIN LESSON | <ul style="list-style-type: none"> • CRITICAL AND CREATIVE THINKING – GENERATING IDEAS, POSSIBILITIES AND ACTIONS • CRITICAL AND CREATIVE THINKING – REFLECTING ON THINKING AND PROCESSES | <ul style="list-style-type: none"> • DESIGN AND TECHNOLOGIES - EXAMINE HOW PEOPLE IN DESIGN AND TECHNOLOGIES OCCUPATIONS ADDRESS COMPETING CONSIDERATIONS, INCLUDING SUSTAINABILITY IN THE DESIGN OF PRODUCTS, SERVICES, AND ENVIRONMENTS FOR CURRENT AND FUTURE USE (ACTDEK019) • DESIGN AND TECHNOLOGIES - INVESTIGATE HOW ELECTRICAL ENERGY CAN CONTROL LIGHT IN A DESIGNED PRODUCT OR SYSTEM (ACTDEK020) |
| 2 | ELECTRICAL ENERGY 90 MIN LESSON | <ul style="list-style-type: none"> • CRITICAL AND CREATIVE THINKING – GENERATING IDEAS, POSSIBILITIES AND ACTIONS • CRITICAL AND CREATIVE THINKING – REFLECTING ON THINKING AND PROCESSES • PERSONAL AND SOCIAL CAPABILITY – SOCIAL MANAGEMENT | <ul style="list-style-type: none"> • SCIENCE - ELECTRICAL ENERGY CAN BE TRANSFERRED AND TRANSFORMED IN ELECTRICAL CIRCUITS AND CAN BE GENERATED FROM A RANGE OF SOURCES (ACSSU097) |

Year 6 – Controlling Light

| LESSON NUMBER | FOCUS | AUSTRALIAN CURRICULUM GENERAL CAPABILITIES | AUSTRALIAN CURRICULUM CONTENT DESCRIPTORS |
|---------------|--------------------------------------|---|--|
| 3 | DIGITAL SYSTEMS 90 MIN LESSON | <ul style="list-style-type: none"> • 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 • PERSONAL AND SOCIAL CAPABILITY – SOCIAL MANAGEMENT • ICT CAPABILITY – MANAGING AND OPERATING ICT | <ul style="list-style-type: none"> • SCIENCE - ELECTRICAL ENERGY CAN BE TRANSFERRED AND TRANSFORMED IN ELECTRICAL CIRCUITS AND CAN BE GENERATED FROM A RANGE OF SOURCES (ACSSU097) • DIGITAL TECHNOLOGIES - EXAMINE THE MAIN COMPONENTS OF COMMON DIGITAL SYSTEMS AND HOW THEY MAY CONNECT TOGETHER TO FORM NETWORKS TO TRANSMIT DATA (ACTDIK014) • DIGITAL TECHNOLOGIES - DESIGN, MODIFY AND FOLLOW SIMPLE ALGORITHMS INVOLVING SEQUENCES OF STEPS, BRANCHING AND ITERATION (REPETITION) (ACTDIP019) • DIGITAL TECHNOLOGIES - IMPLEMENT DIGITAL SOLUTIONS AS SIMPLE VISUAL PROGRAMS INVOLVING BRANCHING, ITERATION (REPETITION), AND USER INPUT (ACTDIP020) |
| 4 | FLASHING LIGHTS 90 MIN LESSON | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • SCIENCE - ELECTRICAL ENERGY CAN BE TRANSFERRED AND TRANSFORMED IN ELECTRICAL CIRCUITS AND CAN BE GENERATED FROM A RANGE OF SOURCES (ACSSU097) • DIGITAL TECHNOLOGIES - EXAMINE THE MAIN COMPONENTS OF COMMON DIGITAL SYSTEMS AND HOW THEY MAY CONNECT TOGETHER TO FORM NETWORKS TO TRANSMIT DATA (ACTDIK014) • DIGITAL TECHNOLOGIES - DESIGN, MODIFY AND FOLLOW SIMPLE ALGORITHMS INVOLVING SEQUENCES OF STEPS, BRANCHING AND ITERATION (REPETITION) (ACTDIP019) |

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|--|--|--|---|
| | | <ul style="list-style-type: none"> • CRITICAL AND CREATIVE THINKING – ANALYSING, SYNTHESISING AND EVALUATING REASONING AND PROCEDURES • PERSONAL AND SOCIAL CAPABILITY – SOCIAL MANAGEMENT • ICT CAPABILITY – MANAGING AND OPERATING ICT | <ul style="list-style-type: none"> • DIGITAL TECHNOLOGIES - IMPLEMENT DIGITAL SOLUTIONS AS SIMPLE VISUAL PROGRAMS INVOLVING BRANCHING, ITERATION (REPETITION), AND USER INPUT (ACTDIPO20) |
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Design Brief: Create a visual sound system for the deaf and hard of hearing by designing an electrical system using an Arduino and programming it to control light (colour, on/off rhythm, brightness) matched to a 2-minute piece of music.

| LESSON NUMBER | FOCUS | AUSTRALIAN CURRICULUM GENERAL CAPABILITIES | AUSTRALIAN CURRICULUM CONTENT DESCRIPTORS |
|---------------|---|---|--|
| | <p>DESIGN AND TECHNOLOGIES PROJECT: DESIGNING A VISUAL SOUND SYSTEM FOR THE DEAF AND HARD OF HEARING</p> | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • DESIGN AND TECHNOLOGIES – INVESTIGATE HOW ELECTRICAL ENERGY CAN CONTROL LIGHT IN A DESIGNED PRODUCT (ACTDEK020) • DESIGN AND TECHNOLOGIES – INVESTIGATE CHARACTERISTICS AND PROPERTIES OF A RANGE OF MATERIALS, SYSTEMS, COMPONENTS, TOOLS AND EQUIPMENT AND EVALUATE THE IMPACT OF THEIR USE (ACTDEK023) • DESIGN AND TECHNOLOGIES – PROCESSES AND PRODUCTION SKILLS (ACTDEP024), (ACTDEP025), (ACTDEP026), (ACTDEP027), (ACTDEP028) |

| LESSON NUMBER | FOCUS | LEARNING OUTCOMES | RESOURCES |
|---------------|---|---|--|
| 5 | INVESTIGATING COMPONENTS OF AN ELECTRONIC SYSTEM WHICH CAN BE USED TO CONTROL LIGHT | <ul style="list-style-type: none"> • IDENTIFY THE COMPONENTS IN AN ELECTRICAL SYSTEM AND LIST THEIR FUNCTIONS | YEAR 6 INVESTIGATING COMPONENTS WORKSHEET – GROUP TASK ARDUINO KITS |
| 6 | GENERATE AND REFINE IDEAS | <ul style="list-style-type: none"> • UNDERSTAND THE REQUIREMENTS OF THE DESIGN BRIEF • CREATE 3 X ELECTRICAL SYSTEM DESIGN IDEAS, DRAW AND LABEL EACH SYSTEM AND DESCRIBE HOW IT WORKS • EVALUATE AND SELECT A FINAL DESIGN | YEAR 6 GENERATE AND REFINE IDEAS WORKSHEET – GROUP TASK ARDUINO KITS |
| 7 | PRODUCTION PLAN | <ul style="list-style-type: none"> • COLLABORATE WITH GROUP MEMBERS • DRAW AND LABEL FINAL ELECTRICAL SYSTEM DESIGN AND DESCRIBE HOW IT WORKS • LIST MATERIALS AND EQUIPMENT • LIST RISKS AND RISK MANAGEMENT STRATEGIES • WRITE PSEUDO-CODE FOR ARDUINO PROGRAMMING • CREATE PRODUCTION STEPS AND ALLOCATE GROUP ROLES | YEAR 6 PRODUCTION PLAN WORKSHEET – GROUP TASK ARDUINO KITS |

| LESSON NUMBER | FOCUS | LEARNING OUTCOMES | RESOURCES |
|---------------|----------------------------|--|---|
| 8 | PRODUCING AND IMPLEMENTING | <ul style="list-style-type: none"> • SAFELY USE APPROPRIATE MATERIALS TO COLLABORATIVELY EXECUTE THE PRODUCTION OF THE ELECTRICAL SYSTEM • CREATE AND DEBUG THE ARDUINO PROGRAM COLLABORATIVELY • TEST PRODUCT MEETS THE DESIGN BRIEF SPECIFICATIONS | COMPLETED YEAR 6 PRODUCTION PLAN WORKSHEET FOR EACH GROUP – GROUP TASK ARDUINO KITS |
| 9 | EVALUATING | <ul style="list-style-type: none"> • EVALUATE AND REFLECT ON ELECTRICAL SYSTEM DESIGN • EXPLAIN USE OF CODE, EVALUATE AND REFLECT ON PROGRAMMING ARDUINO • EVALUATE AND REFLECT ON COLLABORATION SKILLS AND STRATEGIES • EXPLAIN FUTURE USE OF DESIGNED PRODUCT IN THE COMMUNITY | YEAR 6 EVALUATION WORKSHEET – INDIVIDUAL TASK |
| 10 | PRESENTING | <ul style="list-style-type: none"> • GROUPS PRESENT THEIR DESIGNED PRODUCT TO AN AUDIENCE • GROUPS EXPLAIN THEIR ELECTRICAL SYSTEM DESIGN AND ARDUINO PROGRAM TO THE CLASS | COMPLETED YEAR 6 PRODUCTION PLAN WORKSHEET FOR EACH GROUP – GROUP TASK EACH GROUP'S DESIGNED PRODUCT |

Year 6 – Controlling Light

40mins

Lesson 1

| Learning Intentions | | Lesson Outcomes |
|---|--|--|
| <ul style="list-style-type: none"> Students investigate sources of light and why humans need light Students investigate reasons why humans would want to control light Students explore ways that light can be controlled Students explore jobs in the industry | | <ul style="list-style-type: none"> Understand sources of light Understand why humans need light Understand the reasons why humans would want to control light Understand occupations which design light controlling systems Understand the Design Challenge |
| Australian Curriculum Content Descriptors | | Australian Curriculum General Capabilities |
| <p>Design and Technologies</p> <p>Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019)</p> <p>Investigate how electrical energy can control light in a designed product or system (ACTDEK020)</p> | | <p>Critical and creative thinking – generating ideas, possibilities and actions</p> <p>Critical and creative thinking – reflecting on thinking and processes</p> |
| Assessment | | |
| <p>Formative assessment</p> <p>Observations and student responses when examining examples of systems for controlling light and occupations in this industry</p> | | |
| Phase/Slide | Learning Activity | Resources |
| Slide 1 - 3 | <ul style="list-style-type: none"> Greetings Introduction Acknowledgement of Traditional Custodians Lesson outcomes | PowerPoint |
| Slide 4 -8 Engage | <ul style="list-style-type: none"> What is a light source? Exploring sources of light in nature Exploring sources of artificial light | PowerPoint |

| Phase/Slide | Learning Activity | Resources |
|----------------------------|--|---|
| Slide 9-10 Explore | <ul style="list-style-type: none"> • Why do you think humans need light? • Ask students to discuss in small groups and share their thoughts with the class | PowerPoint |
| Slide 11 – 12 Explain | <ul style="list-style-type: none"> • Why do you think humans would want to control light? • Ask students to discuss in small groups and share their thoughts with the class | PowerPoint |
| Slide 13 – 14 Elaborate | <ul style="list-style-type: none"> • If you could design something to control light what would it be and what are the benefits to humans? • Ask students to work in small groups to come up with 1 or 2 design ideas • Groups present their ideas to the class, along with how their design will benefit humans • Share with students some examples of how light is used and controlled in the community | PowerPoint Links to resources online and video |
| Slide 15-18 Engage | <ul style="list-style-type: none"> • Wrap up the lesson and lead into discussion about jobs in the industry • Discuss types of jobs • Subject selection at school • University considerations | PowerPoint |
| Slide 19-20 Explain | <ul style="list-style-type: none"> • Discuss the content of the next lesson • How the lessons are designed to give students the skills to complete the design challenge • Create a visual sound system for the deaf and hard of hearing by designing an electrical system using an Arduino and programming it to control light (colour, on/off rhythm, brightness) matched to a 2-minute piece of music. • Any questions | PowerPoint |

Year 6 – Electrical Energy

90mins

Lesson 2

| Learning Intentions | | Lesson Outcomes |
|--|--|--|
| <ul style="list-style-type: none"> 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 battery packs | | <ul style="list-style-type: none"> 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 Work collaboratively to complete the tasks |
| Australian Curriculum Content Descriptors | | Australian Curriculum General Capabilities |
| <p>Science Understanding</p> <p>Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources (ACSSU097)</p> | | <p>Critical and creative thinking – generating ideas, possibilities and actions</p> <p>Critical and creative thinking – reflecting on thinking and processes</p> <p>Personal and social capability – Social management</p> |
| Assessment | | |
| <p>Formative assessment</p> <p>Observations and feedback on understanding of electrical circuits</p> | | |
| Phase/Slide | Learning Activity | Resources |
| Slide 1 - 3 | <ul style="list-style-type: none"> Greetings Introduction Acknowledgement of Traditional Custodians Lesson outcomes | PowerPoint |
| Slide 4 -5 Engage | <ul style="list-style-type: none"> Why programming is important View the video | PowerPoint and video |
| Slide 6-8 Explore | <ul style="list-style-type: none"> Revise Computational thinking Discuss the concepts and approaches they will use in the lesson today | PowerPoint |

| Phase/Slide | Learning Activity | Resources |
|----------------------------|--|---|
| Slide 9 Explore | <ul style="list-style-type: none"> • What makes the light go on? • Show students an example of a circuit created on the breadboard • Ask students to use their logic to share their thoughts on what makes the light go on | Example circuit on a breadboard with resistor and RGB LED red light |
| Slide 10 – 12 Explain | <ul style="list-style-type: none"> • Explain electrical energy • Explain what makes a circuit work • Explain voltage flow | PowerPoint |
| Slide 13 – 16 Elaborate | <ul style="list-style-type: none"> • 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 17 Engage | <ul style="list-style-type: none"> • Show students the initial breadboard circuit they will make using RGB LED and battery pack | Example circuit on a breadboard with resistor and RGB LED red light |
| Slide 18 – 23 Explain | <ul style="list-style-type: none"> • 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 | Example circuit on a breadboard with resistor and RGB LED red light |
| Slide 24 Explore | <ul style="list-style-type: none"> • Ask students to look at the circuit and hypothesise what colour the RGB LED will light up • Ask students to explain their decision | Example circuit on a breadboard with resistor and RGB LED green light |
| Slide 25 - 27 Explore | <ul style="list-style-type: none"> • 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 |

| Phase/Slide | Learning Activity | Resources |
|-------------------------------|--|------------|
| Slide 28 - 29 Evaluate | <ul style="list-style-type: none"> • Electrical circuits activity • What are some everyday uses for RGB LEDs? • What was the most difficult step in creating the circuit? • What strategies did you use when a circuit would not work? <p>What was the best thing about working with your partner?</p> | PowerPoint |
| Slide 30 - 33 Evaluate | <ul style="list-style-type: none"> • Working in a group of 4, you have 5 minutes to make a list of anything you learnt today. • Pack up the kits • Any questions | PowerPoint |

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

- Revise the components of an electrical circuit
- Describe how an electrical circuit works and safety considerations
- Assemble a breadboard circuit with resistor and 3 x RGB LED lights
- Assemble a circuit with Arduino board, resistor and 3 x RGB LED lights
- Program a flashing light program with Arduino software
- Work collaboratively to complete the tasks

Australian Curriculum General Capabilities

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

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 each Challenge

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

| Phase/Slide | Learning Activity | Resources |
|----------------------------------|---|---|
| Slide 1 - 3 | <ul style="list-style-type: none"> Greetings Introduction Acknowledgement of Traditional Custodians Lesson outcomes | PowerPoint |
| Slide 4 Engage | <ul style="list-style-type: none"> Today we will be programming an Arduino to make RGB LED lights to flash on and off Show students what they will be programming | PowerPoint Example circuit using Arduino board, resistors and RGB LED lights flashing on and off |
| Slide 5 - 6 Explain | <ul style="list-style-type: none"> Identify the Computational thinking skills used in today's lesson Important to persevere when things get difficult today | PowerPoint |
| Slide 7 - 11 Elaborate | <ul style="list-style-type: none"> Using the 1st Lesson RGB LED circuit Run a quick quiz with whole class: <ol style="list-style-type: none"> Revise what makes a circuit work Revise resistors and LEDs Revise Safety | Example circuit on a breadboard with resistor and 3 x wired RGB LED lights PowerPoint |

| Phase/Slide | Learning Activity | Resources |
|---------------------------------------|---|---|
| Slide 12 – 15 Explain | <ul style="list-style-type: none"> • Getting to know the Arduino • Ask students to guess what the circuit will do and how it may be powered • Power sources - power supply and USB • Arduino Uno • Explain difference between analogue signal and digital signal | PowerPoint Example circuit using Arduino board, resistor and RGB LED light |
| Slide 16 Explore | <ul style="list-style-type: none"> • Setting up the Arduino • Describe how to set up the Arduino using Digital PIN 3, 4 & 5 • Students wire up their Arduino circuit | Example circuit using Arduino board, resistor and RGB LED light Arduino kits for students PowerPoint |
| Slide 17 - 22 Explain | <ul style="list-style-type: none"> • Using code to turn the lights on and off • Explain the Arduino software • Explain the set up • Explain the loop • Explain to compile code and upload to Arduino • Explain to check it is programmed for Arduino Uno • Explain input and output | PowerPoint Computer with Arduino IDE |
| Slide 23 Explore | <ul style="list-style-type: none"> • Write the algorithm and run the code using the Arduino • 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 24 - 26 Elaborate | <ul style="list-style-type: none"> • 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 Student made circuit using Arduino board, resistors and RGB LED lights Computer with Arduino IDE |

| Phase/Slide | Learning Activity | Resources |
|------------------------------------|--|--|
| Slide 27 Evaluate | <ul style="list-style-type: none"> • Time permitting, ask students to go around the room and see what other groups created with their code • 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 28-31 Evaluate | <ul style="list-style-type: none"> • Working in a group of 4, you have 5 minutes to make a list of anything you learnt today. • Pack up the kits • Any questions | PowerPoint |

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

- 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

Australian Curriculum General Capabilities

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 | <ul style="list-style-type: none"> • Greetings • Introduction • Acknowledgement of Traditional Custodians • Lesson outcomes | PowerPoint |
| Slide 4 - 5 Engage | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • Rules of programming • Code using today • Set up code • Main code • Revision on what a code will do | PowerPoint |
| Slide 15 - 16 Explore | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • Complete the online quiz • Pack up the kits • Any questions | PowerPoint Link to online Quiz |