MindSET-do

Year 7 – Challenge Micro:maqueen 70min Lesson 5

Learning Intentions	Lesson Outcomes
• Students explore the features of an Ultrasonic Sensor and explore and modify algorithms • Students use and manipulate logic and branching • Students experiment with patterns, algorithms, tones, distance, and create solutions to challenges with debugging and tinkering	• Understand the design brief for today • STEM knowledge used in the lesson • Computational thinking skills • Revise how to program ultrasonic sensors • Programming for logic and branching • Work collaboratively to complete tasks • Set up and complete Challenges 1, 2, 3

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) **Digital technologies -** Implement and modify programs with user interfaces involving branching, iteration, and functions in a general-purpose programming language (ACTDIP030) **Design technologies -** Analyse how motion, force and energy are used to manipulate and control electromechanical systems when designing simple, engineered solutions (ACTDEK031)	**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

Assessment

Summative assessment

Observations and feedback on understanding of modifying algorithms, pseudocode, logic and branching and completing the Challenges, to "bringing it together".

Phase/Slide	Learning Activity	Resources
Slide 1 - 3	• Greetings / Introduction • Acknowledgement of Traditional Custodians • Lesson outcomes	PowerPoint

Phase/Slide	Learning Activity	Resources
Slide 4 – 6 Evaluate	• Introduce the Design Brief • Discuss STEM knowledge that will be used • Discuss Computational thinking • Discuss the concepts and approaches they will use in the lesson today	PowerPoint
Slide 7 - 8 Revision / Engage	• Revise – programming with an ultrasonic sensor • Discuss use of distance, if … then … else programming statements and loops	PowerPoint
Slide 9 - 11 Revision / Engage	• Review – what programming do you use to control a car? • Discuss forward, backward, individually programming each wheel, speed, turning (stop/reverse), pausing	PowerPoint
Slide 12 - 16 Explain Explore	• Explain safety and respect of equipment • Explain how to set up the equipment • Explain how to connect, pair and download • Explain how to download the extension: maqueen	PowerPoint, micro:maqueen kits, laptops for students
Slide 17 - 21 Explore Evaluate	• Explain Driving Challenge - Task 1 • Ask students to hypothesise about what code they will need, what commands to choose, explain their reasoning • Set up the course, using correct measurements • Modify previous code for new challenge, test – tinkering and debugging, saving code • Collaborate, share code	PowerPoint, micro:maqueen kits, laptops for students Resources for driving course
Slide 22- 33 Explore Evaluate	• Explain Car Parking Challenge – Task 2 • Ask students to hypothesise about what code they will need, what commands to choose, explain their reasoning • Introduce – logic and branching - if … then; and if … then … else • Explain using pseudo-code (code in generic English terms) what the code should do • Introduce program elements – true/false, and/or/not; comparison; ultrasonic sensor • Test – tinkering and debugging	PowerPoint, micro:maqueen kits, laptops for students

Phase/Slide	Learning Activity	Resources
Slide 34 - 40 Explore Evaluate	• Explain Object Avoidance – Task 3 • Ask students to hypothesise about what code they will need, what commands to choose, explain their reasoning • Explain good driving techniques • Modify previous code, adding sensor distance, using if … then … else, and adjusting motor speed • Test – tinkering and debugging	PowerPoint, micro:maqueen kits, laptops for students
Slide 41	• Gladiator Challenge – Extension Activity • Using all programming information learned, cars navigate a ring, with obstacles, if a car hit an obstacle they leave the ring, remaining car wins • Students can choose team name, have a record keeper for scoring, have a time keeper and judge	PowerPoint, micro:maqueen kits, laptops for students Resources for creating challenge ring
Slide 42 - 46 Revise Packup / Survey	• Discuss learning outcomes of programming a car using multiple sensors which have limitations, using logic and branching, using variables • Saving work, Questions • Packing up equipment • Survey • Acknowledgements	PowerPoint, micro:maqueen kits, laptops for students Survey