

Mystic 8-Ball – WACE Curriculum Mapping

In the Mystic 8-Ball project, students build and code an interactive digital fortune teller using an Arduino and an OLED screen, exploring how a push-button input triggers a randomly selected, programmable response. The following tables map this project against the Western Australian Curriculum (WACE), across Design & Technologies, Digital Technologies and Science, for Years 3–4, 5–6, 7–8 and 9–10.

Design & Technologies

The Design & Technologies content below traces how students investigate forces and energy, select and justify components, sketch and communicate design ideas, safely produce their Mystic 8-Ball, and evaluate the finished device against design criteria.

Years 3–4

Table 1: Design & Technologies (Years 3–4)

Relevant Code	Application to Project	General Capabilities
WA3/4TDECEP1 – <i>Objects can be moved when a force is applied.</i>	Students investigate how pressing a push button applies a force that activates the Arduino, which controls the OLED display to present a random response. They explore how electrical energy enables electronic components to function together.	- Literacy - Critical & Creative Thinking
WA3/4TDETS1 – <i>Explore how familiar technologies meet personal and community needs.</i>	Students investigate how electronic devices use buttons, displays and programmable systems to create interactive products used for communication and entertainment.	- Personal & Social Capability - Critical & Creative Thinking
WA3/4TDEDTID1 – <i>Explore the purpose for designing a solution.</i>	Students identify the purpose of creating an interactive electronic fortune teller that responds to user input and provides customised responses.	Critical & Creative Thinking
WA4TDEDTID2 – <i>Investigate and select resources based on their properties.</i>	Students select suitable electronic components including an Arduino, OLED display, push button and enclosure materials to create a reliable interactive device.	Critical & Creative Thinking
WA3/4TDEDTPI1 – <i>Design solutions through discussion, modelling and drawings.</i>	Students develop labelled sketches showing the layout of the display, button and electronic components before assembly.	- Literacy - Critical & Creative Thinking
WA3/4TDEDTPI1 – <i>Use available technologies and materials to safely create a solution.</i>	Students safely assemble electronic components, wire circuits and upload Arduino programs while following workshop safety procedures.	- Personal & Social Capability - Critical & Creative Thinking

Relevant Code	Application to Project	General Capabilities
WA3/4TDEDTPM1 – <i>Share ideas to develop a solution.</i>	Students explain their program logic, share customised response ideas and demonstrate their completed Magic 8-Ball to others.	• Literacy • Personal & Social Capability

Years 5–6

Table 2: Design & Technologies (Years 5–6)

Relevant Code	Application to Project	General Capabilities
WA5/6TDECEP1 – <i>Investigate how forces and energy transfer affect designed solutions.</i>	Students investigate how electrical energy flows through circuits to power the Arduino, OLED display and input devices, allowing the system to respond to user interaction.	• Literacy • Critical & Creative Thinking
WA5/6TDETS1 – <i>Examine how technologies meet present and future needs.</i>	Students investigate how embedded electronic systems are used in consumer products to create engaging and interactive user experiences.	• Ethical Understanding • Critical & Creative Thinking
WA5/6TDEDTID1 – <i>Investigate needs or opportunities for designed solutions.</i>	Students define the functional requirements of an interactive electronic device that displays personalised responses based on user input.	• Critical & Creative Thinking
WA5/6TDEDTID2 – <i>Investigate and select suitable materials, components and technologies.</i>	Students compare display modules, push buttons and enclosure materials before selecting components suitable for their design.	• Critical & Creative Thinking
WA5/6TDEDTPH1 – <i>Develop and communicate design ideas.</i>	Students create annotated circuit diagrams, interface layouts and enclosure sketches before constructing the project.	• Literacy • Critical & Creative Thinking
WA5/6TDEDTPH1 – <i>Safely produce designed solutions.</i>	Students assemble, wire and program the Magic 8-Ball while applying safe workshop practices and electrical safety procedures.	• Personal & Social Capability
WA5/6TDEDTPM1 – <i>Plan, manage and communicate production processes.</i>	Students organise construction, programming and testing while documenting refinements made during development.	• Literacy • Personal & Social Capability
WA5/6TDEDETE1 – <i>Evaluate designed solutions against identified criteria.</i>	Students evaluate the readability, responsiveness and creativity of their Magic 8-Ball and identify improvements based on testing.	• Critical & Creative Thinking

Years 7–8

Table 3: Design & Technologies (Years 7–8)

Relevant Code	Application to Project	General Capabilities
WA7/8TDECEP1 – <i>Analyse how forces, motion and energy influence engineered systems.</i>	Students investigate how electrical energy is distributed throughout the embedded system and how input devices trigger programmed outputs on the OLED display.	- Literacy - Critical & Creative Thinking
WA7/8TDETS1 – <i>Investigate how technologies contribute to preferred futures.</i>	Students explore how programmable embedded systems are transforming consumer electronics through personalisation and interactive technologies.	- Ethical Understanding - Critical & Creative Thinking
WA7/8TDEDTID1 – <i>Investigate and define design problems.</i>	Students analyse user needs and develop design specifications for an engaging interactive electronic product.	Critical & Creative Thinking
WA7/8TDEDTID2 – <i>Investigate and select suitable resources.</i>	Students evaluate alternative displays, input devices and enclosure materials to improve usability and reliability.	Critical & Creative Thinking
WA7/8TDEDTID3 – <i>Consider available technologies, resources and components to develop solutions.</i>	Students justify the selection of Arduino hardware, OLED displays and supporting electronic components based on functionality, cost and ease of implementation.	Critical & Creative Thinking
WA7/8TDEDTPI1 – <i>Develop and communicate design ideas.</i>	Students produce annotated engineering drawings, circuit schematics and interface layouts before construction.	- Literacy - Critical & Creative Thinking
WA7/8TDEDTPI1 – <i>Safely produce designed solutions.</i>	Students construct, wire and program the Magic 8-Ball while following safe engineering and electronics practices.	Personal & Social Capability
WA7/8TDEDTPM1 – <i>Plan, manage and document production processes.</i>	Students manage programming, assembly and testing while documenting iterative improvements and troubleshooting decisions.	- Literacy - Personal & Social Capability
WA7/8TDEDETE1 – <i>Evaluate designed solutions using design criteria.</i>	Students evaluate usability, code maintainability, display clarity and overall user experience against design criteria.	Critical & Creative Thinking

Years 9–10

Table 4: Design & Technologies (Years 9–10)

Relevant Code	Application to Project	General Capabilities
WA9/10TDECEP1 – <i>Analyse engineering principles including force, energy and control systems.</i>	Students analyse how embedded electronic systems integrate hardware and software to process user input and generate programmed outputs through the OLED display.	- Literacy - Critical & Creative Thinking

Relevant Code	Application to Project	General Capabilities
WA9/10TDETS1 – <i>Evaluate the role of technologies in preferred futures.</i>	Students evaluate how embedded electronics, programmable devices and maintainable software contribute to sustainable and adaptable technology solutions.	- Ethical Understanding - Critical & Creative Thinking
WA9/10TDEDTID1 – <i>Critically investigate and define complex design problems.</i>	Students develop a comprehensive design brief considering user interaction, functionality, maintainability and future enhancements.	Critical & Creative Thinking
WA9/10TDEDTID2 – <i>Investigate and select suitable resources.</i>	Students evaluate alternative displays, microcontrollers and interface components to optimise reliability, cost and performance.	Critical & Creative Thinking
WA9/10TDEDTID3 – <i>Evaluate technologies, components and production processes.</i>	Students justify engineering decisions by comparing hardware options, software structure and manufacturing approaches using evidence gathered through testing.	Critical & Creative Thinking
WA9/10TDEDTPI1 – <i>Develop and communicate engineering solutions.</i>	Students produce detailed technical drawings, circuit diagrams, flowcharts and software documentation before construction.	- Literacy - Critical & Creative Thinking
WA9/10TDEDTPI1 – <i>Safely produce and refine designed solutions.</i>	Students construct, wire, program and iteratively refine a complete embedded electronic product while applying safe engineering practices.	Personal & Social Capability
WA9/10TDEDTPI1 – <i>Manage production processes and evaluate outcomes.</i>	Students manage project timelines, document software revisions, evaluate testing outcomes and refine the product using iterative engineering practices.	- Literacy - Personal & Social Capability
WA9/10TDEDETE1 – <i>Critically evaluate designed solutions against success criteria.</i>	Students evaluate functionality, usability, code quality, maintainability and user experience, recommending evidence-based improvements for future iterations.	Critical & Creative Thinking

Digital Technologies

The Digital Technologies content below traces how students investigate the Arduino and OLED display as a digital system, design and implement the button-and-response algorithm, represent data digitally, and produce and evaluate their coded solution.

Years 3–4

Table 5: Digital Technologies (Years 3–4)

Relevant Code	Application to Project	General Capabilities
WA3/4DIGDS1 – <i>Investigate how digital systems use hardware components to perform tasks.</i>	Students identify how the Arduino, OLED display, push button and electronic components work together to create an interactive fortune teller.	Digital Literacy

Relevant Code	Application to Project	General Capabilities
WA3/4DIGDI1 – <i>Design algorithms using flowcharts including branching and repetition.</i>	Students design the program logic showing what happens when the button is pressed and how a random response is displayed.	Digital Literacy
WA3/4DIGDI2 – <i>Implement algorithms using branching and repetition.</i>	Students program the Magic 8-Ball using conditional statements, repetition and user input.	Digital Literacy
WA3/4DIGDTID1 – <i>Investigate and define a design opportunity.</i>	Students identify the features required to create an engaging interactive fortune teller.	Critical & Creative Thinking
WA4DIGDTID2 – <i>Select suitable resources for a solution.</i>	Students choose appropriate electronic components and display hardware to achieve the project requirements.	Critical & Creative Thinking
WA3/4DIGDTDE1 – <i>Design a solution using diagrams and annotations.</i>	Students sketch the layout of the enclosure, button and display before construction.	Critical & Creative Thinking
WA3/4DIGDTPI1 – <i>Safely produce a designed solution.</i>	Students assemble the electronics, upload their code and test the completed Magic 8-Ball.	- Critical & Creative Thinking - Personal & Social Capability - Digital Literacy
WA3/4DIGDTPM1 – <i>Follow plans and communicate ideas.</i>	Students follow build instructions, work collaboratively and refine their project through testing.	- Literacy - Personal & Social Capability

Years 5–6

Table 6: Digital Technologies (Years 5–6)

Relevant Code	Application to Project	General Capabilities
WA5/6DIGDS1 – <i>Investigate digital system components and their interactions.</i>	Students explore how the Arduino communicates with the OLED display and responds to button input.	Digital Literacy
WA5/6DIGDI1 – <i>Design algorithms incorporating variables, user input and control structures.</i>	Students design Arduino programs using variables, functions, conditionals and random number generation.	- Numeracy - Digital Literacy
WA5/6DIGDI2 – <i>Implement algorithms using variables and iteration.</i>	Students program custom responses and create interactive behaviours based on user input.	- Numeracy - Digital Literacy
WA5/6DIGDTID1 – <i>Investigate project</i>	Students define the functionality, appearance and user interaction of their personalised Magic 8-Ball.	Critical & Creative Thinking

Relevant Code	Application to Project	General Capabilities
<i>requirements and constraints.</i>		
WA5/6DIGDTID2 – <i>Select resources based on design requirements.</i>	Students justify the selection of electronic components, displays and enclosure materials.	Critical & Creative Thinking
WA5/6DIGDTDE1 – <i>Develop and refine design solutions.</i>	Students improve their code and display layout through iterative testing and feedback.	Critical & Creative Thinking
WA5/6DIGDTP11 – <i>Produce and evaluate a digital solution.</i>	Students integrate programming and electronics to create a fully functioning interactive device.	- Critical & Creative Thinking - Personal & Social Capability - Digital Literacy
WA6DIGDR1 – <i>Represent data digitally.</i>	Students investigate how random numbers, variables and digital signals are represented within the Arduino.	- Numeracy - Digital Literacy
WA5/6DIGDTPM1 – <i>Manage project resources and timelines.</i>	Students organise their programming, assembly and testing while collaborating with peers.	- Literacy - Personal & Social Capability

Years 7–8

Table 7: Digital Technologies (Years 7–8)

Relevant Code	Application to Project	General Capabilities
WA7/8DIGDS1 – <i>Investigate communication within digital systems.</i>	Students examine how the Arduino exchanges information with the OLED display and processes user input.	Digital Literacy
WA7/8DIGDS2 – <i>Evaluate hardware for intended purposes.</i>	Students compare display technologies and input devices suitable for interactive electronic products.	Digital Literacy
WA7/8DIGDI1 – <i>Analyse user experience.</i>	Students evaluate how response timing, animations and screen layout improve user engagement.	- Critical & Creative Thinking - Digital Literacy
WA7/8DIGDI2 – <i>Design algorithms using pseudocode and flowcharts.</i>	Students develop structured algorithms incorporating random number generation and multiple program states.	- Numeracy - Digital Literacy
WA7DIGDI3 / WA8DIGDI3 – <i>Test and refine algorithms.</i>	Students debug programs by identifying logical errors and improving code reliability.	Digital Literacy (WA8 also Numeracy)
WA8DIGDI4 – <i>Implement solutions using a general-</i>	Students develop modular Arduino C++ code using functions, arrays and reusable procedures.	Digital Literacy

Relevant Code	Application to Project	General Capabilities
<i>purpose programming language.</i>		
WA7/8DIGDTID1–3 – <i>Investigate design opportunities and evaluate resources.</i>	Students develop a design brief, consider user needs and justify their choice of hardware and software.	• Literacy (DTID1) • Critical & Creative Thinking
WA7/8DIGDTDE1 – <i>Design and refine digital solutions.</i>	Students iteratively improve both the user interface and program structure based on testing.	• Critical & Creative Thinking
WA7/8DIGDTPI1 – <i>Produce and evaluate digital solutions.</i>	Students integrate electronics and software into a polished interactive product.	• Critical & Creative Thinking • Personal & Social Capability • Digital Literacy
WA7/8DIGDRI – <i>Represent and manipulate digital data.</i>	Students investigate how text, numbers and arrays are stored and processed within Arduino memory.	• Numeracy • Digital Literacy

Years 9–10

Table 8: Digital Technologies (Years 9–10)

Relevant Code	Application to Project	General Capabilities
WA9/10DIGDS1 – <i>Investigate integrated hardware and software systems.</i>	Students analyse how embedded systems combine hardware, software and peripherals to create interactive electronic products.	• Digital Literacy
WA9/10DIGDI1 – <i>Define and decompose problems.</i>	Students identify functional requirements and design an interactive device that meets user needs.	• Numeracy • Digital Literacy
WA9/10DIGDI2 – <i>Design user experiences.</i>	Students prototype screen layouts, menu structures and interaction sequences that improve usability.	• Critical & Creative Thinking • Digital Literacy
WA9/10DIGDI3 – <i>Design modular algorithms.</i>	Students create reusable functions for button handling, display control and random response generation.	• Digital Literacy
WA9/10DIGDI4 – <i>Validate algorithms through testing.</i>	Students systematically test, debug and optimise their code to ensure reliable operation.	• Numeracy • Digital Literacy
WA9/10DIGDI5 – <i>Implement modular programs.</i>	Students develop efficient Arduino C++ programs using functions, arrays and modular programming practices.	• Digital Literacy
WA9/10DIGDTID1–3 – <i>Investigate stakeholder</i>	Students develop a formal design brief, evaluate hardware options and justify engineering decisions.	• Literacy (DTID1) • Critical & Creative Thinking

Relevant Code	Application to Project	General Capabilities
<i>needs and design constraints.</i>		
WA9/10DIGDTDE1 – <i>Design and refine digital solutions.</i>	Students iteratively improve both hardware integration and software functionality based on evaluation.	• Critical & Creative Thinking
WA9/10DIGDTPI1 – <i>Produce and evaluate digital solutions.</i>	Students construct, program and evaluate a complete embedded system that demonstrates reliable interaction between hardware and software.	• Critical & Creative Thinking • Personal & Social Capability • Digital Literacy
WA9DIGDR1 / WA9DIGDR2 – <i>Represent and manipulate digital data.</i>	Students investigate how arrays, strings and random number generation are represented and processed in memory.	• Numeracy • Digital Literacy
WA9/10DIGDTPM1 – <i>Manage digital projects.</i>	Students apply project management processes, document development, evaluate outcomes and refine solutions using iterative design.	• Literacy • Personal & Social Capability • Critical & Creative Thinking (Years 9–10 also include Numeracy and Ethical Understanding)

Science

The Science content below traces how students investigate energy transfer through the Mystic 8-Ball's circuit, pose questions and plan fair investigations into its behaviour, and communicate and apply their scientific understanding of electrical systems.

Years 3–4

Table 9: Science (Years 3–4)

Relevant Code	Application to Project	General Capabilities
WA3/4SSUP1 – <i>Energy can change forms and transfer to other entities.</i>	Students investigate how electrical energy supplied to the Arduino is transferred through the circuit to power the OLED display and respond to button presses.	• Numeracy • Critical & Creative Thinking
WA3/4SSIQ1 – <i>Pose questions and make predictions.</i>	Students predict how changing variables such as the displayed messages, button input or program timing affects the behaviour of the Magic 8-Ball.	• Critical & Creative Thinking
WA3/4SSIPL1 – <i>Plan and conduct investigations.</i>	Students conduct simple investigations by changing one program variable at a time while observing the effect on the displayed output.	• Numeracy • Critical & Creative Thinking

Relevant Code	Application to Project	General Capabilities
WA3/4SSIPR1 – <i>Organise and represent data.</i>	Students record observations of response speed, program behaviour and successful operation using tables or simple graphs to identify patterns.	Numeracy
WA3/4SSIE1 – <i>Evaluate investigations.</i>	Students compare the behaviour of different program versions with their predictions and suggest improvements to the design.	Critical & Creative Thinking
WA3/4SSICM1 – <i>Communicate scientific ideas.</i>	Students explain how electrical circuits, button inputs and electronic displays work using appropriate scientific vocabulary.	Literacy
WA3/4SSICL1 – <i>Apply science knowledge.</i>	Students explain how electrical energy powers the Arduino and display, enabling the Magic 8-Ball to operate interactively.	Critical & Creative Thinking

Years 5–6

Table 10: Science (Years 5–6)

Relevant Code	Application to Project	General Capabilities
WA5/6SSUP1 – <i>Energy can change forms and transfer to other entities.</i>	Students investigate how electrical energy is transferred through the circuit to operate the Arduino, push button and OLED display.	- Numeracy - Critical & Creative Thinking
WA5/6SSIQ1 – <i>Pose questions and make predictions.</i>	Students develop investigable questions about how programming variables, button inputs or display settings affect system behaviour.	Critical & Creative Thinking
WA5/6SSIPL1 – <i>Plan and conduct investigations.</i>	Students plan fair investigations by identifying independent, dependent and controlled variables while testing different program configurations.	- Numeracy - Critical & Creative Thinking
WA5/6SSIPR1 – <i>Organise and represent data.</i>	Students collect and display testing data using tables and graphs to compare response times and program performance.	Numeracy
WA5/6SSIE1 – <i>Evaluate investigations.</i>	Students evaluate the reliability of their testing, compare results with predictions and identify opportunities for improvement.	Critical & Creative Thinking
WA5/6SSICM1 – <i>Communicate scientific ideas.</i>	Students communicate explanations of electrical circuits, current flow and electronic displays using appropriate scientific terminology.	Literacy
WA5/6SSICL1 – <i>Apply science knowledge.</i>	Students apply their understanding of electrical energy and circuits to explain how the Magic 8-Ball processes user input and produces outputs.	Critical & Creative Thinking

Years 7–8

Table 11: Science (Years 7–8)

Relevant Code	Application to Project	General Capabilities
WA7/8SSUP1 – <i>Energy can change forms and transfer to other entities.</i>	Students investigate how electrical energy is distributed through an embedded electronic system to operate input and output devices.	- Numeracy - Critical & Creative Thinking
WA7/8SSIQ1 – <i>Pose questions and make predictions.</i>	Students formulate hypotheses about how changing program logic, display settings or input timing affects system performance and user interaction.	Critical & Creative Thinking
WA7/8SSIPL1 – <i>Plan and conduct investigations.</i>	Students conduct controlled investigations by varying one programming or hardware parameter while measuring system behaviour.	Numeracy
WA7/8SSIPR1 – <i>Process and analyse data.</i>	Students analyse testing data to identify relationships between programming changes and system performance.	Numeracy
WA7/8SSIE1 – <i>Evaluate investigations.</i>	Students evaluate the validity of their investigations, compare findings with predictions and recommend improvements.	Critical & Creative Thinking
WA7/8SSICM1 – <i>Communicate scientific ideas.</i>	Students communicate explanations of electrical energy transfer, embedded systems and electronic circuits using scientific language and diagrams.	Literacy
WA7/8SSICL1 – <i>Apply science knowledge.</i>	Students apply their understanding of electrical systems to troubleshoot hardware connections and optimise system performance.	Critical & Creative Thinking

Years 9–10

Table 12: Science (Years 9–10)

Relevant Code	Application to Project	General Capabilities
WA9/10SSUP1 – <i>Energy can change forms and transfer to other entities.</i>	Students analyse how electrical energy is transferred and transformed within an embedded electronic system to power input, processing and display components efficiently.	- Numeracy - Critical & Creative Thinking
WA8/9SSUP3 – <i>The flow of electricity through a circuit is affected by the type of circuit; loads transform electrical energy; safety devices protect electrical systems.</i>	Students investigate how electrical current flows through the Arduino circuit, how the OLED display and microcontroller act as electrical loads, and why correct wiring and circuit protection are important for safe operation.	- Numeracy - Critical & Creative Thinking
WA9/10SSIQ1 – <i>Pose questions and make predictions.</i>	Students formulate hypotheses about how hardware configuration and software modifications influence system performance, efficiency and reliability.	Critical & Creative Thinking

Relevant Code	Application to Project	General Capabilities
WA9/10SSIPL1 – <i>Plan and conduct investigations.</i>	Students design controlled investigations to test the effect of programming variables and circuit configurations while collecting reliable data.	Numeracy
WA9/10SSICM1 – <i>Communicate scientific ideas.</i>	Students communicate explanations of electrical circuits, embedded systems and energy transfer using precise scientific vocabulary and appropriate representations.	Literacy
WA9/10SSICL1 – <i>Apply science knowledge.</i>	Students apply their understanding of electrical circuits and energy transfer to troubleshoot hardware, optimise performance and explain how the embedded system operates.	Critical & Creative Thinking