Mystic 8-Ball – Critical and Creative Thinking Curriculum Mapping

In the Mystic 8-Ball project, students build and code an interactive digital fortune teller using Arduino and an OLED screen. The physical build and electronics layout are preset, so student agency sits in the code: using conditional statements, random number generation and data arrays to control what the device does and how it responds. The following tables map this project against the Victorian Curriculum F–10 Version 2.0 Critical and Creative Thinking capability, for Levels 3–4, 5–6, 7–8 and 9–10. Each table lists the relevant content descriptions, how they are addressed through the project, and the interrelated strand(s) involved.

Levels 3 and 4

Table 1: Mystic 8-Ball – Critical & Creative Thinking (Level 3–4)

Content Description	Project Application	Interrelated Strands
VC2CC4Q01 – *the construction and use of open and closed questions for different purposes*	Students ask open and closed questions throughout the coding process to investigate how the Mystic 8-Ball selects and displays its answers. For example, "What happens if we add more answers to the array?" (open) or "Is the button connected to the correct input pin?" (closed). These questions guide debugging of the code.	• Questions and Possibilities
VC2CC4Q02 – *how pre-established preferences may influence thinking when generating and responding to alternative ideas and possibilities*	Students reflect on whether their preference for particular kinds of answers (for example, funny answers rather than serious ones) influences which responses they choose to add to their answer array, and consider how this might narrow the range of ideas they explore when writing responses.	• Questions and Possibilities
VC2CC4Q03 – *simple strategies for generating new ideas and possibilities, including repurposing or rearranging*	Students generate new possibilities by rearranging the order of answers in their array, repurposing existing code (for example, adapting a countdown loop into a "thinking" animation on the OLED screen), and experimenting with new combinations of words for their responses.	• Questions and Possibilities
VC2CC4R01 – *ways to identify, structure and communicate a conclusion justified by a range of reasons*	Students explain why particular code choices were made, using evidence gathered from testing. For example, they justify adding a short delay() before displaying the answer because it made the "thinking" effect feel more convincing.	• Reasoning
VC2CC4R02 – *what is meant by evidence and what is meant by a value and how they are used to support reasoning*	Students use testing evidence, such as tallying how often each answer appears over many button presses, to support claims about whether their random number generation is working well, and consider values such as fairness when deciding how the answers should be distributed.	• Reasoning

Content Description	Project Application	Interrelated Strands
VC2CC4R03 – *the use of 'if-then' thinking to come to a conclusion when reasoning, and simple errors that can be made when using this thinking*	Students use conditional statements to control which response is displayed based on the random number generated (for example, "if the random number is 3, then display 'Ask again later'"), and identify errors when the display shows unexpected results, such as wrongly assuming an array index will always match the random number without checking it.	• Reasoning
VC2CC4R04 – *the basis for different kinds of criteria, such as desired qualities or given rules; and how criteria are used to help make judgements when reasoning*	Students identify criteria for a successful Mystic 8-Ball, such as showing a different answer for several presses in a row, displaying clear and readable text, and responding within a reasonable time, and use these criteria to judge their code.	• Reasoning
VC2CC4M01 – *an extended range of general learning strategies including connecting to prior learning, self-questioning, self-explanation and peer instruction*	Students connect new knowledge about arrays and variables to prior knowledge of lists and counting, ask themselves questions to check their understanding of what each block of code does, and explain their code to a peer to test their own understanding.	• Metacognition
VC2CC4M02 – *the use of thinking processes to facilitate thinking, including for problem-solving, and verbal and non-verbal strategies for representing thinking processes*	Students develop and test hypotheses about how many times they need to press the button to see every answer at least once, recording their results in a table to compare outcomes and look for patterns.	• Metacognition
VC2CC4M03 – *how to evaluate a proposed solution using given criteria*	Students use a teacher-provided checklist (for example, "Does a new answer appear each time?", "Is the text readable on the OLED screen?") to evaluate their Mystic 8-Ball code and identify areas for improvement.	• Metacognition

Levels 5 and 6

Table 2: Mystic 8-Ball – Critical & Creative Thinking (Level 5–6)

Content Description	Project Application	Interrelated Strands
VC2CC6Q01 – *the construction of questions for identifying and building understanding*	Students construct a range of questions — technical and design-focused — to build their understanding of how random number generation and arrays work together, and construct questions for an expert or	• Questions and Possibilities

Content Description	Project Application	Interrelated Strands
of information, possibilities, processes and activities	online resource about how the OLED screen displays text.	
VC2CC6Q02 – *the importance of setting aside preconceptions; strategies for setting preconceptions aside when generating and evaluating alternative ideas and possibilities*	Students use given brainstorming rules (deferring judgement, building on others' ideas) when generating a bank of possible Mystic 8-Ball answers in small groups, and reflect on how setting aside their initial ideas about "typical" fortune-teller answers allowed more original and varied responses to be written.	• Questions and Possibilities
VC2CC6Q03 – *an extended range of strategies to generate new ideas and possibilities including forming a link between different information sources*	Students research other fortune-telling or randomising devices and apps, such as dice-rolling apps or "yes/no" generators, to see how they use variety and timing to feel engaging, and form links between these examples to design an original response style and OLED display layout for their own Mystic 8-Ball.	• Questions and Possibilities
VC2CC6R01 – *ways to identify, structure and communicate an argument that uses sub-arguments leading to a main conclusion*	Students construct a design justification with a main conclusion (for example, "Our code produces the fairest and most engaging Mystic 8-Ball") supported by several reasons — even distribution of random answers, clear conditional logic and well-tested code — each of which is further supported by evidence from testing.	• Reasoning
VC2CC6R02 – *ways to consider competing values and the strength of evidence when reasoning*	Students weigh competing values, such as variety of answers versus simplicity of code, and evaluate whose test data — their own or a partner's — provides stronger evidence that their random number generation is fair and unbiased.	• Reasoning
VC2CC6R03 – *simple reasoning errors including hasty generalisations, false analogies and contradiction, and how reasoning associated with these errors can be improved*	Students examine whether concluding "the random function is broken" after seeing the same answer twice in a row is a hasty generalisation, and discuss how running many trials improves the reliability of conclusions about how random their code really is.	• Reasoning
VC2CC6R04 – *the use of criteria to support analysis and evaluation when reasoning*	Students develop criteria — such as response variety, code readability and reliability of the button input — to analyse and compare different versions of their code, using these criteria to justify their final design choice.	• Reasoning
VC2CC6M01 – *learning strategies suited to general and specific contexts, including different*	Students use flowcharts to organise their understanding of how a button press triggers random selection and display, and revisit their code across several sessions (spaced practice) to consolidate their understanding of variables, arrays and conditionals.	• Metacognition

Content Description	Project Application	Interrelated Strands
ways of identifying, expressing and organising key learning, and undertaking spaced practice		
VC2CC6M02 – *thinking processes suited to different contexts and when and how to use them, including for problem-solving*	Students select and apply a structured problem-solving process (define the problem, generate options, test, refine) when troubleshooting why some answers never seem to display, reflecting on why this process suits debugging tasks.	• Metacognition
VC2CC6M03 – *the use of criteria to identify and compare proposed solutions*	Working in small groups, students each propose a different way to structure their array of answers or conditional logic, then use agreed criteria to compare solutions and select the most effective approach.	• Metacognition

Levels 7 and 8

Table 3: Mystic 8-Ball – Critical & Creative Thinking (Level 7–8)

Content Description	Project Application	Interrelated Strands
VC2CC8Q01 – *the construction of a main question and sub-questions for different purposes*	Students define a main investigation question, such as "How can we make our Mystic 8-Ball feel more genuinely random and engaging to users?", and break this into sub-questions covering array structure, random number range and display timing to guide their coding.	• Questions and Possibilities
VC2CC8Q02 – *when and how judgement is suspended to support generating and evaluating alternative ideas and possibilities*	Students engage with a guest programmer or games designer to explore how professionals suspend judgement when brainstorming unconventional response ideas, and practise withholding critique during initial brainstorming of new Mystic 8-Ball themes or "personalities" before evaluating feasibility.	• Questions and Possibilities
VC2CC8Q03 – *strategies for generating new ideas and possibilities including identifying a pattern across multiple information sources*	Students examine several existing random-response apps or games and identify a common pattern in how they use arrays and random number generation to create variety and surprise, then apply this pattern to their own code.	• Questions and Possibilities
VC2CC8R01 – *ways to identify, structure and communicate a conclusion and its justification where competing claims, and*	Students research and weigh competing claims about the best way to generate random numbers in code — for example, using the built-in random() function versus a seeded pseudo-random approach — structuring a written or verbal justification that	• Reasoning

Content Description	Project Application	Interrelated Strands
grounds for claims, are analysed and evaluated	analyses the strength of evidence for each option before reaching a conclusion.	
VC2CC8R02 – *reasons for competing claims about matters of fact and matters of value, including consideration of evidence and expertise, and ways to analyse and evaluate competing claims*	Students investigate documentation explaining how random number generation actually works on a microcontroller (matters of fact) versus peer opinions about which response wording is "funniest" (matters of value), and discuss the role of technical expertise versus user testing when evaluating competing design claims.	• Reasoning
VC2CC8R03 – *an extended range of reasoning errors including cause and effect fallacies and arguing from ignorance, and how reasoning associated with these errors can be improved*	Students examine whether their claim that "changing the delay time caused the button to stop responding" reflects a genuine cause-and-effect relationship in the code or merely a coincidence, and discuss how testing changes individually and systematically improves the strength of their conclusions when debugging.	• Reasoning
VC2CC8R04 – *when and how criteria are selected to improve clarity and support analysis and evaluation, including of competing claims, when reasoning*	Students develop necessary and sufficient criteria for judging whether their code's randomness is "fair" (for example, each answer must appear within a defined percentage range across fifty trials) and use these refined criteria to analyse competing code versions within their group.	• Reasoning
VC2CC8M01 – *ways to select, use and reflect on general and context-specific learning strategies*	Students select appropriate strategies, such as tracing through their code line by line or explaining their conditional logic to a peer, to consolidate their understanding of how arrays and random numbers interact, and reflect on which strategy was most effective for this technical content.	• Metacognition
VC2CC8M02 – *broad strengths and limitations of thinking processes in different contexts, including problem-solving*	Students compare different approaches to structuring their code, such as a single large answer array versus separate categories of responses, and reflect on the strengths and limitations of each when applying computational thinking to develop their Mystic 8-Ball.	• Metacognition
VC2CC8M03 – *the development of criteria for evaluating a range of proposed solutions; ways to evaluate and incorporate new knowledge that could affect the final decision*	Students develop criteria to evaluate multiple proposed code structures for storing and selecting responses, and adjust their final decision in light of new knowledge, such as discovering their array indexing was causing an off-by-one error.	• Metacognition

Levels 9 and 10

Table 4: Mystic 8-Ball – Critical & Creative Thinking (Level 9–10)

Content Description	Project Application	Interrelated Strands
VC2CC10Q01 – *the construction and adaptation of questions to suit different contexts*	Students adapt their investigation questions to suit different audiences — technical questions about pseudo-random number generation for a programming forum, user-experience questions for a peer survey about which responses feel most "believable" — when researching how to refine their Mystic 8-Ball.	• Questions and Possibilities
VC2CC10Q02 – *when and how to critically reflect on suspension of judgement when generating and evaluating alternative ideas and possibilities from different perspectives*	Students critically reflect on how unconscious bias toward familiar response styles — for example, defaulting to classic Magic 8-Ball phrases — may have limited their exploration of more original or personalised content, and discuss strategies to mitigate this bias when generating new ideas.	• Questions and Possibilities
VC2CC10Q03 – *strategies for generating new ideas and possibilities including identifying links and patterns across multiple information sources and perspectives*	Students gather ideas and data from multiple sources — programming documentation, user feedback and other randomising applications — and analyse these for shared patterns to inform an evidence-based redesign of their code's logic and response bank.	• Questions and Possibilities
VC2CC10R01 – *ways to analyse and improve the structure, clarity, consistency and coherence of a conclusion and its justification in different contexts*	Students critically review their code documentation and design justification, checking for unclear assumptions (for example, about how evenly their random function distributes results) and revising the structure and clarity of their argument before presenting it to peers or mentors.	• Reasoning
VC2CC10R02 – *ways to analyse and evaluate claims and grounds for claims for the qualities of accuracy, precision, depth or breadth when reasoning, and ways to identify what qualities are required in different contexts*	Students evaluate whether their testing data on response distribution is sufficiently precise and accurate for a formal report, and determine whether greater breadth (testing across many more trials) or depth (detailed analysis of one part of the code) is required to support their conclusions.	• Reasoning
VC2CC10R03 – *complex reasoning errors including false dichotomies and appeal to consensus,*	Students examine whether framing their design choice as "either use a huge array of responses or the device will be boring" is a false dichotomy, and discuss why appealing to popular classmate opinion about the	• Reasoning

Content Description	Project Application	Interrelated Strands
their significance and how reasoning associated with these errors can be improved	"best" responses is not, by itself, sufficient justification for a final decision.	
VC2CC10R04 – *when and how criteria are refined to improve clarity and support analysis and evaluation, including of competing claims, when reasoning*	Students refine their evaluation criteria for their final Mystic 8-Ball code to be specific, measurable and time-bound (for example, "each response appears within 5% of the expected frequency across 100 trials") and use these refined criteria to resolve competing claims about whose code is most effective.	• Reasoning
VC2CC10M01 – *ways to select, monitor and adapt general and context-specific learning strategies*	Students maintain a coding journal to monitor the effectiveness of their learning strategies — for example, reading Arduino documentation versus experimenting directly with code — throughout the project, adapting their approach as programming challenges evolve.	• Metacognition
VC2CC10M02 – *the importance of critical analysis of thinking processes in different contexts, including for problem-solving, considering factors such as cognitive biases*	Students critically analyse their own debugging process when troubleshooting their Mystic 8-Ball code, identifying cognitive biases such as confirmation bias (favouring test runs that support their assumption the code is already working correctly) and discussing strategies to mitigate this in future testing.	• Metacognition
VC2CC10M03 – *the development and adaptation of criteria for evaluating the viability and sustainability of proposed solutions in different contexts*	Students develop and adapt criteria to assess the viability of their final code and content choices, considering factors such as the inclusivity and appropriateness of responses, memory and storage constraints on the microcontroller, and the feasibility of expanding the response bank, and justify their final design recommendation.	• Metacognition

Mystic 8-Ball – Design and Technologies Curriculum Mapping

In the Mystic 8-Ball project, students build and code an interactive digital fortune teller using Arduino and an OLED screen. The physical build and electronics layout are preset, so student design work happens almost entirely in code rather than in physical materials, mechanisms or production processes. Because Design and Technologies centres on investigating and selecting materials and components, generating physical design ideas, producing solutions with tools, and planning production — none of which students do in this project — very few content descriptions genuinely apply. The following tables map what does apply against the Victorian Curriculum F–10 Version 2.0 Design and Technologies curriculum, for Levels 3–4, 5–6, 7–8 and 9–10, with a note after each table explaining the (extensive) exclusions. For the design work students actually undertake in this project, see the companion Digital Technologies mapping.

Levels 3 and 4

Table 1: Mystic 8-Ball – Design and Technologies (Level 3–4)

Content Description	Project Application	Strand / Sub-strand
VC2TDE4S01 – *the role of people in design and technologies occupations and factors including sustainability that impact on the design of solutions to meet community needs*	Students consider the role of the engineers and designers who created the Arduino board and OLED screen they are using, and discuss sustainability factors such as reusing electronic kits and components across multiple projects rather than buying new hardware each time.	• Technologies and Society

Not mapped for this project: *VC2TDE4C01 (forces affecting function), since the project has no meaningful mechanical force or motion for students to explore; VC2TDE4C02/C03 (Food and fibre production, Food specialisations); and VC2TDE4C04 (Materials and technologies specialisations) and VC2TDE4D01–D05 (the entire Creating Designed Solutions strand), since the physical build and electronics layout are preset for this project — students don't investigate or select materials or components, generate physical design ideas, produce a physical solution with tools, or plan physical production. This hands-on design-and-production process, which this curriculum strand is built around, isn't part of the Mystic 8-Ball project; the Digital Technologies curriculum is a much better fit for the design work students actually do (coding the device's behaviour and on-screen content).*

Levels 5 and 6

Table 2: Mystic 8-Ball – Design and Technologies (Level 5–6)

Content Description	Project Application	Strand / Sub-strand
VC2TDE6S01 – *how people in design and technologies occupations consider competing ethical factors including*	Students consider competing ethical factors that the manufacturers of their Arduino and OLED components may have faced, such as balancing affordability with the environmental impact of electronic waste, even though they are not designing the hardware themselves.	• Technologies and Society

Content Description	Project Application	Strand / Sub-strand
sustainability in the design of products, services and environments		
VC2TDE6C01 – *explain how electrical energy can be transformed into movement, sound or light in a product or system*	Students explain how electrical energy from the battery is transformed into the light emitted by the OLED screen when their code runs, discussing how a simple switch-and-display circuit works even though the circuit itself is provided rather than designed by them.	• Technologies Contexts – Engineering principles and systems

Not mapped for this project: *VC2TDE6C02/C03 (Food and fibre production, Food specialisations); and VC2TDE6C04 (Materials and technologies specialisations) and VC2TDE6D01–D05 (the entire Creating Designed Solutions strand), for the same reason as Level 3–4 — the physical build is preset, so students don't engage in the materials selection, design generation, production or planning processes this strand measures.*

Levels 7 and 8

Table 3: Mystic 8-Ball – Design and Technologies (Level 7–8)

Content Description	Project Application	Strand / Sub-strand
VC2TDE8S01 – *how people in design and technologies occupations consider ethical factors to design and produce products, services and environments*	Students discuss ethical considerations associated with the electronic components they are using, such as the environmental impact of e-waste from discarded microcontrollers and screens, and the importance of attributing any open-source code or circuit designs they build upon.	• Technologies and Society

Not mapped for this project: *VC2TDE8S02 (impacts of innovation and emerging technologies on sustainable living), which is a weaker fit than VC2TDE8S01 for this project; VC2TDE8C01 (force, motion and energy controlling engineered systems), since the project has no meaningful mechanical motion; VC2TDE8C02/C03 (Food and fibre production, Food specialisations); and VC2TDE8C04 (Materials and technologies specialisations) and VC2TDE8D01–D05 (the entire Creating Designed Solutions strand), since the physical build is preset.*

Levels 9 and 10

Table 4: Mystic 8-Ball – Design and Technologies (Level 9–10)

Content Description	Project Application	Strand / Sub-strand
VC2TDE10S01 – *how people in design and technologies occupations consider ethical factors to innovate and improve*	Students discuss how ethical factors, such as responsible sourcing of electronic components and the intellectual property of open-source Arduino libraries, apply to their Mystic 8-Ball even though the hardware itself was provided rather than designed by them.	• Technologies and Society

Content Description	Project Application	Strand / Sub-strand
products, services and environments		

Not mapped for this project: *VC2TDE10S02 (impacts of innovation, enterprise and emerging technologies on sustainable living), which is a weaker fit than VC2TDE10S01; VC2TDE10C01 (force, motion and energy controlling engineered systems), since the project has no meaningful mechanical motion; VC2TDE10C02/C03 (Food and fibre production, Food specialisations); and VC2TDE10C04 (Materials and technologies specialisations) and VC2TDE10D01–D05 (the entire Creating Designed Solutions strand), since the physical build is preset.*

Mystic 8-Ball – Digital Technologies Curriculum Mapping

In the Mystic 8-Ball project, students build and code an interactive digital fortune teller using Arduino and an OLED screen. The physical build and electronics layout are preset, so nearly all of the design work students undertake happens in code — including, uniquely among the robotics projects mapped so far, designing what appears on a screen. The following tables map this project against the Victorian Curriculum F–10 Version 2.0 Digital Technologies curriculum, for Levels 3–4, 5–6, 7–8 and 9–10. Unlike the Rebellious Box and Autonomous Robot Car, which have no screen, the OLED display means the user-interface/user-experience content descriptions genuinely apply here. The project's emphasis on testing whether answers appear fairly at random also means the Data, Information and Privacy strand's data-logging content descriptions apply from Level 5–6 onward. Content descriptions about networking, cyber security and accounts/passwords have been left out, since the device is offline, with a brief note after each table explaining what was excluded and why. Note also that Arduino/C++ is a text-based, general-purpose programming language: at Levels 3–4 and 5–6, where the curriculum expects a visual programming language, the underlying algorithmic concepts (branching, iteration, input) are genuinely present in this project, but the implementation exceeds what's typically expected at those levels.

Levels 3 and 4

Table 1: Mystic 8-Ball – Digital Technologies (Level 3–4)

Content Description	Project Application	Strand / Sub-strand
VC2TDI4S01 – *explore and describe a range of digital systems and their peripherals for a variety of purposes*	Students explore the Arduino microcontroller as a digital system and identify the OLED screen and push button as peripherals connected to it, describing how each expands what the system can display and sense.	• Digital Systems and Security
VC2TDI4C01 – *define simple problems with teacher-provided requirements*	Students define the problem of building a device that displays a different answer each time the button is pressed, using teacher-provided requirements such as "the screen must show a readable answer within two seconds of the button being pressed."	• Creating Digital Solutions
VC2TDI4C02 – *follow, describe and represent algorithms involving sequencing, comparison operators (branching) and iteration*	Students describe and represent the algorithm behind their Mystic 8-Ball as a sequence of steps involving a branching decision (checking which random number was generated) that leads to a specific answer being selected and displayed.	• Creating Digital Solutions
VC2TDI4C03 – *design a simple user interface, generate, communicate and compare the designs*	Students design a simple user interface for the OLED screen, sketching different layout ideas for how the answer text should appear, and compare their designs with a peer.	• Creating Digital Solutions
VC2TDI4C04 – *implement simple*	Students implement their button-and-display algorithm in Arduino/C++ code that reads input from the button	• Creating Digital Solutions

Content Description	Project Application	Strand / Sub-strand
algorithms as visual programs involving control structures and input	and uses a control structure to decide which answer to display. This is written as text-based code rather than a visual program, going beyond the typical visual-programming expectation at this level while covering the same underlying concepts of input and branching.	
VC2TDI4C05 – *discuss how existing and student-created solutions satisfy the given requirements*	Students discuss whether their Mystic 8-Ball satisfies the given requirements by testing how reliably and quickly it displays a readable answer when the button is pressed.	• Creating Digital Solutions

Not mapped for this project: *VC2TDI4S02 (transmitting data between digital systems) and VC2TDI4S03 (memorised passwords), since the Mystic 8-Ball is a standalone offline device with no data transmission or account access; and VC2TDI4D01–D05 (Data, Information and Privacy), since at this level the project doesn't involve representing, collecting or sharing data for an audience, or personal accounts.*

Levels 5 and 6

Table 2: Mystic 8-Ball – Digital Technologies (Level 5–6)

Content Description	Project Application	Strand / Sub-strand
VC2TDI6S01 – *investigate the main internal components of common digital systems and their function*	Students investigate the main components of their Arduino board — the microcontroller, memory and input/output pins — and explain how these work together with the OLED screen and button to display an answer.	• Digital Systems and Security
VC2TDI6D01 – *explain how digital systems represent all data using numbers and explore how data can be represented using binary*	Students demonstrate that the button's on/off state represents the digits 1 and 0, and explain how this binary representation is how their Arduino recognises whether the button has been pressed.	• Data, Information and Privacy
VC2TDI6D02 – *acquire and manipulate different types of data from a range of sources using software tools, including spreadsheets*	Students acquire and record data from many button presses, using a spreadsheet to log which answer appears each time across a large number of trials.	• Data, Information and Privacy
VC2TDI6D03 – *analyse and visualise data using a range of software, including spreadsheets to create information and solve problems*	Students use a spreadsheet to analyse and visualise their logged data, creating a chart of how often each answer appeared to check whether their code is producing a fair spread of results.	• Data, Information and Privacy

Content Description	Project Application	Strand / Sub-strand
VC2TDI6C01 – *define problems with teacher-provided or co-developed functional requirements*	Students co-develop functional requirements for their Mystic 8-Ball as a class, such as specifying how many possible answers the code should include and how quickly the screen should update.	• Creating Digital Solutions
VC2TDI6C02 – *design and represent algorithms involving multiple alternatives (branching) and iteration*	Students design an algorithm with multiple alternatives, such as selecting between many possible answers based on the random number generated, and represent this as a diagram before coding it.	• Creating Digital Solutions
VC2TDI6C03 – *design and modify a user interface for a digital system, and generate, communicate and evaluate the designs*	Students design and modify a user interface for their OLED screen, generating multiple layout ideas — such as adding a border or a "thinking" animation — and evaluating which design communicates the answer most clearly.	• Creating Digital Solutions
VC2TDI6C04 – *implement algorithms as visual programs involving control structures, variables and input*	Students implement their branching algorithm in Arduino/C++ using variables to store the random number and array index, and control structures to decide which answer to display. As at Level 3–4, this is implemented as text-based code rather than a visual program.	• Creating Digital Solutions
VC2TDI6C05 – *evaluate existing and student-created solutions against the requirements and their broader community impact*	Students evaluate their Mystic 8-Ball against the class's agreed requirements and discuss its broader impact, such as how randomness and chance are used in other digital games and apps.	• Creating Digital Solutions

Not mapped for this project: *VC2TDI6S02 (networks) and VC2TDI6S03 (passphrases), since the device doesn't connect to a network or use accounts; and VC2TDI6D04–D06, since the project doesn't involve creating shared online content or managing a digital footprint.*

Levels 7 and 8

Table 3: Mystic 8-Ball – Digital Technologies (Level 7–8)

Content Description	Project Application	Strand / Sub-strand
VC2TDI8S01 – *explain how hardware specifications affect performance and select appropriate hardware for particular tasks and workloads*	Students compare the specifications of different microcontroller boards and OLED screens, and select appropriate hardware for their Mystic 8-Ball based on factors such as processing speed, screen resolution and the number of input/output pins available.	• Digital Systems and Security

Content Description	Project Application	Strand / Sub-strand
VC2TDI8D01 – *investigate how digital systems represent text, image and audio data using integers and binary*	Students explain how their Arduino represents each answer as a sequence of characters using the Unicode or ASCII character set, and how this text is converted to the pixel patterns displayed on the OLED screen.	• Data, Information and Privacy
VC2TDI8D02 – *acquire, store, manipulate and validate data from a range of sources using software tools, including spreadsheets and single-table databases*	Students acquire, store and validate test data from their Mystic 8-Ball, logging which answer appears across many trials in a spreadsheet or simple database.	• Data, Information and Privacy
VC2TDI8D03 – *analyse and visualise data using a range of software, including spreadsheets and simple database queries, draw conclusions and make predictions by identifying trends*	Students analyse and visualise their trial data using a spreadsheet to identify trends, such as whether some answers appear more often than others, and use this to make predictions about whether their random number generation is fair.	• Data, Information and Privacy
VC2TDI8C01 – *define and decompose real-world problems by taking into account functional requirements and constraints*	Students decompose the problem of building an engaging Mystic 8-Ball into smaller parts — detecting the button press, generating a random number, selecting an answer and displaying it — and define functional requirements and constraints such as response time and available memory.	• Creating Digital Solutions
VC2TDI8C02 – *design algorithms involving nested control structures and represent them using flowcharts and pseudocode, and use tracing techniques to test and identify errors*	Students design their answer-selection logic using nested control structures, represent this as a flowchart, and trace through their algorithm by hand to identify errors before testing it on the hardware.	• Creating Digital Solutions
VC2TDI8C03 – *design and modify the user interface and user experience of a digital system; generate, communicate and evaluate the alternative designs*	Students design and modify the user interface and user experience of their OLED display, generating alternative designs — such as different fonts, animations or "personality" themes — and evaluating them against the functional requirements.	• Creating Digital Solutions
VC2TDI8C04 – *implement, modify and*	Students implement, modify and debug their Mystic 8-Ball code in Arduino/C++, a general-purpose	• Creating Digital Solutions

Content Description	Project Application	Strand / Sub-strand
debug programs involving control structures and functions in a general-purpose programming language	programming language, writing a program that receives input from the button and changes its behaviour accordingly — directly analogous to a program that reads a sensor and switches a device's behaviour.	
VC2TDI8C05 – *evaluate existing and student-created solutions against the requirements, constraints and possible future impacts*	Students evaluate their Mystic 8-Ball against its functional requirements and constraints, and consider possible future impacts of interactive random-response devices, such as their use in games and entertainment apps.	• Creating Digital Solutions

Not mapped for this project: *VC2TDI8S02 (wired/wireless network security) and VC2TDI8S03 (multi-factor authentication, phishing), since the device is offline and doesn't use accounts; and VC2TDI8D04–D06, since the project doesn't involve content creation for an external audience or managing a digital footprint.*

Levels 9 and 10

Table 4: Mystic 8-Ball – Digital Technologies (Level 9–10)

Content Description	Project Application	Strand / Sub-strand
VC2TDI10D03 – *develop techniques to acquire, store, manipulate and validate data from a range of sources using software tools, including spreadsheets and relational databases*	Students develop techniques to acquire, store and validate their Mystic 8-Ball's test data using a spreadsheet or simple database, ensuring readings from repeated trials are accurate and consistent.	• Data, Information and Privacy
VC2TDI10D04 – *analyse and visualise data interactively using a range of software, including spreadsheets and relational databases and queries, to draw conclusions and make predictions by identifying trends and outliers*	Students analyse and visualise their test data interactively, identifying trends and outliers across many trials to draw conclusions and make predictions about how fair their random number generation really is.	• Data, Information and Privacy
VC2TDI10C01 – *define and decompose real-world problems, taking into account functional and non-functional*	Students define and decompose the problem of building an engaging Mystic 8-Ball, specifying functional requirements (must display a random answer on request) and non-functional requirements (such as response time and readability), and gather	• Creating Digital Solutions

Content Description	Project Application	Strand / Sub-strand
requirements and by interviewing and surveying stakeholders to identify needs	feedback from classmates on which responses feel most "believable."	
VC2TDI10C02 – *design algorithms involving logical operators and represent them as flowcharts and pseudocode, and validate algorithms and programs by comparing their output against a range of test cases*	Students use logical operators such as AND and OR to combine conditions in their answer-selection algorithm, represent this using pseudocode, and validate their program by comparing its output against a range of test cases.	• Creating Digital Solutions
VC2TDI10C03 – *design, modify and prototype the user interface and user experience of a digital system; generate, communicate and critically evaluate alternative designs against design criteria*	Students design, modify and prototype the user interface and user experience of their OLED display, using simple tools to test different layouts and critically evaluating alternative designs against design criteria such as readability and engagement.	• Creating Digital Solutions
VC2TDI10C04 – *implement, modify and debug modular programs, applying selected algorithms and data structures, including in an object-oriented programming language*	Students structure their Mystic 8-Ball code into modular functions for reading the button, generating a random number and updating the display, and where appropriate define simple classes or structs to model the device's behaviour — noting that fully object-oriented design goes beyond what a typical implementation requires unless the project is extended.	• Creating Digital Solutions
VC2TDI10C05 – *evaluate existing and student-created solutions against the requirements and design criteria, user needs, possible future impact and opportunities for enterprise and innovation*	Students evaluate their Mystic 8-Ball against its requirements and design criteria, gather feedback on user experience, and discuss potential enterprise opportunities, such as producing and selling a novelty version of the device.	• Creating Digital Solutions

Not mapped for this project: *VC2TDI10S01 (hardware/software managing access to data in networked systems, including IoT) and VC2TDI10S02 (cyber security threat modelling), since the Mystic 8-Ball is a standalone, offline device with no network connection or data access to secure; and VC2TDI10D01 (data compression), VC2TDI10D02 (representing online documents as content, structure and presentation), VC2TDI10D05 (emerging tools such as AR/VR), VC2TDI10D06 (project management tools) and VC2TDI10D07 (Australian Privacy Principles), since none of these apply to this project.*

Mystic 8-Ball – Science Curriculum Mapping

In the Mystic 8-Ball project, students build and code an interactive digital fortune teller using Arduino and an OLED screen. The physical build and electronics layout are preset, so this mapping focuses on the circuit, energy and light concepts genuinely present in the fixed hardware, rather than on forces or motion, which aren't a meaningful part of this project. The following tables map this project against the Victorian Curriculum F–10 Version 2.0 Science curriculum, for Levels 3–4, 5–6, 7–8 and 9–10. Only content descriptions with a genuine link to the project are included, with a brief note after each table explaining what was excluded and why.

Levels 3 and 4

Table 1: Mystic 8-Ball – Science (Level 3–4)

Content Description	Project Application	Strand / Sub-strand
VC2S4H01 – *data from observations obtained through scientific inquiry can be used to develop explanations of natural phenomena*	Students collect data from many button presses, such as tallying how often each answer appears on the OLED screen, and use this data to explain whether their code's random selection is working as expected.	• Science as a Human Endeavour – Nature and development of science
VC2S4H02 – *scientific knowledge, skills and data can be used by people to explain how they will meet a need or solve a problem*	Students explain how their understanding of simple circuits — that a switch must be closed for the OLED screen to receive power and display an answer — was used to help build a working Mystic 8-Ball.	• Science as a Human Endeavour – Use and influence of science
VC2S4I01 – *observations can be used as a basis for posing questions to identify patterns and relationships, and to predict the outcomes of investigations*	Students pose questions based on observing their Mystic 8-Ball, such as "Does the same answer ever appear twice in a row?", and use these questions to predict what they might see if they press the button many times.	• Science Inquiry – Questioning and predicting
VC2S4I02 – *scientific investigations to answer questions or test predictions can be planned and conducted using provided scaffolds, including identifying the attributes of fair tests, and considering the safe use of materials and equipment*	Students use a provided scaffold to plan a fair test of their random answer generator, pressing the button the same number of times under the same conditions each trial, and follow safe practices when handling the battery.	• Science Inquiry – Planning and conducting

Content Description	Project Application	Strand / Sub-strand
VC2S4I03 – *observations, including formal measurements, can be made and recorded by following procedures to use familiar scaled instruments and digital tools as appropriate*	Students use a tally chart to record which answer appears each time they press the button across many trials, repeating the count to check for consistency.	• Science Inquiry – Planning and conducting
VC2S4I04 – *data and information can be organised and represented to identify patterns and simple relationships by constructing tables, graphs and visual or physical models*	Students construct a table or simple bar graph recording how many times each answer appeared, and use this to identify whether some answers seem to appear more often than others.	• Science Inquiry – Processing, modelling and analysing
VC2S4I05 – *findings can be compared to those of others, including, as appropriate, whether a test was fair or not, to enable conclusions to be drawn, and may lead to the identification of further questions for investigation*	Students compare their tally of answers with a partner group's results, discuss whether differences might be due to chance or an unfair test, such as pressing the button too quickly, and pose further questions for investigation.	• Science Inquiry – Evaluating
VC2S4I06 – *observations, findings and ideas can be communicated for an identified purpose and audience by using scientific vocabulary and digital tools as appropriate*	Students communicate their findings about how their Mystic 8-Ball works to their class, using scientific vocabulary such as "circuit" and "switch" and simple diagrams to explain how pressing the button makes an answer appear.	• Science Inquiry – Communicating

Not mapped for this project: *VC2S4U09 (heat energy) and VC2S4U10 (forces affecting motion), since with the physical build and electronics preset, students aren't exploring or changing any forces or motion in this project — unlike the Rebellious Box or Robot Car, there is no mechanism whose movement they design or test; and the Biological, Chemical, and Earth and space sciences content descriptions (VC2S4U01–U08).*

Levels 5 and 6

Table 2: Mystic 8-Ball – Science (Level 5–6)

Content Description	Project Application	Strand / Sub-strand
VC2S6H02 – *scientific knowledge, skills and data can be used by individuals and communities to identify problems, consider responses and make decisions*	Students use their understanding of voltage and circuit components to decide how to safely power both the Arduino and the OLED screen from the same battery, in the same way communities use scientific knowledge of electrical safety to make decisions about wiring.	• Science as a Human Endeavour – Use and influence of science
VC2S6U08 – *light can be produced from many sources; light travels in a straight path, can form shadows, and can be absorbed, transmitted, reflected or refracted by objects*	Students identify the OLED screen as an artificial source of light, distinguishing it from natural sources such as the Sun, and discuss how the screen produces its own light to display each answer rather than reflecting light from elsewhere.	• Science Understanding – Physical sciences
VC2S6U09 – *materials may be electrical insulators or conductors; energy can be transferred and transformed in electrical circuits where the components of a circuit play particular roles in the function of the circuit*	Students identify the necessary components of their Mystic 8-Ball's circuit — a battery, the button switch and the OLED screen — and explain how the circuit transforms electrical energy into the light needed to display each answer.	• Science Understanding – Physical sciences
VC2S6I01 – *investigable questions and reasoned predictions can be used in guiding investigations to identify patterns and test relationships*	Students pose an investigable question such as "Does the number of possible answers in the code affect how often the same answer repeats?" and make a reasoned prediction based on their understanding of randomness and circuits.	• Science Inquiry – Questioning and predicting
VC2S6I02 – *repeatable scientific investigations to answer questions can be planned and conducted, including, as appropriate, deciding the variables to be changed, measured and controlled in fair tests, considering potential risks, planning for the safe and ethical use of equipment and materials*	Students plan a repeatable investigation into their random answer generator, identifying the number of button presses as the variable to change, the spread of answers shown as the variable to measure, and factors such as battery charge to keep constant.	• Science Inquiry – Planning and conducting

Content Description	Project Application	Strand / Sub-strand
VC2S6I03 – *equipment can be used to observe, generate, measure and record data with reasonable precision for repeated measurements, using digital tools as appropriate*	Students use a multimeter to record the voltage supplied to the OLED screen and the current drawn by the circuit, using standard units, and record repeated measurements to check for precision.	• Science Inquiry – Planning and conducting
VC2S6I04 – *data and information can be organised and processed to show patterns, trends and relationships by constructing representations including tables, graphs and visual or physical models*	Students construct a circuit diagram of their Mystic 8-Ball using accepted conventions, showing the direction of electricity flow from the battery through the switch to the Arduino and OLED screen.	• Science Inquiry – Processing, modelling and analysing
VC2S6I05 – *methods and findings can be compared with those of others to identify sources of error, to select evidence in support of reasoned explanations and conclusions, and to develop further questions for investigation*	Students compare their tally of answers with another group's, identifying possible sources of error such as inconsistent counting or accidental double presses, and use this comparison to refine their conclusions about how random their code really is.	• Science Inquiry – Evaluating
VC2S6I06 – *scientific ideas, findings, patterns, trends and relationships can be communicated for a specific purpose and audience, using various presentation formats, scientific vocabulary and digital tools as appropriate*	Students construct a short report or poster explaining how their Mystic 8-Ball's circuit works, using appropriate scientific vocabulary such as "conductor", "insulator" and "circuit", to share with a younger class audience.	• Science Inquiry – Communicating

Not mapped for this project: *VC2S6H01 (scientific knowledge changing over time through collaboration), which is a weak fit for a single build project; and the Biological, remaining Chemical, and Earth and space sciences content descriptions (VC2S6U01–U07), covering habitats, adaptation, particle models of matter, geological processes and the solar system.*

Levels 7 and 8

Table 3: Mystic 8-Ball – Science (Level 7–8)

Content Description	Project Application	Strand / Sub-strand
VC2S8U15 – *energy exists in different forms, including thermal, chemical, gravitational and elastic, and may be classified as kinetic or potential; energy transfers and transformations occur in simple systems and can be analysed in terms of energy efficiency*	Students trace the energy transformations in their Mystic 8-Ball, from the chemical energy stored in the battery to the electrical energy in the circuit to the light energy emitted by the OLED screen, and discuss where energy is lost as heat during this process.	• Science Understanding – Physical sciences
VC2S8U17 – *electrical circuits transfer energy when current flows and can be designed for diverse purposes using different components; the operation of circuits can be explained using the concepts of voltage and current*	Students explain how voltage and current in their circuit determine whether the OLED screen and Arduino operate correctly, and compare the role of their button switch as an input, similar to how switches and sensors are used more broadly in control devices.	• Science Understanding – Physical sciences
VC2S8I01 – *investigable questions, reasoned predictions and hypotheses can be developed in guiding investigations to identify patterns, test relationships and analyse and evaluate scientific models*	Students develop a hypothesis such as "Increasing the number of possible answers in the array will make the code appear more random to a user" and design an investigation to test this.	• Science Inquiry – Questioning and predicting
VC2S8I02 – *reproducible investigations to answer questions and test hypotheses can be planned and conducted, including identifying independent, dependent and controlled variables where applicable, stating assumptions, recognising and managing risks*	Students plan a reproducible investigation into how evenly their code distributes answers, identifying the number of possible answers as the independent variable, the spread of results as the dependent variable, and the number of trials to control, while identifying electrical safety risks associated with the battery.	• Science Inquiry – Planning and conducting

Content Description	Project Application	Strand / Sub-strand
VC2S8I03 – *equipment can be selected and used to generate and record data with attention to precision, using digital tools as appropriate*	Students select appropriate equipment, such as a multimeter and a tally counter, to record voltage, current and answer frequency with precision, recording data in a spreadsheet.	• Science Inquiry – Planning and conducting
VC2S8I04 – *data and information can be organised and processed by selecting and constructing representations including tables, graphs, keys, models and mathematical relationships*	Students construct a graph comparing the expected frequency of each answer with the observed frequency across many trials, and use this representation to identify whether their code is producing a fair distribution.	• Science Inquiry – Processing, modelling and analysing
VC2S8I05 – *information and processed data can be analysed to show patterns, trends and relationships, and to identify anomalies*	Students analyse their frequency data to identify trends, such as whether particular answers consistently appear more often than others, and investigate any anomalies that don't fit an expected random pattern.	• Science Inquiry – Processing, modelling and analysing
VC2S8I06 – *scientific methods, conclusions and claims can be analysed to identify assumptions, possible sources of error, conflicting evidence and unanswered questions*	Students evaluate their testing method for possible sources of error, such as inconsistent counting or too small a sample size, and discuss how confident they can be in their conclusions about the fairness of their random number generator.	• Science Inquiry – Evaluating
VC2S8I07 – *evidence-based arguments can be constructed to support conclusions or evaluate claims, including consideration of ethical issues and protocols associated with using or citing secondary data or information*	Students construct an evidence-based argument for their final code design, citing their own testing data and referencing documentation about how their microcontroller generates random numbers.	• Science Inquiry – Evaluating
VC2S8I08 – *communicating ideas, findings and arguments for specific purposes and audiences involves the selection and use of appropriate presentation formats,*	Students create a presentation explaining the energy transformations and circuit operation of their Mystic 8-Ball for a technical audience, using appropriate scientific vocabulary, diagrams and data.	• Science Inquiry – Communicating

Content Description	Project Application	Strand / Sub-strand
scientific vocabulary, models and other representations, and may include the use of digital tools		

Not mapped for this project: *VC2S8U13 (simple machines) and VC2S8U14 (balanced and unbalanced forces), since the physical build has no moving mechanical parts for students to design or analyse, unlike the Rebellious Box's arm or the Robot Car's wheels; VC2S8U16 (household energy audits); all four Science as a Human Endeavour content descriptions (VC2S8H01–H04), since they focus on the history, philosophy and socio-scientific dimensions of science rather than applied circuit design; and the Biological, remaining Chemical, and Earth and space sciences content descriptions (VC2S8U01–U12).*

Levels 9 and 10

Table 4: Mystic 8-Ball – Science (Level 9–10)

Content Description	Project Application	Strand / Sub-strand
VC2S10U14 – *wave and particle models can be used to describe energy transfer (conduction, convection and radiation) through different media; waves (electromagnetic and mechanical) have different properties, features (including amplitude, wavelength, frequency and speed) and applications*	Students use the particle model of electricity to explain how current flows through their circuit when the button is pressed, and discuss how the OLED screen converts electrical energy into visible light, relating this to the broader concept of electromagnetic energy transfer.	• Science Understanding – Physical sciences
VC2S10U15 – *the Law of Conservation of Energy can be analysed in systems, including Earth systems, by assessing the efficiency of energy inputs, outputs, transfers and transformations*	Students apply the Law of Conservation of Energy to their Mystic 8-Ball, analysing how chemical energy from the battery is transformed into electrical energy and then light energy at the OLED screen, and assess where efficiency is lost as heat in the circuit.	• Science Understanding – Physical sciences
VC2S10I01 – *investigable questions, reasoned predictions and hypotheses can be used in guiding investigations to test and develop*	Students develop a hypothesis about whether the distribution of answers becomes more even as the number of trials increases, and design an investigation to test it.	• Science Inquiry – Questioning and predicting

Content Description	Project Application	Strand / Sub-strand
explanatory models and relationships		
VC2S10I02 – *valid, reproducible investigations to answer questions and test hypotheses can be planned and conducted, including identifying and controlling for possible sources of error and bias in sampling or in making observations; safe, ethical investigations include undertaking risk assessments*	Students plan a valid, reproducible investigation into the fairness of their random number generator, identifying and controlling for possible sources of error such as inconsistent timing between button presses, and complete a risk assessment for working with the battery and circuit.	• Science Inquiry – Planning and conducting
VC2S10I03 – *equipment can be selected and used to generate and record data sets that show precision, including consideration of sample size and using digital tools as appropriate*	Students determine an appropriate sample size for their reliability testing (for example, running at least one hundred button presses) and use a tally system or logging code to record data with precision.	• Science Inquiry – Planning and conducting
VC2S10I04 – *data and information can be organised, processed and summarised by selecting and constructing representations including tables, graphs, descriptive statistics, models, symbols, formulas and mathematical relationships*	Students calculate descriptive statistics, such as the mean and range of how often each answer appears, and represent their expected-versus-observed frequency data in a graph.	• Science Inquiry – Processing, modelling and analysing
VC2S10I05 – *information and processed data can be analysed and compared to identify and explain qualitative and quantitative patterns, trends, relationships and anomalies*	Students compare their experimental frequency data with the theoretical probability expected from their code, identifying trends and any anomalies that require further explanation.	• Science Inquiry – Processing, modelling and analysing

Content Description	Project Application	Strand / Sub-strand
VC2S10I06 – *the validity and reproducibility of investigation methods and the validity of conclusions and claims can be evaluated, including by identifying assumptions, conflicting evidence, biases that may influence observations and conclusions, sources of error and areas of uncertainty*	Students evaluate the validity of their investigation into randomness, identifying assumptions such as consistent button-press timing across trials and discussing areas of uncertainty in their measurements.	• Science Inquiry – Evaluating
VC2S10I07 – *arguments based on a variety of evidence can be constructed to support conclusions or evaluate claims, including consideration of any ethical issues and cultural protocols associated with accessing, using or citing secondary data or information*	Students construct an evidence-based argument for their final code design, drawing on their own testing data and citing documentation about how their microcontroller's random number function works.	• Science Inquiry – Evaluating
VC2S10I08 – *communicating and justifying scientific ideas, findings and arguments for diverse audiences involves the selection of appropriate presentation formats, content, scientific vocabulary, conventions, models and other representations, and may include the use of digital tools*	Students prepare a technical report justifying their final circuit and code design, using appropriate scientific vocabulary, formulas and data representations for an audience of peers or industry mentors.	• Science Inquiry – Communicating

Not mapped for this project: *VC2S10U16 (electricity generation via AC turbines or DC photovoltaic cells), which concerns large-scale power generation infrastructure rather than this project's simple battery circuit, already covered by the circuit-components descriptors at Levels 5–6 and 7–8; VC2S10U17 (Newton's laws of motion), since, unlike the Rebellious Box's servo arm or the Robot Car's wheels, the Mystic 8-Ball has no moving mechanical parts whose force, mass or acceleration students investigate; all four Science as a Human Endeavour content descriptions (VC2S10H01–H04); and the Biological, remaining Chemical, and Earth and space sciences content descriptions (VC2S10U01–U13).*