RE-ENGINEERING AUSTRALIA
FOUNDATION

Australian Curriculum Target Outcomes

Addressed by REA programs

F1 in Schools Australia

SUBS in Schools Australia

SPACE in Schools Australia

23 Years Re-Engineering Australia

Re-Engineering Australia Foundation

Re-Engineering Australia Foundation (REA) is a not-for-profit charity and Deductible Gift Recipient focusing on the implementation of educational programs which take the concept of STEM education to another level. By focusing on the analytical problem-solving capacity, communication and collaboration skills of students, we help build resilience and character, preparing them for their future careers and the world of work. REA's programs promote career relevance, life-long learning and foster the transition of knowledge from primary school, through high school, university and directly into industry.

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Executive Summary

At a time of rapid technological advancement, it's crucial to provide approaches to help deliver STEM-based education and technologies in the classroom. Technologies that facilitate students' development of the employability skills industry seek and aid their transition to the world of work.

The industry has played a crucial role in driving the development of STEM education, primarily as a catalyst to lead a change in educational strategy and outcomes. STEM is about "what you do with what you learn"... it's about moving away with a siloed education system and aligning students outcomes with the requirements of industry based on a foundation of Life-Long Learning, Analytical Problem Solving and Communication. Effectively implemented STEM programs deliver a networked cross-curricular collaborative learning environment within a real-world context. They help students appreciate the context of what they learn at schools and develop employability skills. Longitudinal research in Australia has shown that a STEM-based approach to learning can significantly impact education attainment across all subject areas, not only Science, Technology, Engineering and Mathematics. However, current constraints on the implementation of STEM are that they must also work within an educational performance monitoring system driven by the Australian Tertiary Admissions Ranking (ATAR), focused on meeting the requirements of the universities and not the students or industry.

Re-Engineering Australia Foundation (REA) has been implementing STEM programs built on the concept of Life-Long STEM Learning in schools since 1998. To date, REA has engaged with over 1,000,000 students in Australia and achieved remarkable improvements in educational attainment, validated by the performance of Australian students at international STEM competitions.

This paper examines those areas of the Australian Curriculum that map directly to the learning activities undertaken by students who participate in REA's STEM programs, including F1 in Schools, SUBS in Schools & SPACE in Schools. It also highlights those areas covered in its programs that link to the employability outcomes industry seeks in new entrants.

Curriculum Mapping Overview

The core competencies of reading, writing, and arithmetic, first put forward as the fundamentals of education in the 1930s, have become the driver of the education system, particularly in primary school. As students reach high school, the focus on the fundamental development skills (3R's) transitions to learning the science of things and focusing on higher-order skills.

Underlying success within the formal education processes are the life-long skills of problem-solving, communication and applied knowledge. It is these skills that we continue to develop and improve throughout our lifetime, and it is these skills that STEM education focuses on developing. They are the fundamentals upon which employability skills reside.

In the modern world, we have become accustomed to using knowledge from many different sources (via Google) like Apps, calling on the knowledge we need to help populate our problem-solving capacity. What does not come with ubiquitous access to information is interpreting and applying knowledge in the context.

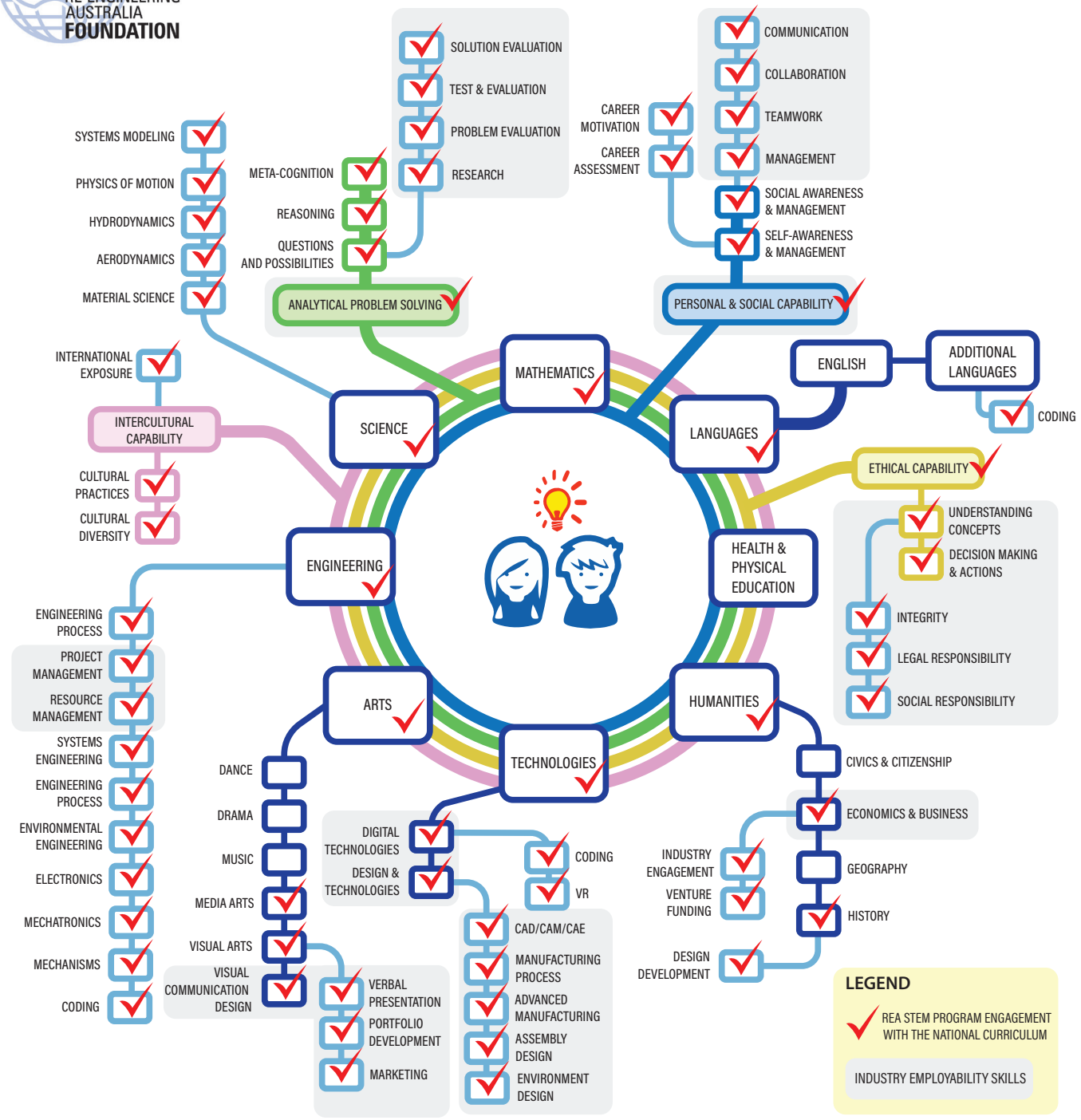
Teaching students higher-order lifelong STEM skills can start in primary schools and be build on throughout the journey through high school. The current education system, however, operates within academic silos or subject fiefdoms to deliver knowledge. STEM is about building the capacity to source expertise and knowledge on-demand to solve problems in a way that crosses these silos. The critical role for teachers in a STEM environment is to help students interpret the vast amounts of data available to them and help them diagnose the problem and the data associated with that problem. At its core is the concept of teachers as coaches or conductors of expertise. They help students apply knowledge similarly to how they have learned to use Apps, each providing part-solutions in a more extensive problem-solving process. Teachers need to understand the relevance of each piece of knowledge and move freely across all areas of the Curriculum that may apply to a problem. They will need to have a high level of cross-curricular knowledge and possibly work in teams of teachers to deliver learning in new ways in the classroom.

The following curriculum map highlights the linkages between the Australian Curriculum components and students' skills in REA's programs and highlights those areas of the Curriculum directly linked to employability skills.

The following table lists those components of the Australian Curriculum (Victorian Curriculum model) that students who participate in REA's STEM programs achieve.

RE-ENGINEERING AUSTRALIA FOUNDATION

REA PROGRAM OUTCOMES MAPPED AGAINST THE AUSTRALIAN CURRICULUM



Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
Level 5 & 6							
Capabilities	Critical and Creative Thinking	5 & 6		Questions and Possibilities	VCCCTQ021	Examine how different kinds of questions can be used to identify and clarify information, ideas and possibilities	1282
Capabilities	Critical and Creative Thinking	5 & 6		Questions and Possibilities	VCCCTQ022	Experiment with alternative ideas and actions by setting preconceptions to one side	1285
Capabilities	Critical and Creative Thinking	5 & 6		Questions and Possibilities	VCCCTQ023	Identify and form links and patterns from multiple information sources to generate non-routine ideas and possibilities	1289
Capabilities	Critical and Creative Thinking	5 & 6		Reasoning	VCCCTR024	Investigate common reasoning errors including contradiction and inconsistency, and the influence of context	1291
Capabilities	Critical and Creative Thinking	5 & 6		Reasoning	VCCCTR025	Consider the importance of giving reasons and evidence and how the strength of these can be evaluated	1295
Capabilities	Critical and Creative Thinking	5 & 6		Reasoning	VCCCTR026	Consider when analogies might be used in expressing a point of view and how they should be expressed and evaluated	1298
Capabilities	Critical and Creative Thinking	5 & 6		Reasoning	VCCCTR027	Examine the difference between valid and sound arguments and between inductive and deductive reasoning, and their degrees of certainty	1302
Capabilities	Critical and Creative Thinking	5 & 6		Reasoning	VCCCTR028	Explore what a criterion is, different kinds of criteria, and how to select appropriate criteria for the purposes of filtering information and ideas	1305
Capabilities	Critical and Creative Thinking	5 & 6		Meta-Cognition	VCCCTM029	Investigate thinking processes using visual models and language strategies	1307
Capabilities	Critical and Creative Thinking	5 & 6		Meta-Cognition	VCCCTM030	Examine learning strategies, including constructing analogies, visualising ideas, summarising and paraphrasing information and reflect on the application of these strategies in different situations	1309
Capabilities	Critical and Creative Thinking	5 & 6		Meta-Cognition	VCCCTM031	Investigate how ideas and problems can be disaggregated into smaller elements or ideas, how criteria can be used to identify gaps in existing knowledge, and assess and test ideas and proposals	1311
Capabilities	Personal and Social Capability	5 & 6		Social Awareness and Management	VCPSCSO032	Identify the characteristics of an effective team and develop descriptions for particular roles including leadership, and describe both their own and their team's performance when undertaking various roles	1718
Science	Science	5 & 6		Science Understanding	VCSSU073	Scientific understandings, discoveries and inventions are used to inform personal and community decisions and to solve problems that directly affect people's lives	20565
Science	Science	5 & 6		Science Understanding	VCSSU076	Solids, liquids and gases behave in different ways and have observable properties that help to classify them	20573
Science	Science	5 & 6		Science Understanding	VCSSU081	Energy from a variety of sources can be used to generate electricity; electric circuits enable this energy to be transferred to another place and then to be transformed into another form of energy	20590
Science	Science	5 & 6		Science Inquiry Skills	VCSIS082	With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be based on previous experiences or general rules	20593
Science	Science	5 & 6		Science Inquiry Skills	VCSIS083	With guidance, plan appropriate investigation types to answer questions or solve problems and use equipment, technologies and materials safely, identifying potential risks	20597
Science	Science	5 & 6		Science Inquiry Skills	VCSIS084	Decide which variables should be changed, measured and controlled in fair tests and accurately observe, measure and record data	20600
Science	Science	5 & 6		Science Inquiry Skills	VCSIS085	Construct and use a range of representations, including tables and graphs, to record, represent and describe observations, patterns or relationships in data	20603
Science	Science	5 & 6		Science Inquiry Skills	VCSIS086	Compare data with predictions and use as evidence in developing explanations	20606
Science	Science	5 & 6		Science Inquiry Skills	VCSIS087	Suggest improvements to the methods used to investigate a question or solve a problem	20608
Science	Science	5 & 6		Science Inquiry Skills	VCSIS088	Communicate ideas and processes using evidence to develop explanations of events and phenomena and to identify simple cause-and-effect relationships	20611
Technologies	Design and Technologies	5 & 6		Technologies and Society	VCDSTS033	Investigate how people in design and technologies occupations address competing considerations, including sustainability, in the design of solutions for current and future use	20922

Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
Technologies	Design and Technologies	5 & 6		Technologies Contexts	VCDSTC034	Investigate how forces or electrical energy can control movement, sound or light in a designed product or system	20928
Technologies	Design and Technologies	5 & 6		Technologies Contexts	VCDSTC037	Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use	20946
Technologies	Design and Technologies	5 & 6		Creating Designed Solutions	VCDSCD038	Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions	20951
Technologies	Design and Technologies	5 & 6		Creating Designed Solutions	VCDSCD039	Generate, develop, communicate and document design ideas and processes for audiences using appropriate technical terms and graphical representation techniques	20956
Technologies	Design and Technologies	5 & 6		Creating Designed Solutions	VCDSCD040	Apply safe procedures when using a variety of materials, components, tools, equipment and techniques to produce designed solutions	20960
Technologies	Design and Technologies	5 & 6		Creating Designed Solutions	VCDSCD041	Negotiate criteria for success that include consideration of environmental and social sustainability to evaluate design ideas, processes and solutions	20965
Technologies	Design and Technologies	5 & 6		Creating Designed Solutions	VCDSCD042	Develop project plans that include consideration of resources when making designed solutions	20969
Technologies	Digital Technologies	5 & 6		Data and Information	VCDTDI028	Acquire, store and validate different types of data and use a range of software to interpret and visualise data to create information	21210
Technologies	Digital Technologies	5 & 6		Data and Information	VCDTDI029	Plan, create and communicate ideas, information and on-line collaborative projects, applying agreed ethical, social and technical protocols	21216
Technologies	Digital Technologies	5 & 6		Creating Digital Solutions	VCDTCD030	Define problems in terms of data and functional requirements, drawing on previously solved problems to identify similarities	21220
Technologies	Digital Technologies	5 & 6		Creating Digital Solutions	VCDTCD032	Design, modify and follow simple algorithms represented diagrammatically and in English, involving sequences of steps, branching, and iteration	21230
The Humanities	Economics and Business	5 & 6		Resource Allocation and Making Choices	VCEBR001	Describe the difference between needs and wants and explain why choices need to be made	5625
The Humanities	Economics and Business	5 & 6		Resource Allocation and Making Choices	VCEBR002	Explore the concept of opportunity cost and explain how it involves choices about the alternative use of limited resources and the need to consider trade-offs	5626
The Humanities	Economics and Business	5 & 6		Economic and Business Reasoning and Interpretation	VCEBE010	Make decisions, identify appropriate actions by considering the advantages and disadvantages, and form conclusions concerning an economics or business issue or event	5652
English	English	5	Reading and Viewing	Language	VCELA309	Understand how texts vary in purpose, structure and topic as well as the degree of formality	2563
English	English	5	Reading and Viewing	Language	VCELA310	Investigate how the organisation of texts into chapters, headings, subheadings, home pages and sub pages for on-line texts and according to chronology or topic can be used to predict content and assist navigation	2564
English	English	5	Reading and Viewing	Language	VCELA311	Explain sequences of images in print texts and compare these to the ways hyperlinked digital texts are organised, explaining their effect on viewers' interpretations	2566
English	English	5	Reading and Viewing	Literacy	VCELY317	Show how ideas and points of view in texts are conveyed through the use of vocabulary, including idiomatic expressions, objective and subjective language, and that these can change according to context	2577
English	English	5	Reading and Viewing	Literacy	VCELY319	Use comprehension strategies to analyse information, integrating and linking ideas from a variety of print and digital sources	2582
English	English	5	Writing	Literacy	VCELY330	Reread and edit own and others' work using agreed criteria for text structures and language features	2599
English	English	5	Writing	Literacy	VCELY332	Use a range of software including word processing programs to construct, edit and publish written text, and select, edit and place visual, print and audio elements	2601

Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
English	English	5	Speaking and Listening	Literacy	VCELY337	Clarify understanding of content as it unfolds in formal and informal situations, connecting ideas to students' own experiences, and present and justify a point of view or recount an experience using interaction skills	2607
English	English	5	Speaking and Listening	Literacy	VCELY338	Participate in informal debates and plan, rehearse and deliver presentations for defined audiences and purposes incorporating accurate and sequenced content and multi-modal elements	2608
Mathematics	Mathematics	5		Number and Algebra	VCMNA181	Identify and describe factors and multiples of whole numbers and use them to solve problems	20053
Mathematics	Mathematics	5		Number and Algebra	VCMNA182	Use estimation and rounding to check the reasonableness of answers to calculations	20055
Mathematics	Mathematics	5		Number and Algebra	VCMNA183	Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies	20058
Mathematics	Mathematics	5		Number and Algebra	VCMNA185	Use efficient mental and written strategies and apply appropriate digital technologies to solve problems	20063
Mathematics	Mathematics	5		Number and Algebra	VCMNA191	Create simple financial plans	20071
Mathematics	Mathematics	5		Measurement and Geometry	VCMMG195	Choose appropriate units of measurement for length, area, volume, capacity and mass	20077
Mathematics	Mathematics	5		Statistics and Probability	VCMSP205	Pose questions and collect categorical or numerical data by observation or survey	20096
Mathematics	Mathematics	5		Statistics and Probability	VCMSP206	Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies	20097
Mathematics	Mathematics	5		Statistics and Probability	VCMSP207	Describe and interpret different data sets in context	20098
English	English	6	Reading and Viewing	Language	VCELA340	Identify and explain how analytical images like figures, tables, diagrams, maps and graphs contribute to our understanding of verbal information in factual and persuasive texts	2612
English	English	6	Reading and Viewing	Literacy	VCELY346	Select, navigate and read increasingly complex texts for a range of purposes, applying appropriate text processing strategies to recall information and consolidate meaning	2621
English	English	6	Reading and Viewing	Literacy	VCELY347	Use comprehension strategies to interpret and analyse information and ideas, comparing content from a variety of textual sources including media and digital texts	2628
English	English	6	Writing	Language	VCELA350	Investigate how complex sentences can be used in a variety of ways to elaborate, extend and explain ideas	2636
English	English	6	Writing	Language	VCELA351	Understand how ideas can be expanded and sharpened through careful choice of verbs, elaborated tenses and a range of adverb groups/phrases	2641
English	English	6	Writing	Literacy	VCELY361	Use a range of software, including word processing programs, learning new functions as required to create texts	2655
English	English	6	Speaking and Listening	Literacy	VCELY366	Participate in and contribute to discussions, clarifying and interrogating ideas, developing and supporting arguments, sharing and evaluating information, experiences and opinions, and use interaction skills, varying conventions of spoken interactions according to group size, formality of interaction and needs and expertise of the audience	2664
English	English	6	Speaking and Listening	Literacy	VCELY367	Participate in formal and informal debates and plan, rehearse and deliver presentations, selecting and sequencing appropriate content and multi-modal elements for defined audiences and purposes, making appropriate choices for modality and emphasis	2665
Mathematics	Mathematics	6		Measurement and Geometry	VCMMG224	Solve problems involving the comparison of lengths and areas using appropriate units	20128
Mathematics	Mathematics	6		Measurement and Geometry	VCMMG225	Connect volume and capacity and their units of measurement	20129
Mathematics	Mathematics	6		Measurement and Geometry	VCMMG227	Measure, calculate and compare elapsed time	20134
Mathematics	Mathematics	6		Measurement and Geometry	VCMMG229	Investigate the effect of combinations of transformations on simple and composite shapes, including creating tessellations, with and without the use of digital technologies	20138

Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
Mathematics	Mathematics	6		Measurement and Geometry	VCMMG230	Introduce the Cartesian coordinate system using all four quadrants	20139
Mathematics	Mathematics	6		Measurement and Geometry	VCMMG231	Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles	20143
Mathematics	Mathematics	6		Statistics and Probability	VCMSP233	Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies	20145
Mathematics	Mathematics	6		Statistics and Probability	VCMSP235	Construct, interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables	20148
Mathematics	Mathematics	6		Statistics and Probability	VCMSP236	Interpret secondary data presented in digital media and elsewhere	20150
Mathematics	Mathematics	6		Statistics and Probability	VCMSP237	Pose and refine questions to collect categorical or numerical data by observation or survey	20151
Level 7 & 8							
Capabilities	Critical and Creative Thinking	7 & 8		Questions and Possibilities	VCCCTQ032	Consider how to approach and use questions that have different elements, including factual, temporal and conceptual elements	1314
Capabilities	Critical and Creative Thinking	7 & 8		Questions and Possibilities	VCCCTQ033	Suspend judgments temporarily and consider how preconceptions may limit ideas and alternatives	1319
Capabilities	Critical and Creative Thinking	7 & 8		Questions and Possibilities	VCCCTQ034	Synthesise information from multiple sources and use lateral thinking techniques to draw parallels between known and new solutions and ideas when creating original proposals and artifacts	1323
Capabilities	Critical and Creative Thinking	7 & 8		Reasoning	VCCCTR035	Examine common reasoning errors including circular arguments and cause and effect fallacies	1327
Capabilities	Critical and Creative Thinking	7 & 8		Reasoning	VCCCTR036	Investigate the difference between a description, an explanation and a correlation and skepticism about cause and effect	1329
Capabilities	Critical and Creative Thinking	7 & 8		Reasoning	VCCCTR037	Investigate when counter examples might be used in expressing a point of view	1331
Capabilities	Critical and Creative Thinking	7 & 8		Reasoning	VCCCTR038	Consider how to settle matters of fact and matters of value and the degree of confidence in the conclusions	1336
Capabilities	Critical and Creative Thinking	7 & 8		Reasoning	VCCCTR039	Examine how to select appropriate criteria and how criteria are used in clarifying and challenging arguments and ideas	1339
Capabilities	Critical and Creative Thinking	7 & 8		Meta-Cognition	VCCCTM040	Consider a range of strategies to represent ideas and explain and justify thinking processes to others	1341
Capabilities	Critical and Creative Thinking	7 & 8		Meta-Cognition	VCCCTM041	Examine a range of learning strategies and how to select strategies that best meet the requirements of a task	1343
Capabilities	Critical and Creative Thinking	7 & 8		Meta-Cognition	VCCCTM042	Consider how problems can be segmented into discrete stages, new knowledge synthesised during problem-solving and criteria used to assess emerging ideas and proposals	1346
Capabilities	Personal and Social Capability	7 & 8		Self-Awareness and Management	VCPSCSE035	Assess personal strengths using feedback from peers, teachers and others and prioritise areas for improvement	1727
Capabilities	Personal and Social Capability	7 & 8		Self-Awareness and Management	VCPSCSE036	Discuss the range of strategies that could be used to cope with difficult tasks or changing situations	1730
Capabilities	Personal and Social Capability	7 & 8		Self-Awareness and Management	VCPSCSE037	Reflect on their effectiveness in working independently by identifying enablers and barriers to achieving goals	1733
Capabilities	Personal and Social Capability	7 & 8		Social Awareness and Management	VCPSCSO041	Perform in a variety of team roles and accept responsibility as a team member and team leader, assessing how well they support other members of the team	1745
Capabilities	Personal and Social Capability	7 & 8		Social Awareness and Management	VCPSCSO042	Identify ways to be proactive in initiating strategies to prevent and/or accomplish positive resolutions to conflict	1748
Science	Science	7 & 8		Science Understanding	VCSSU096	The properties of the different states of matter can be explained in terms of the motion and arrangement of particles	20643
Science	Science	7 & 8		Science Understanding	VCSSU098	Chemical change involves substances reacting to form new substances	20649
Science	Science	7 & 8		Science Understanding	VCSSU103	Change to an object's motion is caused by unbalanced forces acting on the object; Earth's gravity pulls objects towards the centre of Earth	20664

Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
Science	Science	7 & 8		Science Understanding	VCSSU104	Energy appears in different forms including movement (kinetic energy), heat, light, chemical energy and potential energy; devices can change energy from one form to another	20668
Science	Science	7 & 8		Science Inquiry Skills	VCSIS107	Identify questions, problems and claims that can be investigated scientifically and make predictions based on scientific knowledge	20678
Science	Science	7 & 8		Science Inquiry Skills	VCSIS108	Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed	20681
Science	Science	7 & 8		Science Inquiry Skills	VCSIS109	In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task	20684
Science	Science	7 & 8		Science Inquiry Skills	VCSIS110	Construct and use a range of representations including graphs, keys and models to record and summarise data from students' own investigations and secondary sources, and to represent and analyse patterns and relationships	20687
Science	Science	7 & 8		Science Inquiry Skills	VCSIS111	Use scientific knowledge and findings from investigations to identify relationships, evaluate claims and draw conclusions	20689
Science	Science	7 & 8		Science Inquiry Skills	VCSIS112	Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method	20692
Science	Science	7 & 8		Science Inquiry Skills	VCSIS113	Communicate ideas, findings and solutions to problems including identifying impacts and limitations of conclusions and using appropriate scientific language and representations	20694
Technologies	Design and Technologies	7 & 8		Technologies and Society	VCDSTS043	Examine and prioritise competing factors including social, ethical, economic and sustainability considerations in the development of technologies and designed solutions to meet community needs for preferred futures	20974
Technologies	Design and Technologies	7 & 8		Technologies and Society	VCDSTS044	Investigate the ways in which designed solutions evolve locally, nationally, regionally and globally through the creativity, innovation and enterprise of individuals and groups	20980
Technologies	Design and Technologies	7 & 8		Technologies Contexts	VCDSTC045	Analyse how motion, force and energy are used to manipulate and control electromechanical systems when creating simple, engineered solutions	20986
Technologies	Design and Technologies	7 & 8		Technologies Contexts	VCDSTC048	Analyse ways to create designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment	21002
Technologies	Design and Technologies	7 & 8		Creating Designed Solutions	VCDSCD049	Critique needs or opportunities for designing and investigate, analyse and select from a range of materials, components, tools, equipment and processes to develop design ideas	21008
Technologies	Design and Technologies	7 & 8		Creating Designed Solutions	VCDSCD050	Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques	21014
Technologies	Design and Technologies	7 & 8		Creating Designed Solutions	VCDSCD051	Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions	21017
Technologies	Design and Technologies	7 & 8		Creating Designed Solutions	VCDSCD052	Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability	21020
Technologies	Design and Technologies	7 & 8		Creating Designed Solutions	VCDSCD053	Use project management processes to coordinate production of designed solutions	21024
Technologies	Digital Technologies	7 & 8		Data and Information	VCDTDI037	Acquire data from a range of sources and evaluate their authenticity, accuracy and timeliness	21255
Technologies	Digital Technologies	7 & 8		Data and Information	VCDTDI038	Analyse and visualise data using a range of software to create information, and use structured data to model objects or events	21261
Technologies	Digital Technologies	7 & 8		Data and Information	VCDTDI039	Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account	21266
Technologies	Digital Technologies	7 & 8		Creating Digital Solutions	VCDTCD040	Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints	21270
The Arts	Visual Communication Design	7 & 8		Explore and Represent Ideas	VCAVCDE001	Explore and apply methods, materials, media, design elements and design principles to create and present visual communications	1059

Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
The Arts	Visual Communication Design	7 & 8		Visual Communication Design Practices	VCAVCDV002	Use manual and digital drawing methods and conventions to create a range of visual communications	1064
The Arts	Visual Communication Design	7 & 8		Present and Perform	VCAVCDP003	Develop and present visual communications for different purposes, audiences and in response to specific needs	1069
English	English	7	Reading and Viewing	Language	VCELA368	Understand how language is used to evaluate texts and how evaluations about a text can be substantiated by reference to the text and other sources	2668
English	English	7	Reading and Viewing	Literacy	VCELY377	Use prior knowledge and text processing strategies to interpret a range of types of texts	2685
English	English	7	Reading and Viewing	Literacy	VCELY378	Use comprehension strategies to interpret, analyse and synthesise ideas and information, critiquing ideas and issues from a variety of textual sources	2686
English	English	7	Writing	Language	VCELA380	Understand that the coherence of more complex texts relies on devices that signal text structure and guide readers, for example overviews, initial and concluding paragraphs and topic sentences, indexes or site maps or breadcrumb trails for online texts	2689
English	English	7	Writing	Language	VCELA381	Understand the use of punctuation to support meaning in complex sentences with prepositional phrases and embedded clauses	2690
English	English	7	Writing	Language	VCELA382	Recognise and understand that subordinate clauses embedded within noun groups/phrases are a common feature of written sentence structures and increase the density of information	2691
English	English	7	Writing	Language	VCELA383	Understand how modality is achieved through discriminating choices in modal verbs, adverbs, adjectives and nouns	2692
English	English	7	Writing	Literacy	VCELY390	Use a range of software, including word processing programs, to create, edit and publish written and multi-modal texts	2705
English	English	7	Speaking and Listening	Literacy	VCELY396	Plan, rehearse and deliver presentations, selecting and sequencing appropriate content and multimodal elements to promote a point of view or enable a new way of seeing, using body language, voice qualities and other elements to add interest and meaning	2717
Mathematics	Mathematics	7		Number and Algebra	VCMNA248	Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies.	20168
Mathematics	Mathematics	7		Number and Algebra	VCMNA249	Recognise and solve problems involving simple ratios	20169
Mathematics	Mathematics	7		Number and Algebra	VCMNA250	Investigate and calculate 'best buys', with and without digital technologies	20170
Mathematics	Mathematics	7		Number and Algebra	VCMNA254	Design and implement mathematical algorithms using a simple general purpose programming language	20176
Mathematics	Mathematics	7		Number and Algebra	VCMNA255	Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point	20177
Mathematics	Mathematics	7		Number and Algebra	VCMNA257	Investigate, interpret and analyse graphs from real life data, including consideration of domain and range	20183
Mathematics	Mathematics	7		Measurement and Geometry	VCMMG260	Draw different views of prisms and solids formed from combinations of prisms	20189
Mathematics	Mathematics	7		Measurement and Geometry	VCMMG261	Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries	20191
Mathematics	Mathematics	7		Statistics and Probability	VCMSP268	Identify and investigate issues involving numerical data collected from primary and secondary sources	20202
Mathematics	Mathematics	7		Statistics and Probability	VCMSP269	Construct and compare a range of data displays including stem-and-leaf plots and dot plots	20204
Mathematics	Mathematics	7		Statistics and Probability	VCMSP270	Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data	20205
Mathematics	Mathematics	7		Statistics and Probability	VCMSP271	Describe and interpret data displays using median, mean and range	20207

Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
English	English	8	Reading and Viewing	Language	VCELA399	Understand how cohesion in texts is improved by strengthening the internal structure of paragraphs through the use of examples, quotations and substantiation of claims	2720
English	English	8	Reading and Viewing	Language	VCELA402	Investigate how visual and multimodal texts allude to or draw on other texts or images to enhance and layer meaning	2723
English	English	8	Writing	Literacy	VCELY421	Experiment with text structures and language features to refine and clarify ideas to improve the effectiveness of own texts	2762
English	English	8	Writing	Literacy	VCELY422	Use a range of software, including word processing programs, to create, edit and publish texts imaginatively	2763
English	English	8	Speaking and Listening	Literacy	VCELY427	Plan, rehearse and deliver presentations, selecting and sequencing appropriate content, including multimodal elements, to reflect a diversity of viewpoints, using voice and language conventions to suit different situations, modulating voice and incorporating elements for specific effects	2771
Mathematics	Mathematics	8		Measurement and Geometry	VCMMG286	Choose appropriate units of measurement for area and volume and convert from one unit to another	20235
Mathematics	Mathematics	8		Measurement and Geometry	VCMMG288	Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving determining radius, diameter, circumference and area from each other	20239
Mathematics	Mathematics	8		Statistics and Probability	VCMSP298	Explore the practicalities and implications of obtaining data through sampling using a variety of investigative processes	20258
Level 9 & 10							
Mathematics	Mathematics	9		Number and Algebra	VCMNA301	Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems	20262
Capabilities	Critical and Creative Thinking	9 & 10		Questions and Possibilities	VCCCTQ043	Investigate the characteristics of effective questions in different contexts to examine information and test possibilities	1349
Capabilities	Critical and Creative Thinking	9 & 10		Questions and Possibilities	VCCCTQ044	Suspend judgments to allow new possibilities to emerge and investigate how this can broaden ideas and solutions	1352
Capabilities	Critical and Creative Thinking	9 & 10		Questions and Possibilities	VCCCTQ045	Challenge previously held assumptions and create new links, proposals and artifacts by investigating ideas that provoke shifts in perspectives and cross boundaries to generate ideas and solutions	1356
Capabilities	Critical and Creative Thinking	9 & 10		Reasoning	VCCCTR046	Examine a range of rhetorical devices and reasoning errors, including false dichotomies and begging the question	1359
Capabilities	Critical and Creative Thinking	9 & 10		Reasoning	VCCCTR047	Examine how to identify and analyse suppressed premises and assumptions	1362
Capabilities	Critical and Creative Thinking	9 & 10		Reasoning	VCCCTR048	Investigate the nature and use of counter examples structured as arguments	1364
Capabilities	Critical and Creative Thinking	9 & 10		Reasoning	VCCCTR049	Consider ambiguity and equivocation and how they affect the strength of arguments	1367
Capabilities	Critical and Creative Thinking	9 & 10		Reasoning	VCCCTR050	Investigate use of additional or refined criteria when application of original criteria does not produce a clear conclusion	1370
Capabilities	Critical and Creative Thinking	9 & 10		Meta-Cognition	VCCCTM051	Critically examine their own and others thinking processes and discuss factors that influence thinking, including cognitive biases	1372
Capabilities	Critical and Creative Thinking	9 & 10		Meta-Cognition	VCCCTM052	Investigate how the use of a range of learning strategies can be monitored, evaluated and re-directed as necessary	1374
Capabilities	Critical and Creative Thinking	9 & 10		Meta-Cognition	VCCCTM053	Investigate the kind of criteria that can be used to rationally evaluate the quality of ideas and proposals, including the qualities of viability and workability	1378
Capabilities	Personal and Social Capability	9 & 10		Social Awareness and Management	VCPSCSO050	Evaluate own and others contribution to group tasks, critiquing roles including leadership and provide useful feedback to peers, evaluate task achievement and make recommendations for improvements in relation to team goals	1776
Science	Science	9 & 10		Science Understanding	VCSSU114	Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community	20698
Science	Science	9 & 10		Science Understanding	VCSSU115	Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries	20701

Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
Science	Science	9 & 10		Science Understanding	VCSSU133	The description and explanation of the motion of objects involves the interaction of forces and the exchange of energy and can be described and predicted using the laws of physics	20762
Science	Science	9 & 10		Science Inquiry Skills	VCSIS134	Formulate questions or hypotheses that can be investigated scientifically, including identification of independent, dependent and controlled variables	20765
Science	Science	9 & 10		Science Inquiry Skills	VCSIS135	Independently plan, select and use appropriate investigation types, including fieldwork and laboratory experimentation, to collect reliable data, assess risk and address ethical issues associated with these investigation types	20770
Science	Science	9 & 10		Science Inquiry Skills	VCSIS136	Select and use appropriate equipment and technologies to systematically collect and record accurate and reliable data, and use repeat trials to improve accuracy, precision and reliability	20773
Science	Science	9 & 10		Science Inquiry Skills	VCSIS137	Construct and use a range of representations, including graphs, keys, models and formulas, to record and summarise data from students' own investigations and secondary sources, to represent qualitative and quantitative patterns or relationships, and distinguish between discrete and continuous data	20775
Science	Science	9 & 10		Science Inquiry Skills	VCSIS138	Analyse patterns and trends in data, including describing relationships between variables, identifying inconsistencies in data and sources of uncertainty, and drawing conclusions that are consistent with evidence	20777
Science	Science	9 & 10		Science Inquiry Skills	VCSIS139	Use knowledge of scientific concepts to evaluate investigation conclusions, including assessing the approaches used to solve problems, critically analysing the validity of information obtained from primary and secondary sources, suggesting possible alternative explanations and describing specific ways to improve the quality of data	20781
Science	Science	9 & 10		Science Inquiry Skills	VCSIS140	Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations	20784
Technologies	Design and Technologies	9 & 10		Technologies and Society	VCDSTS054	Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved	21029
Technologies	Design and Technologies	9 & 10		Technologies and Society	VCDSTS055	Explain how designed solutions evolve with consideration of preferred futures and the impact of emerging technologies on design decisions	21035
Technologies	Design and Technologies	9 & 10		Technologies Contexts	VCDSTC056	Investigate and make judgments on how the characteristics and properties of materials are combined with force, motion and energy to create engineered solutions	21040
Technologies	Design and Technologies	9 & 10		Technologies Contexts	VCDSTC059	Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions	21054
Technologies	Design and Technologies	9 & 10		Creating Designed Solutions	VCDSCD060	Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas	21059
Technologies	Design and Technologies	9 & 10		Creating Designed Solutions	VCDSCD061	Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication	21065
Technologies	Design and Technologies	9 & 10		Creating Designed Solutions	VCDSCD062	Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions	21070
Technologies	Design and Technologies	9 & 10		Creating Designed Solutions	VCDSCD063	Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability	21075
Technologies	Design and Technologies	9 & 10		Creating Designed Solutions	VCDSCD064	Develop project plans to plan and manage projects individually and collaboratively taking into consideration time, cost, risk and production processes	21080
Technologies	Digital Technologies	9 & 10		Data and Information	VCDTDI048	Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data	21309
Technologies	Digital Technologies	9 & 10		Creating Digital Solutions	VCDTCD050	Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs	21319

Area	Discipline	Level	Mode	Strand	CD Code	Content Description	Ord'ing
The Arts	Visual Communication Design	9 & 10		Explore and Represent Ideas	VCAVCDE006	Develop and present visual communications that demonstrate the application of methods, materials, media, design elements and design principles that meet the requirements of a specific brief and target audience	1082
The Arts	Visual Communication Design	9 & 10		Explore and Represent Ideas	VCAVCDE007	Generate, develop and refine visual communication presentations in response to the brief	1087
The Arts	Visual Communication Design	9 & 10		Visual Communication Design Practices	VCAVCDV008	Use manual and digital drawing methods to create visual communications in the specific design fields of Environmental, Industrial and Communication Design	1094
The Arts	Visual Communication Design	9 & 10		Present and Perform	VCAVCDP009	Develop a brief that identifies a specific audience and needs, and present visual communications that meet the brief	1100
English	English	9	Speaking and Listening	Literacy	VCELY456	Plan, rehearse and deliver presentations, selecting and sequencing appropriate content and multi-modal elements for aesthetic and playful purposes	2826
English	English	10	Reading and Viewing	Language	VCELA459	Evaluate the impact on audiences of different choices in the representation of still and moving images	2831
English	English	10	Reading and Viewing	Literature	VCELT461	Analyse and explain how text structures, language features and visual features of texts and the context in which texts are experienced may influence audience response	2835
English	English	10	Writing	Language	VCELA470	Understand how paragraphs and images can be arranged for different purposes, audiences, perspectives and stylistic effects	2850
English	English	10	Writing	Language	VCELA471	Understand conventions for citing others, and how to reference these in different ways	2851
English	English	10	Writing	Literacy	VCELY479	Create sustained texts, including texts that combine specific digital or media content, for imaginative, informative, or persuasive purposes that reflect upon challenging and complex issues	2869
English	English	10	Writing	Literacy	VCELY480	Review, edit and refine own and others' texts for control of content, organisation, sentence structure, vocabulary, and/or visual features to achieve particular purposes and effects	2870
English	English	10	Writing	Literacy	VCELY481	Use a range of software, including word processing programs, confidently, flexibly and imaginatively to create, edit and publish texts, considering the identified purpose and the characteristics of the user	2871
English	English	10	Speaking and Listening	Literacy	VCELY486	Plan, rehearse and deliver presentations, selecting and sequencing appropriate content and multimodal elements to influence a course of action, speaking clearly and using logic, imagery and rhetorical devices in order to engage audiences	2889

STEM education is not about "what you learn"... it's not about "more maths", "more science", "more coding" or "more anything".

STEM is about "what you do with what you learn"... it's about moving away from a siloed education system and aligning educational outcomes with the requirements of industry based on a foundation of Life-Long Learning, Analytical Problem Solving and Communication. It's about a networked cross-curricular collaborative learning environment.

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