

Curriculum Area / Strand	Sub Strand	ACARA Content Descriptors
Science as a Human Endeavour	Nature and development of science	Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions - ACSHE098
	Use and influence of science	Scientific knowledge is used to solve problems and inform personal and community decisions – ACSHE100
Science Inquiry Skills	Questioning and predicting	With guidance, pose clarifying questions and make predictions about scientific investigations – ACSIS232
	Planning and conducting	Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks – ACSIS103
		Decide variables to be changed and measured in fair tests, and observe measure and record data with accuracy using digital technologies as appropriate – ACSIS104
	Processing and analysing data and information	Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate – ACSIS107
		Compare data with predictions and use as evidence in developing explanations – ACSIS221
	Evaluating	Reflect on and suggest improvements to scientific investigations – ACSIS108
Communication	Communicating	Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts – ACSIS110
Measurement and Geometry	Using units of measurement	Solve problems involving the comparison of lengths and areas using appropriate units – ACMMG137
Statistics and Probability	Data representation and interpretation	Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables – ACMSP147
Design and Technologies	Knowledge and Understanding	Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use – ACTDEK019
		Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use – ACTDEK023
Design and Technologies	Process and Production Skills	Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions – ACTDEK024

		Generate, develop and communicate design ideas and processes for audiences using appropriate technical terms and graphical representation techniques – ACTDEK025
		Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions – ACTDEK026
		Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions – ACTDEK027
		Develop project plans that include consideration of resources when making designed solutions individually and collaboratively – ACTDEK028

## GENERAL CAPABILITIES

Numeracy	Estimating and calculating with whole numbers	<p>This element involves students using numbers for different purposes. Students apply skills in estimating and calculating with whole numbers to solve and model everyday problems in a wide range of authentic contexts using efficient mental, written and digital strategies. They identify situations where money is used and apply their knowledge of the value of money to purchasing, budgeting and justifying the use of money. In developing and acting with numeracy, students:</p> <ul style="list-style-type: none"> <li>• understand and use numbers in context</li> <li>• estimate and calculate</li> </ul>
	Recognising and using patterns and relationships	<p>This element involves students identifying trends and describing and using a wide range of rules and relationships to continue and predict patterns. Students apply their understanding of patterns and relationships when solving problems in authentic contexts.</p>
	Using fractions, decimals, percentages, ratios and rates	<p>This element involves students developing an understanding of the meaning of fractions and decimals, their representations as percentages, ratios and rates, and how they can be applied in real-life situations. Students visualise, order and describe shapes and objects using their proportions and the relationships of percentages, ratios and rates to solve problems in authentic contexts. In developing and acting with numeracy, students:</p> <p>interpret proportional reasoning apply proportional reasoning.</p>
	Using spatial reasoning	<p>This element involves students making sense of the space around them. Students visualise, identify and sort shapes and objects, describing their key features in the environment. They use symmetry, shapes and angles to solve problems in authentic contexts and</p>

		<p>interpret maps and diagrams, using scales, legends and directional language to identify and describe routes and locations. In developing and acting with numeracy, students:</p> <p>visualise 2D shapes and 3D objects</p> <p>interpret maps and diagrams</p>
	Interpreting statistical information	<p>This element involves students gaining familiarity with the way statistical information is represented.</p> <p>Students solve problems in authentic contexts that involve collecting, recording, displaying, comparing and evaluating the effectiveness of data displays of various types. They use appropriate language and numerical representations when explaining the outcomes of chance events. In developing and acting with numeracy, students:</p> <p>interpret data displays</p> <p>interpret chance events</p>
	Using measurement	<p>This element involves students learning about measurement of length, area, volume, capacity, time and mass.</p> <p>Students estimate, measure, compare and calculate using metric units when solving problems in authentic contexts. They read clocks and convert between time systems, identify and sequence dates and events using a calendar and use timetables for a variety of purposes. In developing and acting with numeracy, students:</p> <p>estimate and measure with metric units</p>
	Science	<p>These include practical measurement and the collection, representation and interpretation of data from investigations.</p> <p>Students are introduced to measurement, first using informal units then formal units. Later, they consider issues of uncertainty and reliability in measurement. As students progress, they collect qualitative and quantitative data, which are analysed and represented in graphical forms. Students learn data analysis skills, including identifying trends and patterns from numerical data and graphs. In later years, numeracy demands include the statistical analysis of data, including issues relating to accuracy and validity, and the use of mathematical relationships to calculate and predict values and the use of mathematical tools to provide evidence in support of hypotheses or positions.</p>
	Mathematics	<p>Mathematics has a central role in the development of numeracy in a manner that is more explicit and foregrounded than is the case in other learning areas. It is important that the mathematics curriculum provides the opportunity to apply mathematical understanding and skills in context, in other learning areas and in real-world contexts. A particularly important context for the application of Number and Algebra is financial mathematics. In Measurement and Geometry, there is an opportunity to apply understanding to design. The twenty-first-century world is information driven, and through Statistics and Probability students can interpret data and make informed judgements about events involving chance.</p>

Critical and Creative Thinking	Inquiring – identifying, exploring and organising information and ideas	<p>This element involves students developing inquiry skills. Students pose questions and identify and clarify information and ideas, and then organise and process information. They use questioning to investigate and analyse ideas and issues, make sense of and assess information and ideas, and collect, compare and evaluate information from a range of sources. In developing and acting with critical and creative thinking, students:</p> <p>pose questions identify and clarify information and ideas organise and process information.</p>
	Generating ideas, possibilities and actions	<p>This element involves students creating ideas and actions, and considering and expanding on known actions and ideas. Students imagine possibilities and connect ideas through considering alternatives, seeking solutions and putting ideas into action. They explore situations and generate alternatives to guide actions and experiment with and assess options and actions when seeking solutions. In developing and acting with critical and creative thinking, students:</p> <p>imagine possibilities and connect ideas consider alternatives seek solutions and put ideas into action.</p>
	Reflecting on thinking and processes	<p>This element involves students reflecting on, adjusting and explaining their thinking and identifying the thinking behind choices, strategies and actions taken. Students think about thinking (metacognition), reflect on actions and processes, and transfer knowledge into new contexts to create alternatives or open up possibilities. They apply knowledge gained in one context to clarify another. In developing and acting with critical and creative thinking, students:</p> <p>think about thinking (metacognition) reflect on processes transfer knowledge into new contexts.</p>
	Analysing, synthesising and evaluating reasoning and procedures	<p>This element involves students analysing, synthesising and evaluating the reasoning and procedures used to find solutions, evaluate and justify results or inform courses of action. Students identify, consider and assess the logic and reasoning behind choices. They differentiate components of decisions made and actions taken and assess ideas, methods and outcomes against criteria. In developing and acting with critical and creative thinking, students:</p> <p>apply logic and reasoning draw conclusions and design a course of action evaluate procedures and outcomes.</p>
	Critical and Creative Thinking in the Learning Areas	<p>The imparting of knowledge (content) and the development of thinking skills are accepted today as primary purposes of education. The explicit teaching and embedding of critical and creative thinking throughout the learning areas encourages students to engage in higher order thinking. By using logic and imagination, and by reflecting on how they best tackle issues, tasks and</p>

challenges, students are increasingly able to select from a range of thinking strategies and use them selectively and spontaneously in an increasing range of learning contexts.

Activities that foster critical and creative thinking should include both independent and collaborative tasks, and entail some sort of transition or tension between ways of thinking. They should be challenging and engaging, and contain approaches that are within the ability range of the learners, but also challenge them to think logically, reason, be open-minded, seek alternatives, tolerate ambiguity, inquire into possibilities, be innovative risk-takers and use their imagination.

Critical and creative thinking can be encouraged simultaneously through activities that integrate reason, logic, imagination and innovation; for example, focusing on a topic in a logical, analytical way for some time, sorting out conflicting claims, weighing evidence, thinking through possible solutions, and then, following reflection and perhaps a burst of creative energy, coming up with innovative and considered responses. Critical and creative thinking are communicative processes that develop flexibility and precision. Communication is integral to each of the thinking processes. By sharing thinking, visualisation and innovation, and by giving and receiving effective feedback, students learn to value the diversity of learning and communication styles.

#### Mathematics

In the Australian Curriculum: Mathematics, students develop critical and creative thinking as they learn to generate and evaluate knowledge, ideas and possibilities, and use them when seeking solutions. Engaging students in reasoning and thinking about solutions to problems and the strategies needed to find these solutions are core parts of the Australian Curriculum:

#### Mathematics.

Students are encouraged to be critical thinkers when justifying their choice of a calculation strategy or identifying relevant questions during a statistical investigation. They are encouraged to look for alternative ways to approach mathematical problems; for example, identifying when a problem is similar to a previous one, drawing diagrams or simplifying a problem to control some variables.

#### Science

Science, students develop capability in critical and creative thinking as they learn to generate and evaluate knowledge, ideas and possibilities, and use them when seeking new pathways or solutions. In the science learning area, critical and creative thinking are embedded in the skills of posing questions, making predictions, speculating, solving problems through investigation, making evidence-based decisions, and analysing and evaluating evidence. Students develop understandings of concepts through active inquiry that involves planning and selecting

		<p>appropriate information, evaluating sources of information to formulate conclusions and to critically reflect on their own and the collective process.</p> <p>Creative thinking enables the development of ideas that are new to the individual, and this is intrinsic to the development of scientific understanding. Scientific inquiry promotes critical and creative thinking by encouraging flexibility and open-mindedness as students speculate about their observations of the world and the ability to use and design new processes to achieve this. Students' conceptual understanding becomes more sophisticated as they actively acquire an increasingly scientific view of their world and the ability to examine it from new perspectives.</p>
Personal and Social Capability	Social awareness	<p>This element involves students recognising others' feelings and knowing how and when to assist others.</p> <p>Students learn to show respect for and understand others' perspectives, emotional states and needs. They learn to participate in positive, safe and respectful relationships, defining and accepting individual and group roles and responsibilities. Students gain an understanding of the role of advocacy in contemporary society and build their capacity to critique societal constructs and forms of discrimination, such as racism and sexism. In developing and acting with personal and social capability, students:</p> <ul style="list-style-type: none"> <li>appreciate diverse perspectives</li> <li>contribute to civil society</li> <li>understand relationships.</li> </ul>
	Social management	<p>This element involves students interacting effectively and respectfully with a range of adults and peers.</p> <p>Students learn to negotiate and communicate effectively with others; work in teams, positively contribute to groups and collaboratively make decisions; resolve conflict and reach positive outcomes. They develop the ability to initiate and manage successful personal relationships, and participate in a range of social and communal activities. Social management involves building skills associated with leadership, such as mentoring and role modelling. In developing and acting with personal and social capability, students:</p> <ul style="list-style-type: none"> <li>communicate effectively</li> <li>work collaboratively</li> <li>make decisions</li> <li>negotiate and resolve conflict</li> <li>develop leadership skills.</li> </ul>
	Personal and Social Capability in the learning areas	<p>Personal and social capability skills are addressed in all learning areas and at every stage of a student's schooling. This enables teachers to plan for the teaching of targeted skills specific to an individual's learning needs to provide access to and engagement with the learning areas. However, some of the skills and practices implicit in the development of the capability may be</p>

	<p>most explicitly addressed in specific learning areas, such as in the Australian Curriculum: Health and Physical Education. Teachers can also use the Personal and Social Capability learning continuum to plan for the teaching of targeted skills specific to an individual's learning needs.</p> <p>The learning area or subject with the highest proportion of content descriptions tagged with Personal and Social Capability is placed first in the list.</p> <p>Science</p> <p>In the Australian Curriculum: Science, students develop personal and social capability as they engage in science inquiry, learn how scientific knowledge informs and is applied in their daily lives, and explore how scientific debate provides a means of contributing to their communities. This includes developing skills in communication, initiative taking, goal setting, interacting with others and decision-making, and the capacity to work independently and collaboratively.</p> <p>The Science learning area enhances personal and social capability by expanding students' capacity to question, solve problems, explore and display curiosity. Students use their scientific knowledge to make informed choices about issues that impact their lives such as health and nutrition and environmental change, and consider the application of science to meet a range of personal and social needs.</p> <p>Mathematics</p> <p>In the Australian Curriculum: Mathematics, students develop and use personal and social capability as they apply mathematical skills in a range of personal and social contexts. This may be through activities that relate learning to their own lives and communities, such as time management, budgeting and financial management, and understanding statistics in everyday contexts.</p> <p>The Australian Curriculum: Mathematics enhances the development of students' personal and social capabilities by providing opportunities for initiative taking, decision-making, communicating their processes and findings, and working independently and collaboratively in the mathematics classroom.</p>
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