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Accreditation Period **2023–2027**

Victorian Pathways Certificate

**NUMERACY**

CURRICULUM DESIGN

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Contents

[Important information 5](#_Toc88147537)

[Accreditation period 5](#_Toc88147538)

[Other sources of information 5](#_Toc88147539)

[Providers 5](#_Toc88147540)

[Copyright 5](#_Toc88147541)

[Introduction 6](#_Toc88147542)

[Scope of study 6](#_Toc88147543)

[Rationale 6](#_Toc88147544)

[Underpinned by applied learning 7](#_Toc88147545)

[Approaches to applied learning 8](#_Toc88147546)

[Aims 10](#_Toc88147547)

[Structure 10](#_Toc88147548)

[Entry 11](#_Toc88147549)

[Duration 11](#_Toc88147550)

[Changes to the curriculum 12](#_Toc88147551)

[Monitoring for quality 12](#_Toc88147552)

[Safety and wellbeing 12](#_Toc88147553)

[Employability skills 12](#_Toc88147554)

[Legislative compliance 12](#_Toc88147555)

[Child Safe Standards 12](#_Toc88147556)

[Assessment and reporting 13](#_Toc88147557)

[Satisfactory completion 13](#_Toc88147558)

[Assessment 13](#_Toc88147559)

[Authentication 14](#_Toc88147560)

[Units 1 and 2 15](#_Toc88147561)

[Learning requirements 15](#_Toc88147562)

[Numeracy in context 16](#_Toc88147563)

[Problem-solving cycle 16](#_Toc88147564)

[Problem-solving learning requirement 17](#_Toc88147565)

[a) Identify the mathematics 18](#_Toc88147566)

[b) Act on and use mathematics 18](#_Toc88147567)

[c) Evaluate and reflect 19](#_Toc88147568)

[d) Communicate and report 19](#_Toc88147569)

[Mathematical toolkit 20](#_Toc88147570)

[Focus areas 20](#_Toc88147571)

[Unit 1 21](#_Toc88147572)

[Module 1: Personal numeracy 21](#_Toc88147573)

[Focus area: Location 21](#_Toc88147574)

[Learning goal 21](#_Toc88147575)

[Application 21](#_Toc88147576)

[Focus area: Systematics 22](#_Toc88147577)

[Learning goal 22](#_Toc88147578)

[Application 22](#_Toc88147579)

[Module 2: Financial numeracy 22](#_Toc88147580)

[Focus area: Number 23](#_Toc88147581)

[Learning goal 23](#_Toc88147582)

[Application 23](#_Toc88147583)

[Focus area: Change 23](#_Toc88147584)

[Learning goal 23](#_Toc88147585)

[Application 23](#_Toc88147586)

[Unit 2 24](#_Toc88147587)

[Module 3: Health and recreational numeracy 24](#_Toc88147588)

[Focus area: Shape 24](#_Toc88147589)

[Learning goal 24](#_Toc88147590)

[Application 24](#_Toc88147591)

[Focus area: Quantity and measures 24](#_Toc88147592)

[Learning goal 25](#_Toc88147593)

[Application 25](#_Toc88147594)

[Module 4: Civic numeracy 25](#_Toc88147595)

[Focus area: Data 25](#_Toc88147596)

[Learning goal 25](#_Toc88147597)

[Application 25](#_Toc88147598)

[Focus area: Likelihood 26](#_Toc88147599)

[Learning goal 26](#_Toc88147600)

[Application 26](#_Toc88147601)

[Assessment 27](#_Toc88147602)

Important information

Accreditation period

1 January 2023–31 December 2027

Implementation of this study commences in 2027.

Other sources of information

The [*VCAA Bulletin*](https://www.vcaa.vic.edu.au/news-and-events/bulletins-and-updates/bulletin/Pages/index.aspx) is the only official source of changes to regulations and accredited studies. The *Bulletin* regularly includes advice on Victorian Pathways Certificate (VPC) studies. It is the responsibility of each teacher to refer to each issue of the *Bulletin*. The *Bulletin* is available as an e-newsletter via free subscription on the VCAA’s website at: [www.vcaa.vic.edu.au](https://www.vcaa.vic.edu.au/Pages/HomePage.aspx).

To assist teachers in developing courses, the VCAA publishes an online companion document to the curriculum called *VPC* *Numeracy Support material*:

* curriculum development and assessment advice
* examples of teaching and learning activities
* lists of resources
* advice on how to deliver the VCE Vocational Major and VPC in the same classroom
* advice on how to integrate other VPC units with the Literacy units
* advice on teaching students with additional needs, including adjustment advice for students with disabilities.

The [*VPC Administrative Handbook*](https://www.vcaa.vic.edu.au/administration/vce-vcal-handbook/Pages/index.aspx) contains essential information on assessment processes and other procedures.

Providers

Throughout this curriculum design the term ‘school’ is intended to include both schools and non-school providers.

Copyright

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Introduction

Scope of study

The purpose of this study is to enable students to develop their everyday numeracy practices to make sense of their personal, public, and future vocational lives. Students develop foundational mathematical skills with consideration of their personal, home, vocational and community environments and contexts, and an awareness and use of accessible and appropriate technologies.

This study focuses on providing students with the fundamental mathematical knowledge, skills, understandings and dispositions to solve problems in real life contexts for a range of workplace, personal, further learning and community settings relevant to contemporary society. The numeracies will be situated in accessible, concrete and highly familiar contexts where the mathematics content is explicit with little or no text or distracting information.

The contexts are the starting point and the focus and are framed in terms of personal, financial, civic, and health and recreational classifications. The numeracies are introduced using a problem-solving cycle with four components:

* identifying the mathematics
* acting on and using mathematics
* evaluating and reflecting
* communicating and reporting.

The mathematics includes foundational skills related to measurement, shape, numbers, and graphs applied to tasks that are part of the students’ everyday lives. At the end of the two units, students should be able to attempt structured and supported activities and tasks that require simple processes such as counting, sorting, comparing and performing basic arithmetic operations with whole numbers and common, simple fractions and decimals, money, or recognising common spatial representations and measurements in highly familiar contexts.

Rationale

Numeracy empowers students to use mathematics to make sense of the world and apply mathematics in a context for work, citizenship, personal or social purpose. Numeracy gives meaning to mathematics, and mathematics is the tool (the knowledge and skills) to be used efficiently and critically. Numeracy involves the use and application of a range of mathematical skills and knowledge which arise in a range of different contexts and situations.

Numeracy enables students to develop logical thinking and reasoning strategies in their everyday activities. It develops students’ problem-solving skills, allows them to make sense of numbers, time, patterns and shapes for everyday activities like cooking, gardening, sport and travel. Through numeracy, students understand the mathematical requirements for personal organisation matters involving money, time and travel. They can then apply these skills to their everyday lives to recognise monetary value, understand scheduling and timetabling, direction, planning, monetary risk and reward.

Technology is an integral part of everyday and working life in Australia. Handheld devices like tablets are used for common daily uses: connectivity, communication, sourcing information, and as a tool for carrying out a myriad of functions. Software applications are available on a range of devices. There is an expectation that our students are ready with these skills when they transition to independent living, further study or to work. The integration of digital technologies in the learning of mathematical processes is essential and is embedded throughout this study.

Underpinned by applied learning

Victorian Pathways Certificate Numeracy is framed around an applied learning approach to teaching ensuring that every student feels empowered to make informed choices about the next stages of their lives through experiential learning and authentic learning experiences.

Applied learning incorporates the teaching of skills and knowledge in the context of ‘real life’ experiences. Students apply what they have learnt by doing, experiencing and relating acquired skills to the real-world. Applied learning teaching and practice ensures that what is learnt in the classroom is connected to scenarios and experiences outside the classroom and makes that connection as immediate and transparent as possible.

Applied learning is about nurturing and working with a student in a holistic manner, taking into account their personal strengths, interests, goals, previous experiences and to ensure a flexible and independent approach to learning. Applied learning emphasises skills and knowledge that may not normally be the focus of more traditional school curricula. It also recognises individual differences in ways of learning and post-educational experiences. Real-life application often requires a shift from a traditional focus on discrete curriculum to a more integrated and contextualised approach to learning, as students learn and apply the skills and knowledge required to solve problems, implement projects or participate in the workforce.

The Victorian Pathways Certificate acknowledges that part of the transition from school to further education, training and employment is the ability to participate and function in society as an adult. Moving students out of the classroom to learn allows them to make the shift to become more independent and responsible for their own learning and increase their intrinsic motivation. Best practice applied learning programs are flexible and student-centred, where learning goals and outcomes are individually designed and negotiated with students.

Applied learning can also involve students and their teachers working in partnership with external organisations to access VET and to work in integrated learning placements. These partnerships provide the necessary contexts for students to demonstrate the relevance of the skills and knowledge they have acquired in their study and training.

Approaches to applied learning

This Numeracy curriculum design is framed around an applied learning approach to teaching this study. Applied learning principles and practices are embodied in the following five categories.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Motivation to engage in learning | Applied learning practices | Student agency in learning | A student-centred and flexible approach | Assessment practices which promote success |
| * Ensure what is learnt in the classroom is connected to scenarios and experiences outside the classroom and makes that connection as immediate and transparent as possible * Engage students in demonstrations, activities, investigations and problem-solving in the classroom, community, workplace and other educational settings * Undertake activities that challenge the student’s level of competence and support them to succeed and build self-efficacy. | * Ensure students apply what they have learnt by doing, experiencing, reflecting and relating new knowledge and skills to the real-world * Use authentic bespoke materials and resources rather than textbooks or manufactured materials * Utilise the experience and knowledge of community members including employers, cultural and community leaders and former students * Ensure learning reflects the integration that occurs in real-life tasks. - include skills and knowledge relevant to the whole task and the whole person such as collaboration, communication, problem solving and interpersonal skills * Present learning activities in different modalities – visual, auditory and kinesthetic, to allow the greatest uptake of knowledge * Explicitly teach the technical language of the content that can be applied by students in talking, reading, writing and listening, using authentic examples. | * Engage in a dialogue with students about the curriculum and how they can make connections * Ensure students are moving to equal partners in determining the learning process as they develop greater independence and responsibility for their own learning * Encourage students to collaborate with peers and identify and utilize individual and group strengths and reflect on each stage of their learning journey * Share knowledge – recognising the intellectual, cultural and practical knowledge students bring to the learning environment. * Value students’ own approaches to the study including effective use of supporting technologies * Support students to learn through interaction and cooperation – via discussion, asking questions, giving explanations and presentations, and working cooperatively in pairs or small groups. | * Understand the student’s knowledge and skills prior to commencing the study and use this as the starting point for their learning * Understand and encourage a student’s personal, education and pathway goals * Consider the whole person and celebrating successes and connections to build resilience, confidence and self-worth * Build on the positive strengths of each student – learning strengths, character strengths * Teach concepts in contexts relevant to the students’ backgrounds, interests and experiences * Facilitate mutually beneficial relationships with a range of local communities while raising awareness about social and community issues and practices that influence and impact on students’ lives and futures. | * Use the assessment method that best fits the content and context and allows for incremental indications of success * Afford students multiple opportunities for success and assessment. |

Aims

This study enables students to:

* develop their everyday numeracy practices to make sense of their personal, public and future vocational lives
* develop foundational mathematical skills with consideration of their personal, home, vocational and community environments and contexts, and an awareness and use of accessible and appropriate technologies.

Structure

This study is made up of two units and each unit contains two modules. The learning goal of each module describes the intended learning outcome. The approach to achieving the learning outcome is centred on applied learning principles and is detailed through the application of key knowledge and skills.  
The units have been designed as standalone and can be completed in any order. Each module is based on different numeracies that form the context for the overarching learning intentions.

Each numeracy includes two focus areas that describe the spread of mathematical content knowledge that is required to engage with that specific numeracy. Each focus area includes a learning goal and associated applications.

A glossary defining numerical and mathematical terms and notations used in this study design will be included in the companion Support materials.

This Numeracy study design is designed around four complementary and essential components:

1. The **Modules** are framed around **working mathematically across four numeracy contexts**:
2. Personal numeracy
3. Financial numeracy
4. Health and Recreational numeracy
5. Civic numeracy.
6. A **four-stage problem-solving cycle** that underpins the capabilities required to solve a mathematical problem embedded in the real-world.
7. The development and use of a technical **Mathematical toolkit** to use as they undertake their numeracy activities and tasks. Students should be able to confidently use multiple mathematical tools, both analogue and digital/technological.
8. **Eight Focus Areas** name and describe a range of different mathematical knowledge and skills that are expected to be used and applied across the units and modules.

Diagram, timeline

Description automatically generatedThe structure is illustrated by this diagram.

The structure of Victorian Pathways Numeracy is further explained by the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Module** | **Numeracy** | **Focus Area** | **Problem-Solving Cycle** | **Mathematical Toolkit** |
| UNIT 1 | | | | |
| Module 1 | Personal numeracy | * Location * Systematics | ü | ü |
| Module 2 | Financial numeracy | * Number * Change | ü | ü |
| UNIT 2 | | | | |
| Module 3 | Health and recreational numeracy | * Shape * Quantity and measures | ü | ü |
| Module 4 | Civic numeracy | * Data * Likelihood | ü | ü |

Entry

There are no prerequisites for entry into any of the units in this course.

Duration

Each unit requires 100 nominal hours, of which at least 50 hours are scheduled classroom instruction. The VPC is designed to be delivered flexibly to suit the needs and circumstance of individual students.

Changes to the curriculum

During its period of accreditation minor changes to the study will be announced in the [*VCAA Bulletin*](https://www.vcaa.vic.edu.au/news-and-events/bulletins-and-updates/bulletin/Pages/index.aspx). The *Bulletin* is the only source of changes to regulations and accredited studies. It is the responsibility of each teacher to monitor changes or advice about studies published in the *Bulletin*.

Monitoring for quality

The VCAA will conduct monitoring and quality assurance processes on an annual basis.

Safety and wellbeing

It is the responsibility of the school to ensure that duty of care is exercised in relation to the health and safety of all students undertaking the study.

Employability skills

This study offers a number of opportunities for students to develop employability skills. The Support materialscompanion document will provide specific examples of how students can develop employability skills during learning activities and assessment tasks.

Legislative compliance

When collecting and using information, the provisions of privacy and copyright legislation, such as the Victorian *Privacy and Data Protection Act 2014* and *Health Records Act 2001*, and the federal *Privacy Act 1988* and *Copyright Act 1968*, must be met.

Child Safe Standards

Schools and education and training providers are required to comply with the Child Safe Standards made under the *Child Wellbeing and Safety Act 2005* (Vic). Registered schools are required to comply with *Ministerial Order No. 870 Child Safe Standards – Managing the Risk of Child Abuse in Schools*. For further information, consult the websites of the [Victorian Registration and Qualifications Authority](https://www.vrqa.vic.gov.au/childsafe/Pages/Home.aspx), the [Commission for Children and Young People](https://ccyp.vic.gov.au/) and the [Department of Education and Training](https://www2.education.vic.gov.au/pal/child-safe-standards/policy).

Assessment and reporting

Satisfactory completion

The award of satisfactory completion for a module is based on the teacher’s decision that the student has demonstrated achievement of the set of learning goals described for each of the modules and across each of the specified numeracies, including the four stages of the problem-solving cycle. Demonstration of achievement of a learning requirement and satisfactory completion of a module is determined by evidence gained through the assessment of a range of learning activities and tasks.

Teachers must develop courses that provide appropriate opportunities for students to demonstrate satisfactory achievement of learning goals.

Schools will report a student’s result for each module to the VCAA as S (Satisfactory) or N (Not Satisfactory).

Assessment

The teaching, learning and assessment strategies should be based around the applied learning principles.

The cohort of students enrolled in the Pathways program may have encountered the mathematics content that is covered in these two units during their F-10 years. However, they often have not successfully engaged with the mathematics content or curriculum and are still struggling with learning the foundations of mathematics and numeracy. This challenge needs to be acknowledged and addressed, and in many cases some content presented as if it is a new experience.

Taking an applied learning approach is critical. That is, establish where the learner is in their knowledge and understanding of the content, and use relevant contexts and materials to support them. VPC learners will know some disparate elements of mathematics, may lack confidence, and commonly will not see or use mathematics in their daily lives, except where it is personally pertinent and relevant. Teachers can tap into those known skills and knowledge and make connections to the curriculum. The connections need to be made between the mathematics world and their real world as well as making connections between different areas of mathematics.

The learning goals and applications listed alongside the applied learning principles should be used for course design and for the development of learning activities and assessment tasks. Assessment must be a part of the regular teaching and learning program and should be completed mainly in the classroom or in the work environment within a predetermined timeframe.

Teachers will integrate the assessment of knowledge and skills acquisition with practical applications. It will require a combination of evidence collected from teacher observations along with the collection of records of student work.

Assessment will evaluate the student’s practical application of knowledge and skills. It will require the collection of evidence from a range of assessment activities and tasks. Students should be afforded multiple opportunities to demonstrate satisfactory completion of the learning goal.

Consideration should be given to the following when assessing student work:

* scaffolding tasks to support students with their learning
* using practical and ‘hands-on’ materials and resources – including out-of-class as well as classroom-based demonstrations, activities, investigations, and problem-solving
* using authentic materials – not manufactured materials and word problems
* valuing students’ own approaches to solving problems including effective use of supporting technologies
* teaching concepts in contexts relevant to the student, utilising their backgrounds, interests and experiences – this should include putting mathematics into its historical and cultural contexts
* ensuring holistic teaching through integrating other skill areas into numeracy such as oral communication skills and reading and writing skills
* raising awareness about social and community issues and practices that influence and impact on students’ lives
* ensuring that all students experience success to develop their confidence and allow for personalised programs
* using appropriate everyday and mathematical language as part of the teaching of numeracy and mathematics to explain ideas, concepts, and terminology that can be understood by students and applied by them in talking, reading, writing and listening
* encouraging and supporting students to learn through interaction and cooperation – via discussion, asking questions, giving explanations and presentations, and working cooperatively in pairs or small groups.

Authentication

Work related to the outcomes of each unit will be accepted only if the teacher can attest that, to the best of their knowledge, all unacknowledged work is the student’s own. Teachers will need to refer to the [*VPC Administrative Handbook*](https://www.vcaa.vic.edu.au/administration/vce-vcal-handbook/Pages/index.aspx) for authentication procedures.

Units 1 and 2

The purpose of Units 1 and 2 is to focus the teaching and learning on supporting and enabling students to develop their numeracy skills and practices to make sense of their daily personal, public, and future vocational lives, and in their local community.

Each module describes the range of contexts that are the starting point for developing the students’ numeracy and underpinning their mathematical skills. This range covers four numeracies where foundational mathematical skills are situated and embedded: personal, financial, health & recreational and civic.

At this level, the contexts should be highly familiar and relevant to the students and should reflect their personal interests and lives. The numeracy problems to be solved should be authentic, concrete and immediate. Simple, everyday mathematical information will be situated in highly familiar, simple and concise oral and/or written materials where the mathematics is highly explicit.

Learning requirements

Across Units 1 and 2 the student is required to demonstrate achievement of each of the **eight learning goals** that describe the mathematical content knowledge for **three different learning requirements**. These include covering:

1. Each of the four **numeracies**:

* Personal numeracy
* Financial numeracy
* Health and Recreational numeracy
* Civic numeracy.

1. Each of the **four stages of the problem-solving cycle** that underpin the capabilities required to solve a mathematical problem embedded in the real-world:

* identifying the mathematics
* acting on and using mathematics
* evaluating and reflecting
* communicating and reporting.

1. Diagram, timeline

   Description automatically generatedThe use and application of a technical **Mathematical toolkit**.

Numeracy in context

To achieve this learning requirement, students should be able to apply the mathematical knowledge and skills from the relevant focus areas, across the four specified numeracy contexts.

The purpose of working mathematically across four numeracy contexts is to focus the teaching and learning on supporting and enabling students to develop a range of different numeracy skills and capabilities to make sense of their daily personal, public and vocational lives. Each numeracy describes the range of contexts that are the starting point for developing the students’ numeracy and mathematical skills.

The four numeracies can all be customised and adapted to meet the needs and interests of a particular cohort of students and therefore be focused on the personal interests of the learners. Many Pathways students will need targeted, personalised, and sometimes individualised learning, in order to engage them in successful learning experiences and outcomes:

* Personal numeracy explicitly targets the personal, daily lives of the students; however, this numeracy can be linked to the other three numeracies.
* Financial numeracy relates to the individual students as they go about their daily lives.
* Health and recreational numeracy can be used to address a range of different issues of direct concern or that are relevant to the group of students, which may cover their interests in sports or art and crafts, or as a way of addressing concerns related to personal health and wellbeing.
* Civic numeracy can be used to address the particular personal and community interests the students might have in relation to their involvement and participation in their local communities and its activities, or in broader social issues such as the environment.

It is possible to customise or adapt the teaching and learning to have a vocational focus. The numeracies can focus on students’ interests in relation to their future employment or training ambitions, with the program content focusing on work-life balance and coping with the demands of work and/or vocational training. If teaching the numeracies within a vocational or work-related context, the focus may be on different workplace tools, applications and processes or systems; following and giving directions; participating in quality assurance processes and data collection; reading workplace documents and related information or learning about the financial aspects of that vocation and industry.

The four numeracies are elaborated and described further in each of the modules in Units 1 and 2.

Problem-solving cycle

Students will develop the explicit skills and capabilities to be able to solve problems and use their foundational numeracy and mathematical skills to investigate problems where the mathematics is embedded within a real-world context. The purpose of this learning requirement is to make explicit how students can identify and recognise where and how mathematics can be embedded in everyday activities and tasks, and then how to engage with the world of mathematics and use that knowledge to solve problems.

Given that the contexts described in the four different numeracy contexts will be the starting point, students should be taken through the structured problem-solving cycle in order to know how to move from the context set in the real-world to the mathematical world and use their mathematical knowledge to solve the mathematical problem at hand. Part of solving an embedded problem is to be able to review and evaluate the outcomes, then communicate and report on what was been done and the outcomes.

The problem-solving cycle underpinning the curriculum has four distinct components of identifying the mathematics, acting on and using mathematics, evaluating and reflecting, followed by communicating and reporting on the results. The four distinct components are represented in the figure below.

Diagram

Description automatically generated

The skills and knowledge required to achieve this learning requirement are organised under the four distinct components to match the problem-solving cycle:

1. **Identify the mathematics**: recognise, select and interpret the mathematical information embedded in a real-world context and decide what mathematics to use
2. **Act on and use mathematics**: perform mathematical actions and processes in order to complete a task - this includes the use and application of a range of technologies
3. **Evaluate and reflect**: check and reflect on the mathematical problem-solving processes and outcomes in relation to the real world context
4. **Communicate and report**: use a combination of informal and formal mathematical representations to document and report outcomes and results.

Problem-solving learning requirement

To achieve this learning requirement, students should be able to use the problem-solving cycle (identify the mathematics, act on and use mathematics, evaluate and reflect, and communicate and report) in an applied learning context, relevant to the key skills and knowledge reflected in the focus areas and across the four numeracies.

The key knowledge and skills described below detail the requirements for satisfying the learning goals for each Module in each Unit mapped against the four stages of the problem-solving cycle. For each of the key areas of knowledge and skills, the statements specify the range of actions required and the complexity of the numeracy tasks that are expected of students in Units 1 and 2. It also indicates the levels of support that teachers can provide.

The learning requirements are achieved when students can demonstrate achievement of the key knowledge and skills for each of the four stages of the problem-solving cycle. However, it is not expected that one assessment task or activity can or should cover all key knowledge and skill areas. All should be covered at least once across the different numeracy tasks for each unit.

The key knowledge and skills are grouped according to the four distinct components of the problem-solving cycle.

a) Identify the mathematics

When mathematical problems are embedded within real-world contexts, students need to identify the essential features to be accommodated when transforming the real-world situation into a mathematical problem. This requires students to identify and name the mathematics embedded in the context or scenario and make decisions about how the task can be best represented and solved mathematically. This requires the development of a simple, easy to follow plan, an overview of the context or scenario and related background, and the development of related mathematical questions or investigations of interest.

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| **Learning goals** | **Complexity of the problem-solving tasks undertaken** |
| * Decide on the purpose of the task and the question(s) to be posed and answered * Identify and interpret the relevant mathematical information embedded in the selected numeracy context and materials * Describe and define the mathematical operation(s), processes and tools needed to solve the problem * Make a simple, short plan of the activities to be undertaken to perform the mathematical action(s). | * Locates and recognises simple, everyday mathematical information in highly familiar short and simple oral and/or written materials where the mathematics is highly explicit with concise and simple text and little distracting information. * Relies heavily on hands-on (concrete) and real-life materials, personal experience and prior knowledge to select appropriate actions and processes selected from one or two related mathematical processes described in the focus areas. Teacher scaffolding, advice, and prompting is available. * Develops a plan that is short and clear, using a combination of both informal and some formal written mathematical language and symbols, with support and guidance available; for example, through the use of a planning template. |

b) Act on and use mathematics

This stage of the problem-solving cycle involves undertaking the mathematical aspects of the task identified in the first stage. It requires the utilisation of mathematical processes and problem-solving techniques, facts and procedures in order to solve the problem, and will require the selection and use of appropriate tools, including technology. For example, students may need to perform simple arithmetic computations perhaps with use of devices; read and interpret information from tables and simple everyday graphs; understand and describe 2D shapes or common objects.

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| **Learning goals** | **Complexity of the problem-solving tasks undertaken** |
| * Select and implement a simple mathematical process for completing the numeracy task * Undertake rough estimations required prior to completing the numeracy task * Select and use appropriate technology, tools and applications to complete the numeracy task * Undertake relevant mathematical actions, processes and calculations to complete the numeracy task. | * Involves the use and application of one or two related steps or simple processes such as counting, sorting, performing basic arithmetic operations with whole numbers or money, recognising common spatial or location representations, etc. * Uses personal, informal 'in-the-head' or pen-and-paper methods to calculate or uses a calculator, apps or technology. * Identifies and uses appropriate tools at a basic level in a limited range of applications; for example, uses a ruler to decide whether an item is longer than 10 cm or uses a simple calculator to subtract two numbers. |

c) Evaluate and reflect

Responses to real-world numeracy tasks, including any mathematical results or outcomes, require reviewing. Results should be checked against the original situation in terms of its reasonableness and relevance, and comparisons made with any rough initial estimates. Decisions are made about whether the solution is likely to be ‘about right’ or not, or to revise and adjust the results.

|  |  |
| --- | --- |
| **Learning goals** | **Complexity of the problem-solving tasks undertaken** |
| * Check any estimations, actions and any calculation results to see if results are as expected * Review appropriateness and reasonableness of results to the numeracy task and adjust if necessary, including to redo any calculations if required. | * Relies heavily on hands-on (concrete) and real-life materials, personal experience and prior knowledge to roughly check the reasonableness of the outcome(s) with support via prompting or questioning. |

d) Communicate and report

The results and outcomes of any numeracy task require a summary or presentation of the work to be developed, including the findings from the mathematical activities and related applications. This stage requires students being able to represent and communicate the mathematical results. This will involve the use of both oral and written language, and the use of informal, and some formal, mathematical representations.

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| **Learning goals** | **Complexity of the problem-solving tasks undertaken** |
| * Use informal and some formal written mathematical representation to document and report on the mathematical processes used and the results of the numeracy task * Use informal and some formal oral mathematical language to present and discuss the mathematical processes used and the results of the numeracy task * Use one or two different formats, devices, or technologies to represent and document the numeracy task. | * Writes simple and everyday informal and minimal formal written representations of numbers, monetary amounts and data (into the 100s), including with the support of technology * Uses common, everyday, informal oral language and gestures to convey numeracy-based information and processing; for example, language of position such as *up, down, behind, right, left, over, through;* comparative language such as *taller, heavier, hotter, smaller;* language of shape, size, colour such as *straight, curved, square, circle, triangle,* etc. * Uses simple and informal symbolism, diagrams and conventions relevant to the mathematical knowledge of the level; for example:   *57, $5.98, ½,+, -* |

Mathematical toolkit

To achieve this third learning requirement, students should develop their own mathematical toolkit to use where necessary as they undertake their numeracy practices, activities and tasks. On completion of the learning requirements students should be able to use a variety of tools and appropriate technologies to solve mathematical problems set in practical contexts. Students should become familiar with analogue and digital tools and be confident in knowing the purpose of everyday tools.

These technologies may include:

* analogue and/or digital tools which may include clocks, tape measures, measuring cups, etc.
* digital tools which may include manipulatives, mobile technology, software and applications
* the conventions and use of such analogue and digital tools appropriate to the home or community
* awareness of contemporary technological and online and digital media, including software and applications based on computers, tablets, calculators and hand-held devices and the functionality of their use and application.

Students should demonstrate competence in the following key skills:

* use highly familiar tools and devices to carry out tasks
* read and interpret the inputs and outputs of highly familiar technology
* use highly familiar technology to compute simple problems mathematically and to interpret the results
* reflect on the technology used and the outcomes obtained relative to personal, contextual, and real-world implications.

Focus areas

Each numeracy comprises of two focus areas that describe the spread of mathematical content knowledge that is required to engage with that specific numeracy. There are eight focus areas in total. The associated focus areas are detailed and have been assigned under each of the numeracies. There is a learning goal and an application for each focus area.

The focus areas comprise:

* Number
* Data
* Location
* Shape
* Quantity and measures
* Change
* Likelihood
* Systematics.

Unit 1

Module 1: Personal numeracy

Personal numeracyrelates to the mathematical requirements for personal organisational matters involving money, time and travel, or for participation in community-based activities and events.

Personal numeracy relates to understanding, using and interpreting numerical and mathematical information presented and embedded in different formats, in order to undertake personally relevant activities in highly familiar situations.

The understanding, use and interpretation of personal numeracy can be drawn from the following, but are not limited to these examples:

* transport and travel: planning routes, travel times and destinations including use of highly familiar maps, apps and software
* planning or scheduling: a day out or attending a social/community event or activity
* planning a BBQ, family event, trips to sites of cultural significance
* personal and home/family day-to-day tasks: such as cooking, gardening, sport, travel.

This module must be taught in conjunction with the aims of the study, which include the integration of the problem-solving cycle and embedded use of analogue and digital technologies.

Focus area: Location

The focus of location includes understanding of space, direction and location in relation to highly familiar local places. Students should be able to follow simple and familiar directions to locations based on digital or printed maps. Students should demonstrate an awareness of their place in space.

Learning goal

On completion of this module students should have the knowledge to be able to:

* find location and direction in relation to everyday, familiar places within the vicinity
* find location and direction with everyday, simple and familiar maps and technologies
* use everyday oral directions using informal language such as left/right, up/down, front/back, under/beside/over.

Application

Application of the learning goal requires students to demonstrate the following skills:

* orally describe location of familiar, local places
* use interactive and paper maps to locate highly familiar places or objects
* give and follow simple oral directions to highly familiar locations.

Focus area: Systematics

The focus of systematics includes using everyday technology to input and output information for the purposes of planning and scheduling. Students should be able to choose a number of inputs of familiar data and read the outputs, and any summary information derived from the technology.

Learning goal

On completion of this module students should have the knowledge to be able to:

* find common and familiar information and data inputs
* read data outputs
* summarise information.

Application

Application of the learning goal requires students to demonstrate the following skills:

* input simple data into familiar apps
* read simple output data
* interpret simple output data.

Module 2: Financial numeracy

Financial numeracy relates to undertaking basic and personal financial transactions and making straightforward decisions regarding the use and management money.

Financial numeracy involves managing relevant personal, social or work-related everyday financial costs, charges, income and expenditure.

The understanding, use and interpretation of financial numeracy can be drawn from the following, but are not limited to these examples:

* income: pay, pay rates, payslips, deductions, loadings
* shopping and living costs: payments, costs, checking change, savings on sale items, utility bills, comparing common familiar food costs *$/kg*, and comparing pricing per unit costs on price tags to ascertain value for money
* personal banking: opening and managing an account, keeping money safe online, and common methods of payments
* savings: personal saving plans and amounts, and how to reduce costs.

This module must be taught in conjunction with the aims of the study, which include the integration of the problem-solving cycle and embedded use of analogue and digital technologies.

Focus area: Number

This focus area aims to develop students’ number sense through meaningful application of numeracy practices to a range of contexts where whole numbers and some simple fractions and decimals are used.

Learning goal

On completion of this module students should have the knowledge to be able to understand:

* place value and numbers up to 1000
* whole numbers and monetary amounts up to $1000
* addition and subtraction (with no borrowing or decomposition) of whole numbers and familiar monetary amounts into the 100s
* common, simple unit fractions such as 1/2, 1/4 and 1/10
* common decimals and percentages such as 0.5, 0.25, 50%, 25%.

Application

Application of the learning goal requires students to demonstrate the following skills:

* identify place value and read whole numbers up to 1000
* perform calculations of addition and subtraction with simple whole number amounts and familiar monetary amounts (into the 100s)
* recognise and understand very common simple unit fractions, decimals and percentages.

Focus area: Change

The focus of change includes the recognition of simple patterns and change in spatial, arithmetical and numerical contexts and applications. Students should recognise when change is occurring.

Learning goal

On completion of this module students should have the knowledge to be able to understand:

* pattern prediction with shapes
* repeating patterns with one element such as with shapes, or $2, $4, $6, $8, …
* changes and number matching with simple numbers. For example, prices increasing or decreasing, matching corresponding numbers.

Application

Application of the learning goal requires students to demonstrate the following skills:

* recognise changes in numerical values such as prices increasing or decreasing with a common fixed price discount
* number matching and comparison of simple numbers in context such as matching prices from receipts to on-the-shelf items
* predict pattern continuation with shapes. For example, triangle, square repeating pattern
* demonstrate repeating patterns with one element. For example, $2, $4, $6, $8, …

Assessment

The award of satisfactory completion for a module is based on whether the student has demonstrated the set of learning goals specified for the module. Teachers should use a variety of learning activities and assessment tasks that provide a range of opportunities for students to demonstrate the learning goals for satisfactory completion of the module.

The eight focus areas, including the learning goals and applications listed for each module, should be used for course design and the development of learning activities and assessment tasks. Assessment must be a part of the regular teaching and learning program and should be completed mainly in class and within a limited timeframe.

For each module students are required to demonstrate three learning requirements.

Demonstration of achievement of all Learning requirements should be based on the students’ performance on a selection of evidence encompassing:

* each of the four numeracy modules with the learning goals
* the four stages of the problem-solving cycle
* the technical Mathematical toolkit.

The following table provides suitable tasks for assessment for each module.

|  |  |
| --- | --- |
| Learning requirements | Suggested assessment tasks |
| **Learning requirement 1:**  Apply their numeracy capabilities developed from the 4 numeracy modules and focus areas, including the learning goals and applications across the four specified numeracy contexts. | Assessment could consist of, but is not limited to, a combination of the following activities where students could apply and demonstrate their learning:   * Investigations and projects; for example, keeping a record or diary on a “day in the life of me”, recording what they did and when; using a recipe and baking using measuring instruments; or measuring quantities of groceries and compare these to the stated measurements. * Multimedia presentation, poster or report; for example, exploring games in common usage such as netball, AFL, 10 pin bowling considering number facts and operations; compare costs of items on sale; comparing class data on favourite activities, sports or TV shows. * Interview, blog or vlog. For example, describing an excursion or trip showing directions using a mapping app, giving oral directions and main time points; comparing the nutritional information on favourite foods. |
| **Learning requirement 2:**  Use the problem-solving cycle (identify the mathematics, act on and use mathematics, evaluate and reflect, and communicate and report) in an applied learning context, relevant to the key skills and knowledge reflected in the modules. |
| **Learning requirement 3:**  Apply the appropriate mathematical tool from the toolkit to undertake the numeracy tasks required in Learning requirements 1 and 2. The toolkit should be applied and should underpin all learning and teaching activities in both Learning requirements 1 and 2. |

Tests are not considered to be reflective of the applied learning process. Where teachers allow students to choose between tasks, they must ensure that the tasks they set are of comparable scope and demand.

Unit 2

Module 3: Health and recreational numeracy

Health and recreational numeracy relates to accessing, understanding and using foundational mathematical information to be aware of issues related to health and well-being, or when engaging in different recreational activities. Recreational activities may include indoor and outdoor pursuits, arts, social media, gaming and other personal interests and hobbies.

The understanding, use and interpretation of health and recreational numeracy can be drawn from the following, but are not limited to these examples:

* personal health and wellbeing: food and drinks ingredients and intakes, current social issues affecting youth such as binge drinking or vaping
* First Nations peoples health awareness
* traditional games in the First Nations peoples context including games from different regions within Australia
* cooking and eating: planning and making meals, following simple recipes,
* sport and e-sports/games: score keeping, timing, shapes/dimensions of playing spaces
* crafts and hobbies: concepts of shape and dimension in design and creation of goods/items.

This module must be taught in conjunction with the aims of the study, which include the integration of the problem-solving cycle and embedded use of analogue and digital technologies.

Focus area: Shape

The focus of shape includes the recognition, naming and comparison of familiar shapes and objects in relation to size and shape of common one- and two-dimensional shapes. Students should be able to describe and classify common and familiar shapes in both diagrammatical and concrete forms. This focus also includes common characteristics and properties used in classifying shapes.

Learning goal

On completion of this module students should have the knowledge to be able to understand:

* common and familiar one- and two-dimensional shapes such as lines, triangles, circles, squares, etc.
* common properties of different one- and two-dimensional shapes such as size, colour, number and type of sides (straight/curved).

Application

Application of the learning goal requires students to demonstrate the following skills:

* recognise common and familiar one- and two-dimensional shapes
* name common and familiar one- and two-dimensional shapes
* construct common and familiar two-dimensional shapes
* categorise similar shapes according to common classifications.

Focus area: Quantity and measures

The focus of quality and measures enables students to explore highly familiar everyday measurements and quantities. Students will develop a beginning sense of estimation and will know and use simple and straightforward quantities and measurements such as those found in the home.

Learning goal

On completion of this module students should have the knowledge to be able to:

* use common and familiar basic metric measurements and quantities such as length, mass, capacity/volume, time and temperature such as personal height and weight, door height, liquid measurement, temperatures
* recognise common and familiar units such as m, cm, Kg, L, degrees C
* recognise 12-hour digital time, including minutes and hours on digital clocks, and hours, quarter-, and half-hours on analogue clocks
* recognise day and month dates.

Application

Application of the learning goal requires students to demonstrate the following skills:

* estimate lengths of highly familiar objects or items
* order and compare simple everyday measures and quantities
* recognise familiar and commonly used units of metric measurement
* read common and familiar dates and times using digital and analogue clocks.

Module 4: Civic numeracy

Civic numeracyrefers to activities related to participating in the student’s community and social life through being aware of and knowing about government and societal data, information and related processes.

The understanding, use and interpretation of civic numeracy can be drawn from the following, but are not limited to these examples:

* data and information in the popular media: sports results, weather, music, and film
* infographics: reading and understanding basic data and information presented in infographics from government, authorities, independent agencies, cultural and community organisations
* simple, everyday risk and likelihood of events: understanding basic risk and generalised likelihood and chance of events relating to society such as weather, health, polls.

This module must be taught in conjunction with the aims of the study, which include the integration of the problem-solving cycle and embedded use of analogue and digital technologies.

Focus area: Data

Data can be found in everyday life, workplaces, and society. Students should be able to collect, represent and read familiar data represented in simple graphs and tables found in the media or in everyday contexts.

Learning goal

On completion of this module students should have the knowledge to be able to understand:

* simple data collection by hand or with tables
* simple cases of data, graphs and infographics.

Application

Application of the learning goal requires students to demonstrate the following skills:

* collect and display simple data
* read simple graphs such as bar or pie graphs
* read simple tables
* identify and locate key facts from simple data.

Focus area: Likelihood

The focus of likelihood includes being able to understand and use everyday language of likelihood and chance related to common and familiar events. Students should be able to talk about chance and risk given the likelihood of common and familiar events occurring.

Learning goal

On completion of this module students should have the knowledge to be able to:

* use everyday language to talk about the likelihood of an event occurring such as possible, impossible, unlikely, likely, certain, “Buckley’s chance”, “pigs might fly”, “dead-set”
* understand language and relative magnitude of simple and highly familiar chance events.

Application

Application of the learning goal requires students to demonstrate the following skills:

* recognise and use the everyday language of chance and likelihood
* use everyday language to compare and order different and simple magnitudes of chance.

Assessment

The award of satisfactory completion for a module is based on whether the student has demonstrated the set of learning goals specified for the module. Teachers should use a variety of learning activities and assessment tasks that provide a range of opportunities for students to demonstrate the learning goals for satisfactory completion of the module.

The eight focus areas, including the learning goals and applications listed for each module, should be used for course design and the development of learning activities and assessment tasks. Assessment must be a part of the regular teaching and learning program and should be completed mainly in class and within a limited timeframe.

For each module students are required to demonstrate three learning requirements.

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| **Learning requirements** | **Suggested assessment tasks** |
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| **Learning requirement 2:**  Use the problem-solving cycle (identify the mathematics, act on and use mathematics, evaluate and reflect, and communicate and report) in an applied learning context, relevant to the key skills and knowledge reflected in the modules. |
| **Learning requirement 3:**  Apply the appropriate mathematical tool from the toolkit to undertake the numeracy tasks required in Learning requirements 1 and 2. The toolkit should be applied and should underpin all learning and teaching activities in both Learning requirements 1 and 2. |

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