DEPARTMENT OF EDUCATION
learners first

Personal Futures

Mathematics

Essential Mathematics 1

COURSE DOCUMENT

DRAFT

PHASE 3 CONSULTATION

Catholic Education Tasmania

INDEPENDENT SCHOOLS TASMANIA

Years 9 to 12 Learning

Tasmanian Government

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Essential Mathematics, 150 hours – Level 1

This course is the Level 1 component of the Essential Mathematics program.

Aims

The purpose of Years 9 to 12 Education is to enable all students to achieve their potential through Years 9 to 12 and beyond in further study, training or employment.

Years 9 to 12 Education enables: Personal Empowerment, Cultural Transmission, Preparation for Citizenship and Preparation for Work.

This course supports the principles of Access, Agency, Excellence, Balance, Support and Achievement as part of a range of programs that enables students to access a diverse and highly flexible range of learning opportunities suited to their level of readiness, interests and aspirations.

Courses aligned to the Years 9 to 12 Curriculum Framework belong to one of the five focus areas of Discipline-based Study, Transdisciplinary Projects, Professional Studies, Work-based Learning and Personal Futures.

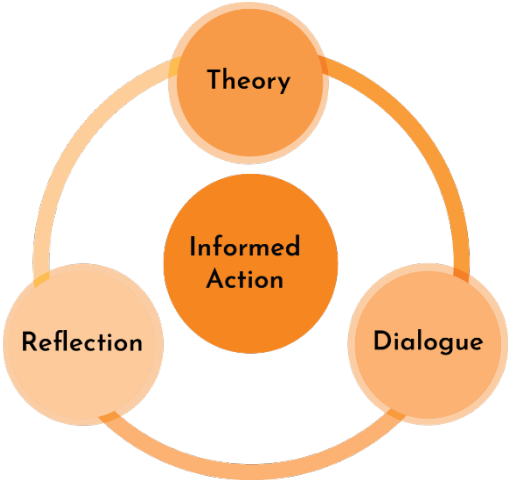
Essential Mathematics Level 1is a Personal Futures course.

Focus Area – Personal Futures

Personal Futures courses prepare students to be independent young adults, able to lead healthy, fulfilled and balanced lives. Learning is highly personalised. Students develop strategies to optimise learning, make decisions, solve problems, set career and life goals, and pursue areas of strong personal interest. Personal Futures supports students to develop the required knowledge, skills and understandings to make informed choices that enhance their own and others' health and wellbeing. The inclusion of Personal Futures as a focus area responds to a range of contemporary research findings highlighting the importance of students having broad educational goals that include individual and collective wellbeing and opportunities for student agency as they navigate a complex and uncertain world.

Personal Futures courses have three key features that guide teaching and learning

- theory and dialogue
- informed action
- reflection and dialogue.



In this course learners will do this by building the foundational understanding, background knowledge, rules and conventions of mathematics. They will interact and work with other people, exploring reasoning and learning from others. Learners will identify challenges and will use problem solving and mathematical reasoning to trial strategies, compare solutions and generate knowledge. Using a growth mindset, they will integrate their prior knowledge, skills, attitudes and values in mathematics to improve their understanding and refine personal decisions.

Rationale

The *Essential Mathematics* Level 1 course is designed to develop adolescent learners' confidence and self-esteem to engage with mathematics and develop their ability to apply mathematical thinking and reasoning in real world contexts. In doing so, the course enables learners to build the requisite knowledge and skills and the capacity, confidence and disposition to use mathematics to meet the minimum adult numeracy standard as detailed by ACSF Level 3 - numeracy.

This course will promote Mathematics and numeracy learning opportunities that aims to:

- enable learners to interpret everyday practical situations; and
- provide the basis for many informed personal decisions.

These aims will be met by developing learners' ability to formulate situations mathematically and to employ mathematical concepts, facts, procedures and reasoning to interpret these situations. This is more pertinent than ever before as 75% of the fastest growing occupations require competence in STEM with an estimated 44% or 5.1 million jobs in Australia at risk of digital disruption[1]. Successful completion of the course will provide learners with a level of mathematical competence that will enable them to contribute productively in the rapidly changing workforce.

Reference:

Price-Waterhouse Report (April, 2015). A Smart Move: Future proofing Australia's workforce by growing skills in science, mathematics, engineering and maths (STEM)

Integration of General Capabilities and Cross-Curriculum Priorities

The general capabilities addressed specifically in this course are:

- Critical and creative thinking
- Information and communication technology capability
- Literacy
- Numeracy
- Personal and social capability

The cross-curriculum priorities are enabled through this course are:

- Aboriginal and Torres Strait Islander Histories and Cultures
- Asia and Australia's Engagement with Asia
- Sustainability

Course Description

Essential Mathematics Level 1 is designed to build foundational knowledge of mathematics that enables learners to select and apply problem-solving strategies and mathematical techniques to engage in situations involving:

- number, proportional reasoning, financial mathematics and pattern
- using units of measurement, shape, maps and plans
- everyday chance events, data collection and representation

Learners will develop their multiplicative thinking and mathematical reasoning by:

- engaging in mathematical discussions
- working on collaborative problem-solving tasks
- sharing strategies and solutions
- providing explanations for their answers.

They will reflect on everyday scenarios involving mathematics and will integrate their prior knowledge, skills, attitudes and values in mathematics to refine improve their understanding and refine personal decisions.

Pathways

The *Essential Mathematics* Level 1 course enables learning continuity from Years 8-10 Australian Curriculum Mathematics for learners who have attained either a 'D' or 'E' rating and where an agreed Individual Education Plan is in place. Additionally, learners who have successfully undertaken the currently accredited TASC course *Preliminary Mathematics* Stage 4 may progress into Level 1 of this course.

Essential Mathematics Level 1 will provide the fundamental knowledge for learners wishing to pursue further mathematics study in *Essential Mathematics* Level 2.

Course Requirements

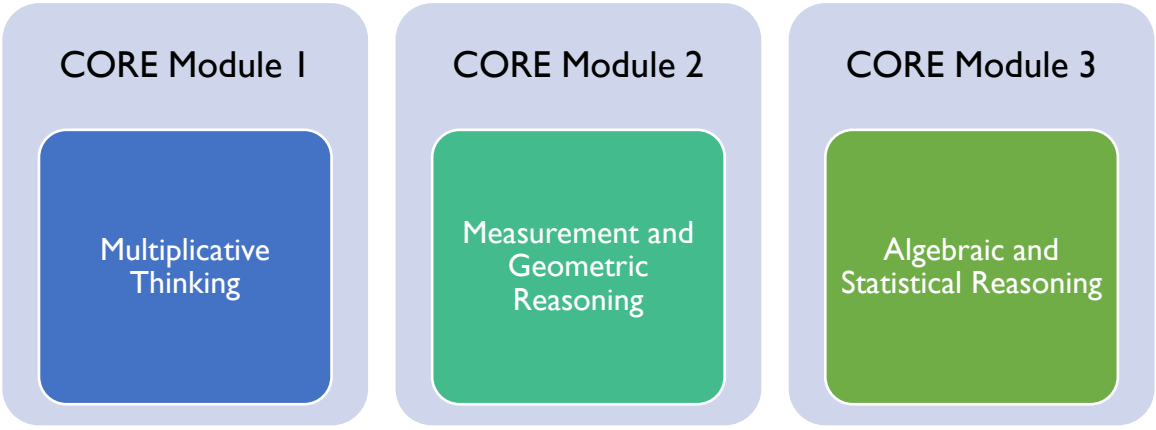
- Access considerations – students who have attained a 'D' or 'E' rating in Australian Curriculum: Mathematics at the end of Year 8 or 9 and who have an agreed Individual Education Plan in place stating that the learning outcomes in this course are developmentally appropriate are able to access this course.
- Resources – the learning outcomes in this course require learners to have access to specific mathematics manipulatives and concrete materials including counters, dice, spinners, blocks, 3-dimensional models.

Course Structure, Delivery and Progression

Structure

This course consists of three 50-hour modules.

Modules Available
Core Module 1: Multiplicative thinking
Core Module 2: Measurement and geometric reasoning
Core Module 3: Algebraic and statistical reasoning



Delivery

Module 1 should be delivered first, there is no other prescribed order

Developmental Progression

At both the module and course level the learner is introduced to and builds upon key ideas, concepts, skills, knowledge and understanding leading to performance of understanding reflected in the work requirements.

Individual modules have a developmental progression that introduces, builds upon and culminates in a performance of understanding in the work requirements. Between modules there is also a developmental progression that leads to a culminating performance of understanding in the final work requirements.

Module 1 - Multiplicative thinking

This module contains two topics:

- Multiplicative thinking
- Algebraic reasoning

'Multiplicative thinking' will enable learners to develop a capacity to work flexibly and efficiently with whole numbers, decimals, common fractions, ratio and percentages. In turn this will improve learners' ability to recognise and solve problems involving multiplication and division including direct and indirect proportion.

'Algebraic reasoning' will enable learners to develop the capacity to communicate mathematical situations effectively through words, symbolic expressions, written algorithms and other representations. They will explore, describe and extend number patterns, find generalisations in situations involving two variables, identify equivalent expressions and explore equivalence, factors and properties of numbers.

Module 1 Learning Outcomes

On successful completion of this module, learners will be able to:

1. Interpret and communicate mathematical information and ideas and apply mathematical conventions in a range of contexts
2. Select and apply a variety of mathematical and problem-solving strategies in a range of contexts and reflect on their effectiveness
3. Apply mathematical reasoning to make inferences, generalize and represent relationships and explain thinking in a range of contexts
4. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving number and algebra

Module 1 Content

This topic has three subtopics:

- Number and place value
- Fractions, decimals and percentages
- Money and financial mathematics

Number and place value:

Key knowledge and skills:

- Investigate and use the properties of odd and even numbers
- Identify and describe factors and multiples of whole numbers and use them to solve problems
- Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies
- Investigate everyday situations that use integers. Locate and represent these numbers on a number line
- Compare, order, add and subtract integers
- Carry out the four operations with integers, using efficient mental and written strategies and appropriate digital technologies
- Apply place value to partition, rearrange and regroup numbers to at least ten thousand to assist calculations and solve problems
- Make connections between fractions and decimal notation
- Recognise that the place value system can be extended beyond hundredths
- Solve problems involving division by a one-digit number, including those that result in a remainder
- Use estimation and rounding to check the reasonableness of answers to calculations
- Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers
- Apply the associative, commutative and distributive laws to aid mental and written computation

Fractions, decimals and percentages

Key knowledge and skills:

- Count by quarters halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line
- Compare fractions with related denominators and locate and represent them on a number line
- Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator
- Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line
- Solve problems involving addition and subtraction of fractions, including those with unrelated denominators
- Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies
- Express one quantity as a fraction of another, with and without the use of digital technologies
- Compare, order and represent decimals
- Investigate terminating and recurring decimals
- Round decimals to a specified number of decimal places
- Multiply and divide decimals by powers of 10
- Connect fractions, decimals and percentages and carry out simple conversions
- Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies
- Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies

Money and financial mathematics:

Key knowledge and skills:

- Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies
- Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies
- Investigate and calculate 'best buys', with and without digital technologies

Topic: Algebraic reasoning

This topic has two subtopics:

- Rates, ratio and proportion
- Pattern and equivalence

Rates, ratio and proportion

Key knowledge and skills:

- Calculate rates using two known and connected quantities e.g. runs/over or km/hr
- Recognise ratio as the comparison of any two quantities and a way to describe relative proportion (e.g. which recipe will be sweeter? When comparing different amounts of sugar proportionate to the serving size)

- Simplify ratios and describe ratio components as fractions of a whole
- Solve rate and ratio problems using fractions or percentages and choose the most efficient form to solve a particular problem

Pattern and equivalence

Key knowledge and skills:

- Explore and describe number patterns resulting from performing multiplication
- Describe, continue and create patterns with fractions, decimals and whole numbers resulting from addition and subtraction
- Solve word problems by using number sentences involving multiplication or division where there is no remainder
- Find unknown quantities in number sentences involving multiplication and division and identify equivalent number sentences involving multiplication and division
- Introduce the concept of variables as a way of representing numbers using letters
- Investigate and use square roots of perfect square numbers

Module 1 Work Requirements

The work requirements of a course are processes, products or performances that provide a significant demonstration of achievement that is measurable against the course's standards. Work requirements need not be the sole form of assessment for a module.

This module includes 10 short responses as work requirements.

See Appendix 3 for summary of Work Requirement specifications for this course.

Module 1 Assessment

This module will assess criteria 1, 2, 3, 4.

Module 2 - Measurement and geometric reasoning

This module contains three topics:

- Using units of measurement
- Shape, maps and plans
- Geometric reasoning

'Using units of measurement' enables learners to perform measurements using scaled instruments, connect decimal representations to the metric system and name, convert and use appropriate units of measure. They will estimate, calculate and solve problems involving length, area, volume and capacity, temperature and time.

'Shape, maps and plans' will enable learners to develop their knowledge of 2-Dimensional shapes and 3-Dimensional objects. They will utilise this knowledge of the attributes and properties of shapes to construct, compare, draw and describe objects. Learners will use the features of routine maps, plans and timetables to read and interpret information, describe locations and routes and calculate distances or travel time.

'Geometric reasoning' will enable learners to describe translations, reflections and rotations of shapes, identify line and rotational symmetry and create symmetrical patterns and pictures. Learners will measure, construct and classify angles and use their properties to classify triangles, describe quadrilaterals and investigate relationships between angles.

Module 2 Learning Outcomes

On successful completion of this module, learners will be able to:

1. Interpret and communicate mathematical information and ideas and apply mathematical conventions in a range of contexts
2. Select and apply a variety of mathematical and problem-solving strategies in a range of contexts and reflect on their effectiveness
3. Apply mathematical reasoning to make inferences, generalize and represent relationships and explain thinking in a range of contexts
5. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving measurement and geometry

Module 2 Content

Using units of measurement

Key knowledge and skills:

- Use scaled instruments to measure and compare lengths, masses, capacities, time and temperatures
- Calculate perimeter and area of rectangles using familiar metric units
- Connect decimal representations to the metric system
- Convert between common metric units of length, mass and capacity
- Choose appropriate units of measurement for length, area, volume, capacity and mass
- Solve problems involving the comparison of lengths and areas using appropriate units
- Connect volume and capacity and their units of measurement
- Convert between units of time
- Use 'am' and 'pm' notation and solve simple time problems
- Compare 12- and 24-hour time systems and convert between them

Shape, maps and plans

Key knowledge and skills:

- Compare the areas of regular and irregular shapes by informal means
- Compare and describe two dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies
- Connect three-dimensional objects with their nets and other two-dimensional representations
- Construct simple prisms and pyramids
- Use simple scales, legends and directions to interpret information contained in basic maps
- Draw different views of prisms and solids formed from combinations of prisms
- Use a grid reference system to describe locations. Describe routes using landmarks and directional language
- Introduce the Cartesian coordinate system using all four quadrants
- Interpret and use timetables

Geometric reasoning

Key knowledge and skills:

- Estimate, measure and compare angles using degrees. Construct angles using a protractor
- Compare angles and classify them by name according to angle size (acute, obtuse, right, straight, reflex and rotation)
- Classify triangles according to their side and angle properties and describe quadrilaterals
- 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
- Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral
- Describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries
- Create symmetrical patterns, pictures and shapes with and without digital technologies

Module 2 Work Requirements

The work requirements of a course are processes, products or performances that provide a significant demonstration of achievement that is measurable against the course's standards. Work requirements need not be the sole form of assessment for a module.

This module includes 10 short responses as work requirements.

See Appendix 3 for summary of Work Requirement specifications for this course.

Module 2 Assessment

This module will assess criteria 1, 2, 3, 5.

Module 3 - Algebraic and statistical reasoning

This module contains two topics:

- Chance
- Data collection, representation and interpretation

'Chance' provides an opportunity for learners to describe the probability of everyday events occurring, to construct and carry out single-step experiments for equiprobable outcomes. Learners will use mathematical reasoning to compare the frequency of outcomes with theoretical probability equating differences to concepts including randomness, variation and distribution.

'Data collection, representation and interpretation' enables learners to select and trial simple data collection processes and to represent, read and interpret information in routine tables, graphs and charts including column graphs, picture graphs, dot plots and stem-and-leaf plots. They will explore the variation between different samples taken from the same population and investigate the effect of individual data values on the mean and median.

Module 3 Learning Outcomes

On successful completion of this module, learners will be able to:

1. Interpret and communicate mathematical information and ideas and apply mathematical conventions in a range of contexts
2. Select and apply a variety of mathematical and problem-solving strategies in a range of contexts and reflect on their effectiveness
3. Apply mathematical reasoning to make inferences, generalize and represent relationships and explain thinking in a range of contexts
4. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving number and algebra

Module 3 Content

Chance

Key knowledge and skills:

- Describe possible everyday events and order their chances of occurring
- Identify everyday events where one cannot happen if the other happens
- Identify events where the chance of one will not be affected by the occurrence of the other
- Recognise that probabilities range from 0 to 1
- List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions
- Construct sample spaces for single-step experiments with equally likely outcomes
- Describe probabilities using fractions, decimals and percentages
- Assign probabilities to the outcomes of events and determine probabilities for events
- Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies
- Identify possible reasons for variations and distribution of outcomes in trials
- Compare observed frequencies across experiments with expected frequencies

Data collection, representation and interpretation

Key knowledge and skills:

- Select and trial methods for data collection, including survey questions and recording sheets
- Pose questions and collect categorical or numerical data by observation or survey
- Identify and investigate issues involving numerical data collected from primary and secondary sources
- Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values
- Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies
- Construct and compare a range of data displays including stem-and-leaf plots and dot plots
- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables
- Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data
- Describe and interpret different data sets in context

- Describe and interpret data displays using median, mean and range
- Evaluate the effectiveness of different displays in illustrating data features including variability
- Explore the variation of means and proportions of random samples drawn from the same population
- Investigate the effect of individual data values, including outliers, on the mean and median

Module 3 Work Requirements

The work requirements of a course are processes, products or performances that provide a significant demonstration of achievement that is measurable against the course's standards. Work requirements need not be the sole form of assessment for a module.

This module includes one (1) project as work requirements.

See Appendix 3 for summary of Work Requirement specifications for this course.

Module 3 Assessment

This module will assess criteria 1, 2, 3, 6

Assessment

Criterion-based assessment is a form of outcomes assessment that identifies the extent of learner achievement at an appropriate end-point of study. Although assessment – as part of the learning program – is continuous, much of it is formative, and is done to help learners identify what they need to do to attain the maximum benefit from their study of the course. Therefore, assessment for summative reporting to TASC will focus on what both teacher and learner understand to reflect end-point achievement.

The standard of achievement each learner attains on each criterion is recorded as a rating 'A', 'B', or 'C', according to the outcomes specified in the standards section of the course.

A 't' notation must be used where a learner demonstrates any achievement against a criterion less than the standard specified for the 'C' rating.

A 'z' notation is to be used where a learner provides no evidence of achievement at all.

Internal assessment of all criteria will be made by the provider. Providers will report the learner's rating for each criterion to TASC.

Criteria

	Module 1	Module 2	Module 3	Notes
Criteria assessed	1,2,3,4	1,2,3,5	1,2,3,6	Three common in all modules and one focus criterion per module

The assessment for *Essential Mathematics* Level 1 will be based on the degree to which the learner can:

1. Interpret and communicate mathematical information and ideas and apply mathematical conventions in a range of contexts
2. Select and apply a variety of mathematical and problem-solving strategies in a range of contexts and reflect on their effectiveness

3. Apply mathematical reasoning to make inferences, generalize and represent relationships and explain thinking in a range of contexts
4. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving number and algebra
5. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving measurement and geometry
6. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving statistics and probability

Standards

Criterion 1: Interpret and communicate mathematical information and ideas and apply mathematical conventions in a range of contexts

Rating C	Rating B	Rating A
interprets mathematical information and ideas in routine texts in familiar and some unfamiliar contexts	interprets and sequences mathematical information and ideas in routine texts in familiar and some unfamiliar contexts	interprets, sequences and abstracts embedded mathematical information from routine texts in familiar and some unfamiliar contexts
recalls and uses some mathematical facts, rules and definitions to describe mathematical situations	selects, recalls and uses some mathematical facts, rules and definitions to describe mathematical situations	consistently selects, recalls and uses facts, rules, definitions and procedures correctly to describe mathematical situations
uses a combination of formal and informal mathematical conventions and symbolism and representations	uses formal mathematical conventions, including symbolic expressions and rules appropriately on most occasions	uses mathematical conventions and systems including symbolic expressions accurately and purposefully
selects and uses language to express ideas and listens to the perspectives of others.	selects, uses and refines language to respond to multiple perspectives when expressing ideas.	purposefully selects, uses and refines language to effectively connect with address multiple perspectives when expressing ideas.

Criterion 2: Select and apply a variety of mathematical and problem-solving strategies in a range of contexts and reflect on their effectiveness

Rating C	Rating B	Rating A
identifies how a given problem can be solved mathematically	identifies and describes how mathematics can be used to solve familiar problems and generates a possible mathematical strategy	describes and explains how mathematics can be used to solve unfamiliar problems and generates possible mathematical strategies
chooses and applies an appropriate method of solution from a limited range of mathematical processes	selects and applies mathematical and problem-solving strategies purposefully and checks outcomes	selects or devises and flexibly applies mathematical and problem-solving strategies purposefully and checks outcomes

chooses and uses appropriate tools, instruments and technological processes from a limited range to solve problems	selects and uses appropriate tools, instruments and technological processes to solve problems	selects and uses appropriate tools, instruments and technological processes purposefully and accurately to solve problems
identifies limitations of chosen mathematical approaches and errors or issues associated with tools, instruments or technological processes used to solve problems	analyses the effectiveness of chosen mathematical approaches and describe any possible errors or issues associated with tools, instruments or technological processes used to solve problems	evaluates the effectiveness of chosen mathematical approaches and use of tools, instruments and technological processes used to solve problems

Criterion 3: Apply mathematical reasoning to make inferences or estimations, generalize and represent relationships and explain thinking in a range of contexts

Rating C	Rating B	Rating A
uses estimation, rounding and other assessment skills, to check the accuracy of measurements, calculations or solutions	uses estimation, rounding and other assessment skills, to check the accuracy of measurements, calculation or solutions and refine	uses estimation, rounding and other assessment skills, to check and refine measurements, calculations or solutions and evaluates reasonableness according to the task or context
makes observations and responds to patterns or data sets	makes inferences and extrapolates from patterns or data based on mathematical reasoning	makes inferences and explains extrapolations from patterns or data based on logically rooted mathematical reasoning
identifies and describes simple arithmetic relationships that can be generalised using a rule	explores and conjectures about patterns and identify generalisations based on known information	explains generalisations by telling stories in words, with materials and using symbols
describes methods of solution to routine problems	describes methods of solution to routine and non-routine problems and explains reasons for chosen method	justifies the appropriateness of methods of solution to routine and non-routine problems according to the task or context

Criterion 4: Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving number and algebra

Rating C	Rating B	Rating A
compares, orders and solves calculations involving whole numbers, routine fractions, decimals and percentages including where appropriate converting between different forms	applies order of operations to solve multi-step calculations involving whole numbers, routine fractions, decimals and percentages including where appropriate converting between different forms	applies order of operations to solve multi-step calculations involving integers, fractions, decimals and percentages and flexibly uses equivalent forms
makes, compares, orders, sequences and counts forwards and backwards in place-value parts, numbers involving decimal fractions of tenths and hundredths	applies place value to partition, rearrange, regroup and rename numbers to at least 10 000 and decimal fractions to tenths	applies place value to partition, rearrange, regroup and rename numbers to at least 10 000 and decimal fractions to hundredths including situations involving money
uses and applies rates in familiar or routine situations e.g. km/hr, bpm, unit-costs, exchanging Australian currency denominations	uses and applies rates and ratios in familiar or routine situations e.g. km/hr, m/s mixing quantities, scaling recipes	uses and applies rates and ratios including making conversions e.g. km/hr to m/s
recognises, continues and describes simple growing and repeating patterns and represents the same pattern in different equivalent ways	maintains equivalence between two amounts using relational thinking and examines the relationships between different factors that when multiplied give the same result	explores the relationships of two numbers or quantities as they vary simultaneously as equivalent expressions and explains why they are equivalent

Criterion 5: Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving measurement and geometry

Rating C	Rating B	Rating A
uses properties of 2-Dimensional shapes and 3-Dimensional objects to describe and draw everyday objects	identifies the shape and relative position of faces of 3-Dimensional objects to describe, draw and construct 3-Dimensional objects from nets or concrete materials	measures or calculates lengths and angles of each face of 3-Dimensional objects and accurately describes, draws or constructs scale models from nets or concrete materials
identifies and measures common angles using simple tools and estimates unknown angles	measures and compares angles between 0 and 180 degrees and classifies them as right, acute, obtuse, or straight	constructs angles accurately using a protractor and measure and classifies angles between 0 and 360 degrees
uses simple scaled instruments to measure and compare lengths, masses, capacity, time and temperature and estimates unknown measurements	uses scaled instruments appropriately to measure and compare lengths, masses, capacity, time and temperature and calculates perimeter and area of rectangles using familiar metric units	converts between time systems and routine metric units in situations involving length, mass, capacity and temperature, and estimates the area of 2-Dimensional shapes using informal means
uses distance, direction, co-ordinates, simple scales, labels, symbols and keys to read and use routine maps and plans	uses a grid reference system to describe locations and create maps and describes routes on a map using landmarks, co-ordinates and directional language	uses, calculates and interprets information based on timetables, maps and plans including scales, compass points, travel distances, speeds and times

Criterion 6: Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving statistics and probability

Rating C	Rating B	Rating A
applies a familiar data collection process to collect information to answer a simple statistical question	selects and applies a familiar data collection process to collect numerical or categorical information to answer a simple statistical question	selects and applies a data collection process to collect numerical and/or categorical data to answer a statistical question involving two variables
organises familiar data and constructs tables, graphs and charts using simple and familiar scales and axes with and without the aid of technology	organises numerical or categorical information and represents in familiar tabular and/or graphical formats using appropriate scales and axes with and without the aid of technology	represents numerical and/or categorical information purposefully and accurately in tabular and graphical formats using appropriate scales and axes with and without the aid of technology
accurately reads information represented in simple tables, graphs and charts including comparison between categories or individual results	interprets information represented in simple tables, graphs and charts including identifying likelihood of chance events based on experimental data	interprets information represented in tables, graphs and charts and performs calculations to compare averages between different data sets e.g. comparison of heights in two different Grade 9 classes
describes and compares the likelihood of everyday chance events using qualitative terms such as certain, likely, impossible and relates these to routine fractions, decimals or percentages	describes, compares and interprets the likelihood of everyday chance events using qualitative terms on a decimal scale between 0 (impossible) and 1 (certain)	compares and describes theoretical and experimental probability of everyday events, identifies and explains variation, randomness and distribution of the data

Quality Assurance

- This will be determined by TASC at time of accreditation.

Qualifications and Award Requirements

The final award will be determined by the Office of Tasmanian Assessment, Standards and Certification from 6 ratings.

The minimum requirements for an award in *Essential Mathematics* Level 1 are as follows:

EXCEPTIONAL ACHIEVEMENT (EA)
5 'A' ratings, 1 'B' rating

HIGH ACHIEVEMENT (HA)
3 'A' ratings, 2 'B' ratings, 1 'C' rating

COMMENDABLE ACHIEVEMENT (CA)
3 'B' ratings, 3 'C' ratings

SATISFACTORY ACHIEVEMENT (SA)
5 'C' ratings

PRELIMINARY ACHIEVEMENT (PA)
3 'C' ratings

A learner who otherwise achieves the ratings for an SA (Satisfactory Achievement) award but who fails to show any evidence of achievement in one or more criteria ('z' notation) will be issued with a PA (Preliminary Achievement) award.

Course Evaluation

- This will be confirmed by time of accreditation.

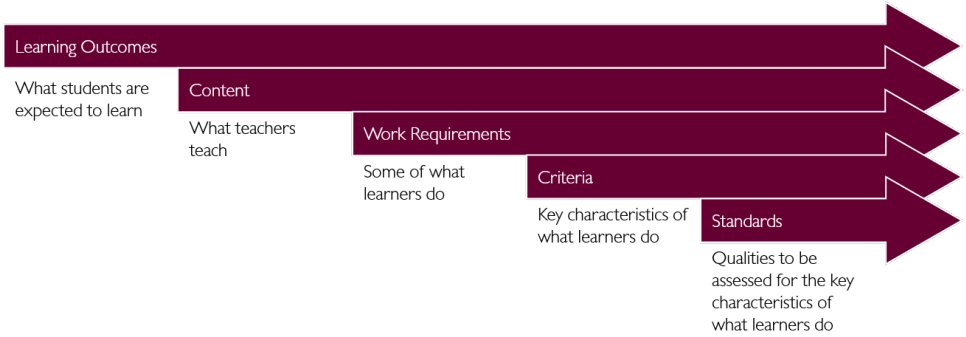
Course Developer

This course has been developed by the Department of Education's Years 9 to 12 Learning Unit in collaboration with Catholic Education Tasmania and Independent Schools Tasmania.

Accreditation and Version History

- Details to be determined by TASC at time of accreditation.

Appendix 1 - Line of Sight



Learning Outcomes	Course Content	Work Requirements	Criteria	Standards	General Capabilities (GC)
1. Interpret and communicate mathematical information and ideas and apply mathematical conventions in a range of contexts.	Module 1, 2, 3	Module 1, 2, 3	C 1	E 1, 2, 3, 4	GC:
2. Select and apply a variety of mathematical and problem-solving strategies in a range of contexts and reflect on their effectiveness.	Module 1, 2, 3	Module 1, 2, 3	C 2	E 1, 2, 3, 4	GC:
3. Apply mathematical reasoning to make inferences, generalize and represent relationships and explain thinking in a range of contexts.	Module 1, 2, 3	Module 1, 2, 3	C 3	E 1, 2, 3, 4	GC:
4. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving number and algebra.	Module 1	Module 1	C 4	E 1, 2, 3, 4	GC:

5. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving measurement and geometry.	Module 2	Module 2	C 5	E 1, 2, 3, 4	GC: 
6. Apply a range of mathematical techniques and procedures to solve problems and make informed choices in situations involving statistics and probability.	Module 3	Module 3	C 6	E 1, 2, 3, 4	GC: 

Appendix 2 - Alignment to Curriculum Frameworks

The content and assessment in this course is designed to enable learners who successfully complete the course to demonstrate evidence of 'Numeracy Level 3' of the Australian Core Skills Framework.

Appendix 3 - Work Requirements

Module 1 Work Requirements Specifications

Focus Area: Personal Futures
Title of Work Requirement: Multiplicative Thinking and Algebraic Reasoning
Mode /Format: Short response (question and answer / interview)
Learning Outcomes: 1,2,3,4
Description: Learners will complete a series of short responses where they will employ a range of mathematical techniques and procedures, problem solving strategies and mathematical reasoning to make informed choices relating to personal situations involving proportion and algebra.
Size: 10 x 50 word responses
Timing: Ongoing throughout module
External agencies: At teacher discretion
Relevant criteria:

- Criterion 1: all elements
- Criterion 2: all elements
- Criterion 3: all elements
- Criterion 4: all elements

Module 2 Work Requirements Specifications

Focus Area: Personal Futures
Title of Work Requirement: Measurement and Geometric Reasoning
Mode /Format: Short response (question and answer / interview)
Learning Outcomes: 1,2,3,5
Description: Learners will complete a series of short responses where they will employ a range of mathematical techniques and procedures, problem solving strategies and mathematical reasoning to make informed choices relating to personal situations involving measurement and geometry.
Size: 10 x 50 word responses
Timing: Ongoing throughout module
External agencies: At teacher discretion
Relevant criteria:

- Criterion 1: all elements
- Criterion 2: all elements
- Criterion 3: all elements
- Criterion 5: all elements

Module 3 Work Requirements Specifications

Focus Area: Personal Futures
Title of Work Requirement: Data Collection and Analysis Project
Mode /Format: Project
Learning Outcomes: 1,2,3,6
Description: Learners will complete a data collection and analysis project where they will employ a range of mathematical techniques and procedures, problem solving strategies and mathematical reasoning to make informed choices relating to personal situations involving probability and statistics.
Size: 500 words and/or 3 minutes multimodal presentation.
Timing: Ongoing throughout module
External agencies: At teacher discretion
Relevant criteria:

- Criterion 1: all elements
- Criterion 2: all elements
- Criterion 3: all elements
- Criterion 6: all elements

Appendix 4 – General Capabilities and Cross-Curriculum Priorities

Learning across the curriculum content, including the cross-curriculum priorities and general capabilities, assists students to achieve the broad learning outcomes defined in the *Alice Springs (Mparntwe) Education Declaration (December 2019)*.

General Capabilities:

The general capabilities play a significant role in the Australian Curriculum in equipping young Australians to live and work successfully in the twenty-first century.

In the Australian Curriculum, capability encompasses knowledge, skills, behaviours and dispositions. Students develop capability when they apply knowledge and skills confidently, effectively and appropriately in complex and changing circumstances, in their learning at school and in their lives outside school.

The general capabilities include:

- Critical and creative thinking
- Ethical understanding
- Information and communication technology capability
- Intercultural understanding
- Literacy
- Numeracy
- Personal and social capability

Cross-Curriculum Priorities:

Cross-curriculum priorities enable students to develop understanding about and address the contemporary issues they face, for their own benefit and for the benefit of Australia as a whole. The priorities provide national, regional and global dimensions which will enrich the curriculum through development of considered and focused content that fits naturally within learning areas. Incorporation of the priorities will encourage conversations between students, teachers and the wider community.

The cross-curriculum priorities include:

- Aboriginal and Torres Strait Islander Histories and Cultures
- Asia and Australia's Engagement with Asia
- Sustainability

Appendix 5 – Glossary

- A central glossary will be added to the final draft of the course for consultation.