Mathematics

At Tully State High School, mathematics is an integral and highly valued component of the curriculum. Students identify and explore mathematics concepts through active investigation of real-life situations involving mathematics. They understand that mathematics can help them to make meaning of their world.

When learning about mathematics, students recognise that there are particular ways of working with concepts in mathematics. Students also recognise that there are particular facts and procedures required for knowing and understanding in mathematics. Students and teachers value mathematics as a way of investigating, thinking, reasoning and relating to real-life situations.

Mathematics is a way of making sense of the world. The mathematics Key Learning Area helps students to know about mathematics, know how to do mathematics, and know when and where to use it. All people need the capacity to make sense of and be critical about numerical information. To achieve this they need a disposition to think and act mathematically, and the confidence and intuition to apply mathematical concepts to explore and solve everyday problems that confront them.

Skills needed for mathematics include mental computation and deep understandings of how numbers work. They also require meta-cognitive/higher order skills such as reflection, analysis, estimation, justification, synthesis and communication skills. These skills are needed to describe each of these in appropriate language and format, and are learned through working mathematically. The ways of working will be used to provide guidance of what students will be expected to do.

At Tully State High School, mathematics is seen as a dynamic field of study. Students from Year 8 to students in Year 12 will be led to discover the power and place of mathematics, both as a discipline, as it relates to learning in each of the other Key Learning Areas, and in our everyday encounters at work and play outside school.

Numeracy — Our view

Mathematics and numeracy are not the same thing. To be numerate is to use mathematics effectively to meet the general demands of life at home, in paid work, and for participation in community and civic life.

In school education, numeracy is a fundamental component of learning needed across all areas of the curriculum. It involves the disposition to use, in context, a combination of:

- underpinning mathematical concepts and skills from across the discipline (numerical, spatial, graphical, statistical and algebraic)
- mathematical thinking and strategies
- general thinking skills
- grounded appreciation of context.
- Unlike mathematics, which focuses on generalisation and abstraction, numeracy is embedded in specific contexts and has real-world purposes.

People who are numerate draw on three kinds of know-how:

- using mathematical concepts and skills
- making sense of unfamiliar situations
- being critical of how mathematics is used.

Many out-of-school numerate practices do not require mathematics as it is traditionally taught in schools. Instead, students need to use and adapt intuition, tools and rules of thumb to meet specific circumstances and solve problems. Within a school setting, the teaching we do to improve students' numeracy involves developing their ability to be adaptive thinkers, confident in applying mathematics knowledge in a range of contexts, flexible in their thinking, and willing to take reasonable risks when solving problems.

Content structure

Years 8 to 10

In the Australian Curriculum Mathematics is organised around the interaction of t**hree content strands (*Number and Algebra*, *Measurement and Geometry*, and *Statistics and Probability)*.** They describe **what** is to be taught and learnt, and **four proficiency strands** (***Understanding*, *Fluency*, *Problem Solving*, and *Reasoning)*.** They describe **how** content is explored or developed, that is, the thinking and doing of mathematics. They provide the language to build in the developmental aspects of the learning of mathematics and have been incorporated into the content descriptions of the three content strands described above

Content strands

Number and Algebra

Number and Algebra are developed together, as each enriches the study of the other. Students apply number sense and strategies for counting and representing numbers. They explore the magnitude and properties of numbers. They apply a range of strategies for computation and understand the connections between operations. They recognise patterns and understand the concepts of variable and function. They build on their understanding of the number system to describe relationships and formulate generalisations. They recognise equivalence and solve equations and inequalities. They apply their number and algebra skills to conduct investigations, solve problems and communicate their reasoning.

Measurement and Geometry

Measurement and Geometry are presented together to emphasise their relationship to each other, enhancing their practical relevance. Students develop an increasingly sophisticated understanding of size, shape, relative position and movement of two-dimensional figures in the plane and three-dimensional objects in space. They investigate properties and apply their understanding of them to define, compare and construct figures and objects. They learn to develop geometric arguments. They make meaningful measurements of quantities, choosing appropriate metric units of measurement. They build an understanding of the connections between units and calculate derived measures such as area, speed and density.

Statistics and Probability

Statistics and Probability initially develop in parallel and the curriculum then progressively builds the links between them. Students recognise and analyse data and draw inferences. They represent, summarise and interpret data and undertake purposeful investigations involving the collection and interpretation of data. They assess likelihood and assign probabilities using experimental and theoretical approaches. They develop an increasingly sophisticated ability to critically evaluate chance and data concepts and make reasoned judgments and decisions, as well as building skills to critically evaluate statistical information and develop intuitions about data.

Content descriptions are grouped into **sub-strands** to illustrate the clarity and sequence of development of concepts through and across the year levels. They support the ability to see the connections across strands and the sequential development of concepts from Foundation to Year 10.

Number and Algebra	**Measurement and Geometry**	**Statistics and Probability**
Number and place value (F-8)	*Using units of measurement* *(F-10)*	*Chance (1-10)*
Fractions and decimals (1-6)	*Shape (F-7)*	*Data representation and interpretation (F-10)*
Real numbers (7-10)	*Geometric reasoning (3-10)*	
Money and financial mathematics (1-10)	*Location and transformation*	

	(F-7)	
Patterns and algebra (F-10)	*Pythagoras and trigonometry (9-10)*	
Linear and non-linear relationships (8-10)		

Years 11 and 12

Mathematics – Years 11-12

Mathematics A

Mathematics A is recommended for students requiring a general Mathematics education, and who have achieved a Sound Achievement (or higher) in Year 10 Core Mathematics.

Mathematics A is an integral part of a general education. It is important in making informed decisions on everyday issues such as choosing between loan repayment schedules or insurance plans, interpreting information in the media, reading maps or house plans or estimating quantities of materials. In Mathematics A, the skills needed to make decisions which affect students' everyday lives are taught.

Students are strongly advised to consult the relevant QTAC Pre-requisites Handbook when planning their selection of an appropriate Mathematics course.

Successful completion of this subject contributes four points to a student's QCE.

Mathematics B

Mathematics B is recommended for students who have achieved a Sound Achievement (or higher) in Year 10 Extension Mathematics.

Mathematics is an integral part of a general education. It underpins science and technology, most industry, trade and commerce, social and economic planning and communication systems and is an essential component of effective participation in a rapidly changing society.

Mathematics B is a prerequisite for many Tertiary courses. Students planning to do Chemistry and/or Physics are recommended to choose Mathematics B. Students are strongly advised to consult the relevant QTAC Pre-requisites Handbook when planning their

selection of an appropriate Mathematics course.

Successful completion of this subject contributes four points to a student's QCE.

Mathematics C

Mathematics C is recommended for students who have achieved a High Achievement (or higher) in Year 10 Extension Mathematics, and who are considering furthering their Mathematical/Scientific studies at University.

In Mathematics C, students are given the opportunity to develop their full mathematical potential and extend the knowledge acquired in Mathematics B. They will be encouraged to recognise the dynamic nature of mathematics through problem solving and applications in life related situations. Opportunities are provided for students to appreciate and experience the power of mathematics, and to see the role it plays as a tool in modelling and understanding many aspects of the world's environment.

Successful completion of this subject contributes four points to a student's QCE.

Mathematics C is not a prerequisite, but is recommended for several Tertiary courses. Students studying Physics will find that many of the concepts taught in Mathematics C correspond as they are complementary subjects.

Students are strongly advised to consult the relevant QTAC Pre-requisites Handbook when planning their selection of an appropriate Mathematics course.

Pre-Vocational Mathematics

Pre-Vocational Mathematics is recommended for students requiring a general Mathematics education. Emphasis is placed on preparation work for TAFE courses, Vocational Education and Pre-Apprenticeship.

Mathematics is an integral part of a general education. It is important in making informed decisions on everyday issues such as choosing between loan repayment schedules or insurance plans, interpreting information in the media, reading maps or house plans or estimating quantities of materials. In Pre-Vocational Mathematics, the skills needed to make decisions which affect students' everyday lives are taught.

Successful completion of this subject contributes four points to a student's QCE.

Short Course in Numeracy

The short course in literacy and the short course in numeracy provide opportunities for students to demonstrate the QCE's literacy or numeracy requirements.

Students who complete a short course at a Sound Achievement level will achieve one credit towards the QCE.