

Mathematics

Mathematics

Years 1–8

PRIMARY SCHOOL CURRICULUM

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Ministry of Education, Sports and Culture

This curriculum statement was prepared and written by Professor Karoline Afamasaga-Fuata'i after consultations with the Mathematics Subject Committee and others. Tafaomālō Sione was the CMAD Curriculum Officer.

Utumoa S.F. Oloapu
Tuaia Isaia
Naomi Tavila
Vine S. Maulolo
Viesea Isaako
Tuitamai Lui
Luapi Reti
Perenise Sufia

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Designed, edited and typeset by Mary Egan Limited
+64 9 360 9118
www.maryegan.co.nz

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Introduction

All citizens in Sāmoa have the right to participate fully in all aspects of development and self-determination. To do this, students need to develop sound mathematical knowledge, skills and understanding. Students need to have a thorough understanding of Mathematics in order to find solutions to real-life problems. By linking new mathematical concepts to their daily experiences and existing cultural knowledge, students integrate their knowledge, skill and understanding so that they can use Mathematics in familiar and interesting contexts in their own lives.

As outlined in the *National Curriculum Policy Framework* (MESC, 2006), Mathematics is both a necessary tool for social living and the language of the sciences. Practical applications in these areas provide a framework for deciding what underlying mathematical concepts, skills and processes students should acquire. Through the study of Mathematics, students will acquire concepts and processes that are:

- associated with a broad definition of numeracy;
- necessary for interpreting change and innovations in the environment;
- essential to problem solving including making plans and decisions;
- appropriate for understanding the application of mathematics to other content areas in the curriculum and the wider community. (p. 9)

Mathematics is a reasoning and creative activity employing abstraction and generalisation to identify, describe and apply patterns and relationships. Mathematical ideas have evolved over centuries and across all cultures and they continue to expand. The symbolic nature of Mathematics enables a powerful, precise and concise means of communication. The Sāmoan Primary Mathematics (Mathematics) syllabus focuses on developing the processes of interpreting and posing questions, strategically thinking and representing, reasoning and justifying, reflecting and evaluating, and communicating mathematically. It is a powerful tool for solving familiar and unfamiliar problems both within and beyond Mathematics and in relation to authentic contexts. As such, Mathematics consists of multiple but interrelated and interdependent concepts and systems that students can apply in other subject areas and to realistic situations.

Numeracy (or mathematical literacy) skills is the ability to effectively use mathematics in everyday situations. It is essential for all Sāmoan citizens in order to meet the general demands of life at home and at work, and for participation in community, cultural and public life.

In addition to its practical applications, the study of Mathematics is a valuable pursuit in its own right, providing opportunities for originality, challenge and leisure.

The cross-curriculum content addresses issues, perspectives and policies that will assist students to achieve the broad learning outcomes as encapsulated in *Samoa's National Curriculum Policy Framework* (MESC, 2006, p. 9).

For these reasons it is important that we use Mathematics in schools to produce a numerate or mathematically literate population. The ability to make informed decisions, and to interpret and apply mathematics in a variety of authentic contexts is an essential component of students' preparation for life in the twenty-first century. To participate fully in society students need to develop the capacity to critically evaluate ideas and arguments that involve mathematical concepts or that are presented in mathematical form.

General aims

The general aims of the basic education Mathematics Curriculum are to develop students' thinking, understanding, competence and confidence in the application of mathematics, their creativity, enjoyment and appreciation of the subject, and their engagement in lifelong learning. More specifically, mathematics education aims to provide opportunities for students to:

- learn to describe and apply patterns and relationships;
- reason, predict and solve problems;
- calculate accurately both mentally and in written form;
- estimate and measure;
- interpret and communicate information presented in numerical, geometrical, graphical, statistical and algebraic forms;
- develop an appreciation of mathematics and its applications in their everyday lives and in the worlds of science, technology, commerce, the arts and employment;
- develop a positive self-concept as learners of mathematics;
- obtain enjoyment from mathematics, and become self-motivated learners through inquiry and active participation in challenging and engaging experiences;
- develop concurrent learning in other curriculum areas;
- build a sound foundation for further mathematics education.

Organising strands

The prescribed content in Mathematics is organised around the interaction of outcomes and content statements in six broad strands; one process strand, Working Mathematically; and five content strands – Number and Operations, Patterns and Algebra, Data Analysis, Measurement, and Space and Geometry.

Within each strand, particular aspects of students' mathematical learning and understanding are developed and organised through substrands. However, students need to be able to make connections between mathematical ideas, concepts and procedures and to link these to daily cultural and family practices in order to develop a richer understanding and better appreciation of mathematics. Integrating concepts within and between the following strands and authentic contexts will support development of these connections.

Working Mathematically

Working Mathematically (WM) includes five interrelated groups of processes, namely, interpreting and/or posing questions, strategically thinking and representing, reasoning and justifying, reflecting and evaluating, and communicating mathematically. These processes provide the language to build in the developmental aspects of doing, learning and understanding mathematics. For example, these WM processes should be implemented when developing new skills and concepts and also when applying existing knowledge to solve routine and non-routine problems both within and beyond Mathematics and in relation to authentic contexts. At different stages of teaching and learning a content area, the focus may be on a particular process or group of processes, but often the five groups of processes interweave and/or overlap. While this strand has a set of separate outcomes, it is interwoven into, and underpins, the content of each of the five content strands in the syllabus.

Number and Operations

Number includes the development of number sense and understanding the connection between operations and development of confidence and competence in using a range of informal and formal strategies for computation, problem solving and conduct of investigations.

Patterns and Algebra

This strand emphasises number patterns and number relationships leading to an investigation of the way that one quantity changes relative to another.

Data Analysis

The Data Analysis strand emphasises the need for all students to understand, interpret, analyse and present data in tables and graphs.

Measurement

Measurement enables the identification and quantification of attributes of objects so that they can be compared and ordered. Students make meaningful measurements of attributes and choose appropriate units and measuring devices, and calculate derived measures such as areas and volumes given particular information.

Space and Geometry

Space and Geometry, the study of spatial forms, involves representation of shape, size, pattern, position and movement of two-dimensional (2D) figures and three-dimensional (3D) objects in space, or in the mind of the learner. Students investigate properties and use their understanding of these properties to describe, compare and construct figures and objects.

The strands and substrands are illustrated in the table below.

STRAND		SUBSTRAND
<i>Process Strand</i>	<i>Working Mathematically</i>	<ul style="list-style-type: none"> • interpreting and/or posing questions, • strategically thinking and representing, • reasoning and justifying • reflecting and evaluating • communicating mathematically
<i>Content Strands</i>	<i>Number and Operations</i>	<ul style="list-style-type: none"> • Whole Numbers • Addition and Subtraction • Multiplication and Division • Fractions and Decimals • Chance
	<i>Patterns and Algebra</i>	<ul style="list-style-type: none"> • Patterns • Number Relationships
	<i>Data Analysis</i>	<ul style="list-style-type: none"> • Data Analysis
	<i>Measurement</i>	<ul style="list-style-type: none"> • Length • Area • Volume and Capacity • Mass • Time
	<i>Space and Geometry</i>	<ul style="list-style-type: none"> • Three-dimensional Space • Two-dimensional Space • Position

TABLE 1: OVERVIEW OF STRANDS AND SUBSTRANDS

Key principles

The National Curriculum Framework lists five key principles which underpin all aspects of the Sāmoan education including the development of the curriculum. They are as follows.

Equity

Equity requires that the system will treat all individuals fairly and justly in provision of educational opportunity. Policies and practices which advantage some social groups and disadvantage others will be avoided, while those which address existing inequalities in access, treatment and outcome will be promoted.

Quality

Educational quality is exemplified by high standards of academic achievement, cultural understanding and social behaviour and results from a complex interplay of professional and technical factors, and social and cultural practices. Policies promoting these will focus on the learning institutions and specifically on day-to-day classroom practices including the monitoring, assessment and reporting of student outcomes and teaching effectiveness.

Relevance

Relevance in education implies a system which is meaningful, recognised, applicable and useful to one's life. It should enhance individual and community well-being and ultimately national development, including cultural, humanistic and spiritual aspects. Policy decisions will address what is relevant to the individual learner, to the community and nation.

Efficiency

Efficiency in education is demonstrated by leadership and management practices which ensure optimum use of resources – human, financial and material – at all levels, efficient service delivery, effective communication and coordinated and transparent decision making. Policies will reflect the need to be both efficient and effective.

Sustainability

Sustainability requires the wise use of human, financial and material resources, to ensure balanced and continual development in the system. Transparency and accountability are necessary at all levels. The collective values of trust, integrity and a sense of responsibility for the common good in community and national development will be promoted.

Curriculum principles

The National Curriculum Framework outlines the following curriculum principles to give direction and consistency to the development of programmes:

All students can be successful learners

The Sāmoan Curriculum recognises that *all* students can be successful learners when they are provided with sufficient time and support.

Students need to be engaged

The Sāmoan Curriculum recognises that for students to succeed, curriculum experiences must relate to student interests, needs and learning styles in order to engage students.

Programmes must be planned

The Sāmoan Curriculum recognises that for students to be successful, programmes must be carefully planned and use a range of teaching approaches in order to cater for the various learning styles of students.

Programmes must develop the whole person

The Sāmoan Curriculum recognises that programmes must be broad and balanced and provide opportunities for the intellectual, social, spiritual and cultural disposition of each student to be developed so when students complete their schooling they are well prepared for work and further study.

Assessment must inform practice

The Sāmoan Curriculum recognises the need for teachers to use monitoring, assessment and reporting practices that help them evaluate the effectiveness of their teaching practices as well as provide an indication of student achievement against established standards.

Teachers make a difference

The Sāmoan Curriculum recognises the centrality of highly effective teaching in ensuring quality outcomes for students.

Community involvement assists learning

The Sāmoan Curriculum recognises that *fa'asāmoa* must be upheld and that the community plays a large role in the education of students.

A sustainable future

The Sāmoan Curriculum emphasises the need to develop environmentally and socially sustainable practices. This applies not only to the physical environment but also in the way society structures itself socially, culturally and economically.

Essential skills

Essential skills are the broader skills that are developed throughout the years of schooling. The essential skills are developed as a result of the quality of the experiences provided in all classroom and school activities and are used by students in all school activities as well as in their social and cultural world outside the school.

Communicating effectively

Communication underpins all learning and includes reading, writing, speaking and listening, visual and graphic representation, non-verbal communication and the use of number and data to convey meaning.

Students are encouraged to express mathematical concepts and processes using their own words as well as using mathematical terminology and notation.

Solving problems

This involves the use of inquiry and reasoning, gathering data and processing information, posing creative solutions and evaluating outcomes. Mathematical concepts and skills are often used when solving problems.

Problem-solving tasks provide opportunities for students to develop the capacity to plan and organise activities. It involves the use of inquiry and reasoning, of gathering data and processing information, posing creative solutions and evaluating outcomes to ensure their reasonableness and meaningfulness given the context of the mathematical task. Planning and organising their own strategies for obtaining solutions to tasks involves:

- the ability to set goals by identifying what the focus questions are;
- establish priorities;
- implement a plan based on given information provided in the task, main concepts used and existing relevant knowledge and skills;
- select and manage resources and time to achieve the goals;
- monitor individual performance; and
- meta-cognitively reflect on the value of the learning experience in the general context of learning mathematics.

Utilising aesthetic judgement

This involves the use of the visual and performing arts as a means of expression and requires an appreciation of the aesthetic value of objects and experiences.

In Mathematics, group or self-evaluation of mathematical statements, informal descriptions, general rules, multiple strategies, and/or methods of solutions provide students with the opportunities to judge the validity, consistency, sophistication and/or elegance of their mathematical ideas and reflections.

Students are encouraged to link their school mathematics to everyday social, environmental and cultural practices and artefacts at the home, community, village and national levels.

Developing social and cultural skills and attributes

The capacity to operate socially and to work effectively with others is an essential skill. It requires an understanding of context, of the cultural norms and expectations that exist and the ability to negotiate and reach consensus. It also involves individuals developing their ethical framework including an informed understanding of the issues associated with gender.

The experience of working with others and in teams can facilitate learning and enhance social skills. Group work provides the opportunity for students to communicate mathematically with each other, to take risks and make conjectures in a supportive non-threatening environment, to cooperate, to debate, to counter-argue, to logically and mathematically justify ideas, and to persevere when solving problems and undertaking investigations.

Managing oneself and developing work and study skills

Students need to be able to manage their time effectively to allow them to pursue personal, spiritual, sporting and academic interests. They need to know how to resolve conflict in constructive ways that

allows all involved to feel that they have been treated with fairness and respect. They need to take personal responsibility for their choices and actions and learn from both their mistakes and successes. This includes responsibility for personal health and fitness.

Planning and organising their own strategies for obtaining solutions to mathematics tasks involves the ability to set goals, establish priorities, implement a plan, select and manage resources and time, and monitor individual progress, performance and achievement of goals.

Integrating knowledge

While learning areas are used as the organisers of knowledge, the prime purpose of education is for students to understand the world around them and see the links between the various areas. This requires a deep and thorough understanding of subjects so the knowledge gained can be linked to experience and complex interrelated understandings developed.

In integrating their knowledge, students develop their competencies in using mathematical ideas and techniques and solving problems. Across the syllabus strands attention is drawn to opportunities for students to solve meaningful and challenging problems in both familiar and unfamiliar contexts, within Mathematics, in other key learning areas, at work and in everyday situations. Problem solving can promote communication, critical reflection, creativity, analysis, organisation, experimentation, synthesis, generalisation, validation, perseverance, and systematic recording of information. In addition, teaching through problems that are relevant to students can encourage improved attitudes to Mathematics and an appreciation of its importance to society.

Effectively using technology

Technology involves the development of the skills and knowledge used to make and construct objects and products used in day-to-day living and in the pursuit of special interests. Technology also involves the use of information technology used to access information stored electronically. Over time, information technology will become more widely available and be increasingly used in all areas of the curriculum to create, locate and store information.

In order to achieve the outcomes of this syllabus, students will need to learn about and use appropriate technologies to develop their competency in using technology. It is important for students to determine the purpose of a technology, when and how to apply it, and to evaluate the effectiveness of its application, or whether its use is inappropriate or even counterproductive. Computer software as well as calculators, mobile phones, digital cameras, and video cameras can be used to facilitate teaching and learning.

Skills for mathematics

Students will develop knowledge, skills and understanding specific to mathematics:

- through inquiry, application of problem-solving strategies including the selection and use of appropriate technology, communication, reasoning, justifying and reflection;
- in mental and written computation and numerical reasoning;
- in patterning, generalisation and algebraic reasoning;
- in collecting, representing, analysing and evaluating information;
- in identifying and quantifying the attributes of shapes and objects and applying measurement strategies;
- in spatial visualisation and geometric reasoning.

Specific skills at each year level are outlined in the following table.

TABLE 2: SKILLS FOR MATHEMATICS, BY YEAR LEVEL

YEARS 1 AND 2	YEARS 3 AND 4	YEARS 5 AND 6	YEARS 7 AND 8
<i>By the end of Year 2 students will be able to</i>	<i>By the end of Year 4 students will be able to</i>	<i>By the end of Year 6 students will be able to</i>	<i>By the end of Year 8 students will be able to</i>
Understanding the Task (Interpreting &/or Posing Questions) <ul style="list-style-type: none"> interpret the language of the task description rephrase the task description using own words use concrete objects, actions, imagery and/or diagrams to explore their interpretations of the task identify the main focus questions to be answered identify given information and main ideas 	Understanding the Task (Interpreting &/or Posing Questions) <ul style="list-style-type: none"> interpret the language of the task description rephrase the task description using own words use concrete objects, pictures, and/or diagrams to represent their interpretations identify all focus questions to be answered identify given information and main ideas 	Understanding the Task (Interpreting &/or Posing Questions) <ul style="list-style-type: none"> interpret the language of the task description rephrase the task description using own words use concrete objects, pictures, and/or diagrams to represent their interpretations identify all focus questions to be answered identify given information and main ideas 	Understanding the Task (Interpreting &/or Posing Questions) <ul style="list-style-type: none"> interpret the language of the task description rephrase the task description using own words represent interpretations in multiple ways identify all focus questions to be answered identify given information and main ideas
Developing and Implementing a Plan (Strategically Thinking & Representing, Reasoning & Justifying) <ul style="list-style-type: none"> explore and identify other useful ideas and strategies explore connections between their mathematical representations of the task, useful strategies and given information organise the identified connections into a logical plan implement the plan systematically to answer the identified focus questions explore other methods of solving the same task 	Developing and Implementing a Plan (Strategically Thinking & Representing, Reasoning & Justifying) <ul style="list-style-type: none"> identify other useful ideas and strategies make clear connections between the mathematical representations of the task, useful strategies and given information organise the identified connections into a logical plan implement the plan systematically to answer the identified focus questions explore other methods of solving the same task 	Developing and Implementing a Plan (Strategically Thinking & Representing, Reasoning & Justifying) <ul style="list-style-type: none"> identify other useful ideas and strategies make clear connections between the mathematical representations of the task, useful strategies and given information organise the identified connections into a logical plan implement the plan systematically to answer the identified focus questions explore other methods of solving the same task 	Developing and Implementing a Plan (Strategically Thinking & Representing, Reasoning & Justifying) <ul style="list-style-type: none"> identify other useful ideas and strategies make clear connections between the mathematical representations of the task, useful strategies and given information organise the identified connections into a logical plan implement the plan systematically to answer the identified focus questions explore other methods of solving the same task
Evaluating Solutions (Reflecting & Evaluating) <ul style="list-style-type: none"> check whether the answers are reasonable compared to the given information evaluate whether the answers make sense in the context of the task ensure, by referring back to the task description, that the solution has satisfactorily answered all focus questions determine whether a different method gives the same answers 	Evaluating Solutions (Reflecting & Evaluating) <ul style="list-style-type: none"> check whether the answers are reasonable compared to the given information evaluate whether the answers make sense in the context of the task ensure, by referring back to the task description, that the solution has satisfactorily answered all focus questions determine whether a different method gives the same answers 	Evaluating Solutions (Reflecting & Evaluating) <ul style="list-style-type: none"> check whether the answers are reasonable compared to the given information evaluate whether the answers make sense in the context of the task ensure, by referring back to the task description, that the solution has satisfactorily answered all focus questions determine whether a different method gives the same answers 	Evaluating Solutions (Reflecting & Evaluating) <ul style="list-style-type: none"> check whether the answers are reasonable compared to the given information evaluate whether the answers make sense in the context of the task ensure, by referring back to the task description, that the solution has satisfactorily answered all focus questions determine whether a different method gives the same answers

YEARS 1 AND 2	YEARS 3 AND 4	YEARS 5 AND 6	YEARS 7 AND 8
<i>By the end of Year 2 students will be able to</i>	<i>By the end of Year 4 students will be able to</i>	<i>By the end of Year 6 students will be able to</i>	<i>By the end of Year 8 students will be able to</i>
<p>Communicating Mathematically (Strategically Thinking & Representing, Reasoning & Justifying, Reflecting & Evaluating)</p> <ul style="list-style-type: none"> • use pictures, diagrams, actions and/or symbols to describe mathematical situations • compare and contrast the different strategies of solving the same task • support conclusions by explaining or demonstrating how answers were obtained using everyday and some mathematical language • make generalisations about, and identify applications of, existing knowledge and understanding to other learning areas • describe the relevance of existing knowledge and understanding to everyday experiences • pose new tasks to apply and extend existing knowledge and understanding 	<p>Communicating Mathematically (Strategically Thinking & Representing, Reasoning & Justifying, Reflecting & Evaluating)</p> <ul style="list-style-type: none"> • select and use appropriate mental or written strategies or technology to solve problems • use appropriate terminology to describe, and symbols to represent, mathematical ideas • compare and contrast the different methods of solving the same task • check the accuracy of a statement and explain the reasoning used in terms of mathematical definitions and general rules • make generalisations about, and identify applications of, existing knowledge and understanding to other learning areas • describe the relevance of existing knowledge and understanding to everyday experiences • pose new tasks to apply and extend existing knowledge and understanding 	<p>Communicating Mathematically (Strategically Thinking & Representing, Reasoning & Justifying, Reflecting & Evaluating)</p> <ul style="list-style-type: none"> • select and apply appropriate problem-solving strategies, including technological applications, in undertaking investigations • describe and represent a mathematical situation in a variety of ways using mathematical terminology and some conventions • compare and contrast the different methods of solving the same task. • give a valid reason for supporting one possible solution over another in terms of mathematical definitions and general rules • make generalisations about, and identify applications of, existing knowledge and understanding to other learning areas • describe the relevance of existing knowledge and understanding to everyday experiences • pose new tasks to apply and extend existing knowledge and understanding 	<p>Communicating Mathematically (Strategically Thinking & Representing, Reasoning & Justifying, Reflecting & Evaluating)</p> <ul style="list-style-type: none"> • analyse a mathematical or real-life situation, solving problems using technology where appropriate • use mathematical terminology and notation, algebraic symbols, diagrams, text and tables to communicate mathematical ideas • compare and contrast the different methods of solving the same task • identify relationships and the strengths and weaknesses of different strategies and solutions, giving reasons in terms of mathematical definitions and general rules • make generalisations about, and identify applications of, existing knowledge and understanding to other learning areas • describe the relevance of existing knowledge and understanding to everyday experiences • pose new tasks to apply and extend existing knowledge and understanding

Values in the curriculum

Like the essential skills, values are central to the personal development of each individual and the way the broader society operates. Values are not only developed by schools but by the broader community including the media. Values are the internal beliefs and attitudes held by individuals and groups that are used in responding to everyday events. The school curriculum will help individuals to develop and clarify their own beliefs and values. The values that underpin the Sāmoan Curriculum include:

Fairness, in order to ensure that:

decisions and practices are viewed as having respected the opinion of others and where outcomes are accepted as just.

Honesty, in order to ensure that:

there is a consistency and sincerity in what is said and done.

Excellence, in order to ensure that:

high achievement is valued and celebrated.

Responsibility, in order to ensure that:

students are responsible for their actions and undertake actions to assist others.

Respect, in order to ensure that:

others are treated with consideration and sensitivity, the physical environment is maintained and cultural and spiritual values and societal rules are adopted by all.

Tolerance, in order to ensure that:

the differences and diversity within society are respected and accommodated.

Values in mathematics

The goal of this curriculum statement is to produce individuals and a population with personal mathematical beliefs and attitudes that:

- reflect an appreciation of mathematics as an essential and relevant part of life;
- show interest and enjoyment in inquiry and the pursuit of mathematical knowledge, skills and understanding;
- demonstrate confidence in applying mathematical knowledge, skills and understanding to everyday situations and the solution of everyday problems;
- develop and demonstrate perseverance in undertaking mathematical challenges;
- recognise mathematics as a subject that has been developed in many cultures in response to human needs.

More particular to mathematics learning are the following values:

Logical and critical thinking, in order to ensure that:

mathematical explanations, solutions, generalisations, reasoning and justifications are internally consistent with the initial conditions of a given mathematical task and subsequent interpretations of these and in accordance with the criteria of excellence of the discipline.

Communication, in order to ensure that:

there is a considered sound and transparent mathematical rationale for a proposed argument or solution which takes into account the parameters of the mathematical task; relevant mathematical concepts, processes and principles are identified and applied; the argument or proposed solution is succinctly expressed in appropriate mathematical representational forms, terminology and/or notation.

Consistency, in order to ensure that:

the proposed argument, strategy or solution is internally consistent with the parameters of the mathematical task and those of similar tasks, and is meaningful given the context of the task including justifications with relevant mathematical principles and processes.

Work things out, in order to ensure that:

the proposed solution, strategy or argument is based on the appropriate identification of relevant from irrelevant information, careful selection of pertinent principles and processes, and suitable integration of these to generate answers to the focus questions of the mathematical task.

Investigation, in order to ensure that:

mathematical conjectures, tentative generalisations, general rules, and/or developing abstractions are firmly grounded in, or supported by, the data collected.

Accuracy, in order to ensure that:

a proposed solution or answer makes sense given the context of the mathematical task and its given information.

Verification, in order to ensure that:

the proposed solution is reasonable and mathematically rigorous and robust enough to withstand constructive critiques from peers and/or more mathematically capable others.

Proof and reflection, in order to ensure that:

the proposed solution makes sense given the context of the mathematical task, is suitably supported by the given information and is the result of strategically applying relevant mathematical principles and processes.

Inclusive education

The Ministry of Education, Sports and Culture is committed to providing high-quality inclusive education to all Sāmoan students within a school culture based on respect and acceptance. A key component of quality education is the provision of appropriate programmes and support for a diverse range of students including those with disabilities, those at risk because of social or economic circumstances, and those in the gifted range. The principle that ‘*All students can be successful learners*’ recognises that all students can succeed when they are provided with sufficient time, support and effective teaching. This ensures that the aims of social justice and equity are seen in practice as all students, irrespective of race, ethnicity, disability or socio-economic background can achieve quality educational outcomes. It acknowledges the right of all students to be successfully enrolled in schools and experience success through participating in inclusive educational programmes.

For all students the need to cater for their individual needs and develop appropriate skills, knowledge and personal attributes through a holistic approach to learning is at the centre of all educational programmes. All students have the right to be included in their local school where they will have the

opportunity to access the rich social and cultural setting to best develop the social and cultural skills necessary to be included in the broader community.

Supporting the process of inclusive education

Inclusive education is a process whereby the school systems, strategic plans and policies adapt and change to include teaching strategies for a wider, more diverse range of children and their families. Inclusive education means to identify a child's learning style and adapt the classroom and teaching strategies to ensure high-quality learning outcomes for all members of the class. Everyone is important, unique and valued for their contribution to the school.

Students who are gifted in one or more areas also have educational needs. For these students it is important that programmes are provided that extend their abilities and assist them to develop their intellectual, artistic or other talents to their fullest potential.

Gender

The Sāmoan Curriculum ensures that the learning experiences of girls as well as boys are catered for equally. It is based on the knowledge that:

- a person's sex is genetically determined but gender roles are not, but rather change over time, from place to place, and from individual to individual;
- learners can play an active role in making meaning from their experiences, and in deciding to adopt or reject ways of behaving;
- gender stereotypes should be challenged.

Gender is what it means to be a female or a male. It refers to those behaviours and attitudes that are culturally accepted, and acceptable, as ways of being a woman and of being a man. Addressing gender issues goes well beyond ensuring that males and females have the same opportunities to receive an education and to fulfil their learning potential. A person's experiences determine the way they understand and make sense of the world. Gender is also culturally determined. In Sāmoa there is a need for sensitivity to local cultural practices and values, with respect to traditional roles for males and females. The curriculum provides learners with subjects, resources and experiences that value the needs of girls and boys.

To be inclusive, teachers need to ensure that all girls and boys are able to participate in activities that enhance their learning equally, and provide equal opportunities to pursue a productive and fulfilling life when they complete their schooling. Teaching practices, including classroom organisation and management, should ensure that girls and boys are able and encouraged to participate fully in all learning activities. Teachers must be sensitive to the kinds of classroom practices that discourage girls or boys from succeeding and persevering with their studies.

Materials used in teaching must give learners the opportunity to understand how men and women, and boys and girls, can have a wide range of occupations, tasks and responsibilities. Materials must also use gender-neutral language wherever possible.

School programmes and classroom learning tasks should reflect the diversity of roles available to women and men and girls and boys. Teachers need to ensure that gender is not an obstacle to learning success or individual value. To ensure this, learning programmes must:

- include the interests, perspectives and contributions of both females and males in programmes, content, resources and methods of teaching;
- ensure that both males and females have equal access to learning resources, and teachers' time, and take part fully in all forms of learning activity;
- ensure that both females and males take active and valued leadership roles in learning activities;
- ensure that boys and girls understand and respect the right of each to equal opportunity.

Language learning through Mathematics

The language associated with learning in every subject in the curriculum is often abstract and demanding for any learner. Learning becomes even more complex as the medium of instruction in basic education moves from Sāmoan to English. So it is important for teachers to regard every lesson in every subject as a language lesson in which students' competence in the use of both Sāmoan and English is improved.

Language functions refer to the purpose for which language is used. For example, language can be used to give instructions, ask for help, describe reasons and so on. Much of this language is common to all subjects in the curriculum. However, in addition to developing their general competence in the functional use of Sāmoan and English, it is necessary for students to understand and use the concepts and language functions that are especially relevant to Mathematics.

Literacy is the ability to communicate purposefully and appropriately with others, in and through a wide variety of contexts, modes and mediums. While English and Sāmoan have a particular role in developing literacy, all curriculum areas, including Mathematics, have a responsibility for the general literacy requirements of students, as well as for the literacy demands of their particular discipline.

Studies have shown that the causes of student errors on word problems may relate to the literacy components rather than the application of mathematical computations. Mathematics at times uses words from everyday language that have different meanings within a mathematical context. This can create confusion for some students. Clear explanations of these differences will assist students in the acquisition and use of mathematical terminology.

In Mathematics the language functions that are especially important for students to learn to use include:

- Describing patterns from everyday life, using everyday language (Sāmoan or English) and/or mathematical (or arithmetic) language as appropriate for the developmental stage of students.
- Communicating their mathematical understanding by making connections between the mathematics they learn in school and their daily experiences.
- Critically evaluating, interpreting, applying and communicating mathematical information in a range of practical situations.
- Negotiating mathematical meanings in a social setting using various representational forms including the appropriate mathematical terminology and notation.
- Flexibly and fluently presenting their mathematical reflections and understandings using various mathematical representations.
- Expressing their mathematical conjectures, generalisations, justifications and creative solutions precisely and concisely using the appropriate mathematical language and notation.

Assessment in Mathematics

Assessment is not separate from the curriculum but is a cornerstone of outcomes-based learning in all subjects. It is the process of collecting and interpreting evidence in order to determine the learner's progress, to make judgements about a learner's performance and, above all to improve each student's learning.

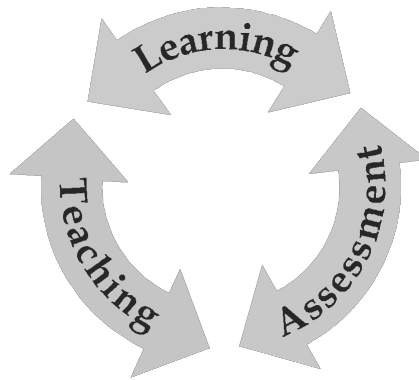
An outcomes-focused approach to assessment involves:

- providing a range of opportunities for learners to be aware of and to demonstrate outcomes
- gathering and recording evidence of learners' demonstration of outcomes
- making judgements about learners' demonstration of outcomes
- guiding the planning of teaching and learning programmes

- reporting achievement to learners and parents in an effective way which encourages further learning

Assessment should be an integral part of teaching and learning: it should not merely test learner achievement at the end of a unit of work. For this purpose, teachers' guide/manuals provide assessment guidelines appropriate for each learning outcome – which need to be adapted to suit the circumstance of each classroom situation. For assessment to achieve its full potential teachers need to ensure that learners receive immediate feedback on areas that need improvement.

Figure 1: Learning-teaching-assessment cycle



There are three purposes of assessment:

- 1 Assessment *for* learning
- 2 Assessment *as* learning
- 3 Assessment *of* learning.

Assessment *for* learning

Assessment of individual learner's progress is, above all, diagnostic and informative. The purpose of such assessment is to improve teaching and learning by diagnosing learning strengths and weaknesses before teaching and learning commences, and then measuring learners' progress against defined learning outcomes, and reviewing the effectiveness of teaching programmes. The information which teachers record from these assessments enables clear profiles of individual learners' achievement to be built. These profiles are used to inform teachers about each learner's learning and development, and to provide the basis for feedback to learners and parents.

Assessment for learning is based on a variety of student activities. These include: questioning of and by students; class exercises and activities involving individual and group work; products created by learners; projects and portfolios; teacher observations of learner performance; discussion; student self-assessment and peer assessment.

Activities such as these give teachers the opportunity to give verbal or written feedback to each student. The feedback is constructive and encouraging, and aims to build confidence. It is mainly descriptive, emphasizing strengths and challenges. The information also gives teachers the opportunity to adjust their own teaching to ensure students' learning is proceeding satisfactorily.

No grades or scores are given.

Assessment as learning

A learning outcomes approach to teaching and learning requires constant classroom assessment of learner progress for each clearly defined outcome, and constant feedback to learners and parents. Assessment should be positive and encouraging and help learners understand how to improve. Assessment is only meaningful when there is a clear sense of purpose and anticipated outcome – known to both the learner and the teacher.

Students have some ownership of, and take responsibility for their learning because they know in advance what is expected of them – what the learning goals are, and how achievement of the goals is going to be measured. Assessment tasks are explicitly linked to the curriculum and classroom programme.

Assessment of learning

Assessment of learning is summative. It takes place at the end of a learning unit and is usually accompanied by a grade or score. It tells the student, parents and the teacher how achievement compares with the expected outcome.

Achievement objectives and learning outcomes overview

Sāmoa's basic education curriculum is outcomes based. An outcomes-based curriculum clearly identifies the knowledge, skills, attitudes and values that all learners should be able to demonstrate at a particular year level, in a particular subject. Teachers are able to teach and learners are able to learn more effectively when the outcomes of learning are made explicit and are shared.

Within each of the organising strands and substrands of the Mathematics curriculum, achievement objectives, learning outcomes, and content statements are prescribed for each year. Achievement objectives are broad statements of what students are expected to learn. They describe what students need to know and be able to do for each subject and year level i.e. the 'content standards' associated with each learning area and year level.

Learning outcomes are statements that describe what learners demonstrate they know or are able to do as a result of engaging with the content through a variety of teaching and learning activities and experiences.

Outcomes-based education (OBE) shifts from the traditional focus on the topics teachers teach (content) and for how much time, to a focus on what learners are expected to demonstrate they know and are able to do. The characteristics of good learning outcomes are:

- learning is observable;
- learning is measurable;
- learners can demonstrate the application of their knowledge/skill/attitude;
- what learners are expected to know and to be able to do with their knowledge is highly focused and made explicit to learners, teachers and parents;
- high expectations are held for all learners, in the knowledge that all are capable of achievement;
- there is a focus on development, which emphasises the likely sequence of conceptual and cognitive development;
- a range of teaching contexts, opportunities and means of support are necessary to enable learners to gain knowledge and demonstrate achievement of outcomes. All learners have different learning needs and learning styles and will not always be ready to demonstrate learning outcomes in the same way at the same time, or even at the same year level.

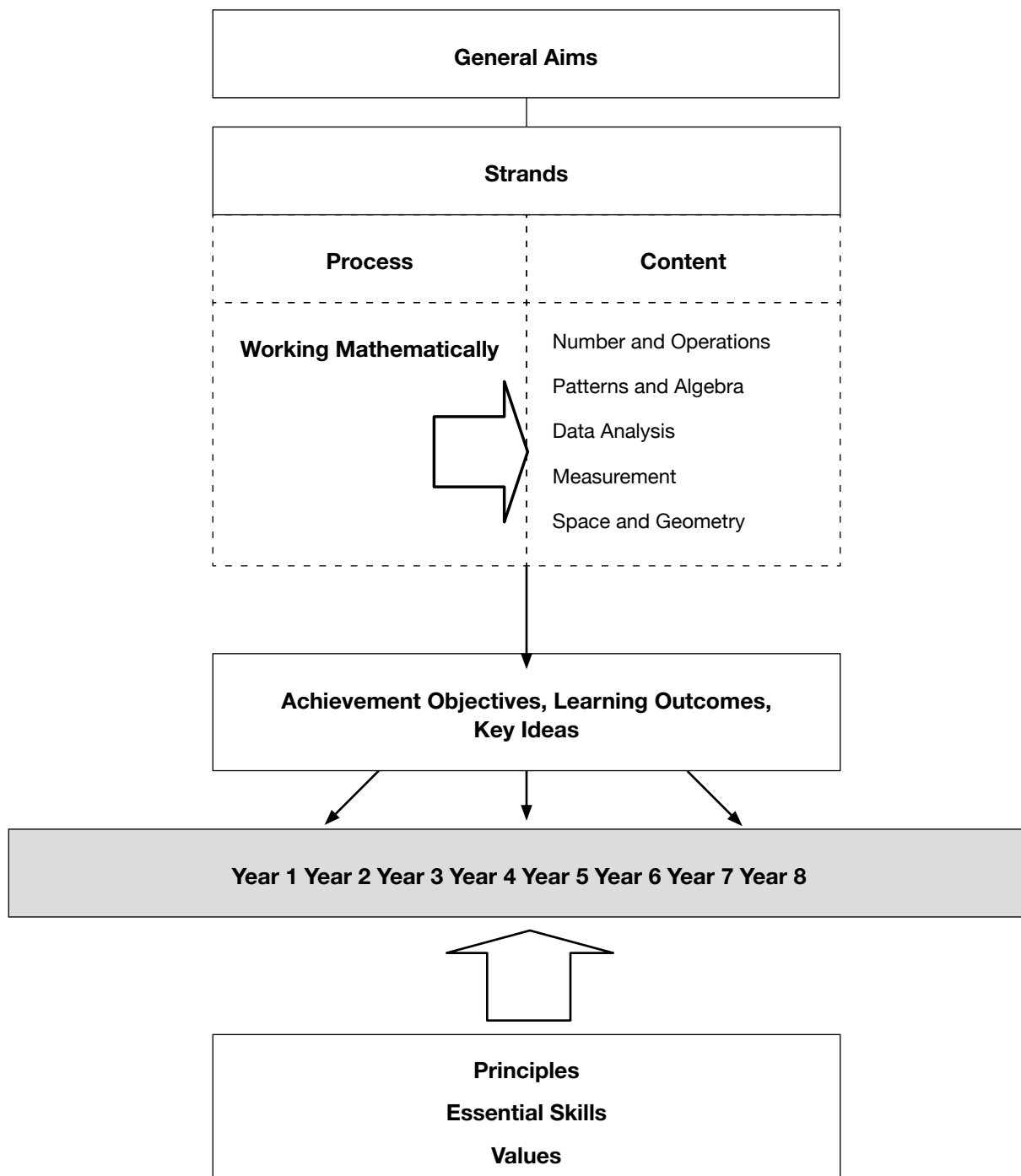
The ultimate test of a good learning outcome is whether or not the action taken by the participants can

be assessed in an authentic way. Learning outcomes enable teachers to closely monitor the progress of learners, and to report accurately to parents on learner progress. It follows that there is a close connection between learning outcomes and ongoing assessment of learners.

The structure of the curriculum

The structure of the Mathematics Curriculum is illustrated in the following diagram.

Figure 1: Structure of the Mathematics curriculum



Working Mathematically outcomes and indicators

The Working Mathematically processes, namely, *Interpreting &/or Posing Questions*, *Strategically Thinking & Representing*, *Reasoning & Justifying*, *Reflecting & Evaluating*, and *Communicating Mathematically*, underpin the teaching of the content of this curriculum. As such, examples of implementing them are provided in the Teachers’ Manual along with the knowledge and skills to be learnt by students.

The outcomes for the processes of *Interpreting &/or Posing Questions* (first one) and *Reasoning & Justifying* (third one) are similar for each year level with reference to that year’s content.

The difference between years will be in the level of sophistication expected for the outcomes. For *Interpreting &/or Posing Questions*, this means that a Year 1 student might interpret and/or pose questions about identifying the number before and after a given number, whereas a Year 8 student might interpret and/or pose questions about expressing a number as a product of its prime factors.

For *Reasoning & Justifying*, a Year 1 student might reason about fair share for each child given a particular number of lollies whereas a Year 8 student might reason about and justify the use of equal and non-equal contributions to a family/village *faalavelave* as a basis for fair distribution of returns as practised in other cultures including Sāmoan culture.

Figure 1 below shows a concept map of the Working Mathematically Processes.

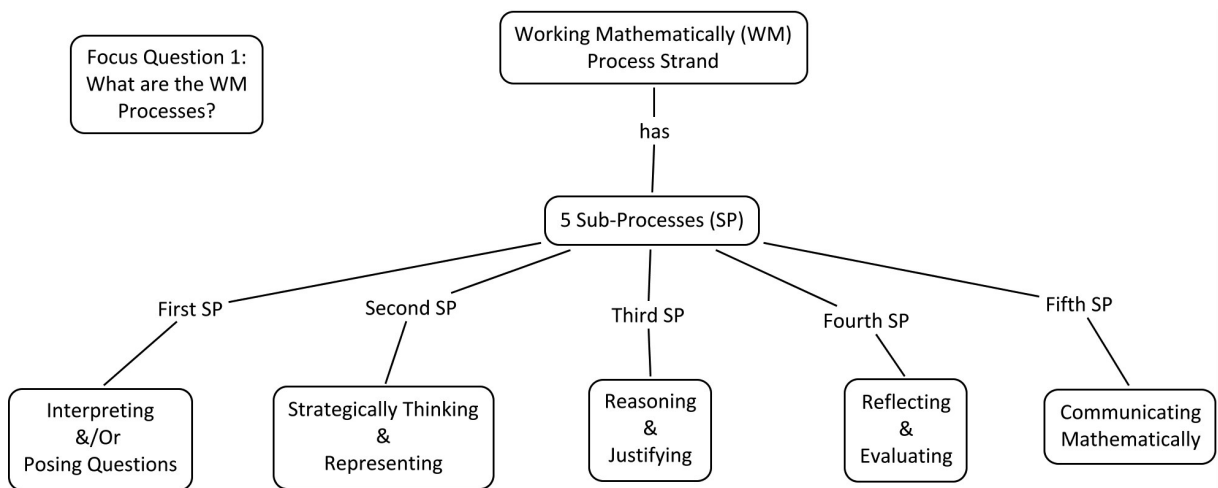


Figure 1: Working Mathematically Concept Map

Year Level: strands, achievement objectives, learning outcomes, key ideas

Year One

Number and Operations

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students count, order, read, write, partition and regroup numbers up to 50 and use a range of mental strategies, informal recording methods and materials to add, subtract, multiply and divide.</p> <p>Students model and describe objects and collections divided into halves.</p> <p>Students sort, order and count coins up to 50 sene.</p> <p>Students recognise and describe the element of chance in familiar activities</p>		
Whole numbers	<p>develop an understanding of the ways numbers are represented, the role of place value, and relationships among numbers and number systems.</p>	<p>NR1.1 Recognise and count to and from 50 by ones and twos, and order, read and represent numbers in the range 0 to 50.</p>	<p>Count forwards by ones and twos to 50, from any starting point.</p> <p>Count backwards by ones and twos from any starting point, in the range 0 to 50.</p> <p>Recognise, compare, order, read and represent numbers up to 50.</p> <p>Use place value to partition numbers into tens and units.</p> <p>Read and use the ordinal names to at least 'tenth'.</p> <p>Recognise, describe and order Sāmoan coins.</p>
Addition and Subtraction	<p>develop fluency with number facts and computation using addition and subtraction and construct an appreciation of the relationship between those facts and the two operations.</p>	<p>NR1.2 Model, combine and separate sets of objects, describe additive, including counting on, and sharing strategies using everyday language and record using informal methods.</p>	<p>Combine sets of objects to model addition.</p> <p>Take part of a set or collection away to model subtraction.</p> <p>Compare and contrast sets to determine 'how many more' using efficient strategies including counting on.</p> <p>Represent and record addition and subtraction informally.</p>

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Multiplication and Division	develop fluency with number facts and computation using multiplication and division and construct an appreciation of the relationship between those facts and the two operations.	NR1.3 Model and represent multiplication and division by grouping, sharing and counting sets and collections of objects, justify and explain using everyday language such as equal grouping and sharing equally and record using informal methods.	Construct and represent equal groups, sets or rows of objects. Group and share sets equally. Identify 'non-equal' sets. Record grouping and sharing informally.
Fractions and Decimals	develop an understanding of fractions as parts of unit wholes, as parts of a set, as locations on number lines, and as divisions of whole numbers.	NR1.4 Model halves as two equal parts of an object, recognise and create halves of collections found in everyday situations.	Construct and model two equal parts of an object, set or collection. Identify, explain and model halves using everyday objects or sets. <i>See Whole Number substrand for early money concepts.</i>
Chance	construct an understanding of chance and likelihood as applied in everyday situations and develop an appreciation of the difference between theoretical and experimental probabilities.	NR1.5 Identify the element of chance in familiar activities and describe chance using words such as yes, no and maybe.	Identify the element of chance in familiar activities. Describe chance using everyday language such as yes, no and maybe.

Patterns and Algebra

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students describe, create and continue a variety of number patterns and relate addition and subtraction facts to 50. Students solve word problems involving the application of patterns and relationships in relation to the Year 1 content.		
Patterns and Algebra	demonstrate fluency in generating, describing, recording, extending and representing geometric and numeric patterns as well as construct an understanding of the relationships and change between numbers and apply these in solving problems.	PA1.1a Identify, describe, copy, generate and extend repeating patterns as sequences of sounds and/or actions, shapes or simple numeric patterns that decrease or increase.	Identify, describe, generate and extend repeating patterns of sounds and/or actions, shapes and numbers. Model and extend simple number patterns that increase up to 50 or decrease from 50. Analyse change and describe how growing patterns are generated.
		PA1.1b Model quantitative relationships involving addition and subtraction number facts to 50, using objects, pictures and/or numbers.	Describe equality of sets using the term 'is the same as'.

Data Analysis

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students collect data about themselves and their surroundings and use objects or pictures to represent information. Students organise the objects or pictures into a data display using a scale of one-to-one correspondence, and interpret the information presented.		
Data Analysis	formulate questions that can be answered by collecting, organising, tabulating, graphing and analysing data.	DA1.1 Design investigations and collect, organise, represent and interpret picture graphs where one picture represents one data value including organising themselves into people graphs.	Design an investigation to answer a question about students and their environment. Collect and organise data to answer questions. Organise actual objects, pictures of the objects or students themselves into a data display. Record and interpret picture graphs and people graphs.

Measurement

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	Students compare objects directly in terms of their length, area, volume, capacity and mass and use everyday and comparative language to describe these attributes. Students demonstrate an understanding of the need for formal units of length. Students name and order days of the week; and sequence events and tell time on the hour using analogue and digital clocks.		
Length	identify and describe the attribute of length and use informal and formal (metric and imperial) units for measurement.	MS1.1 Use everyday language (long, short, high, tall, low, the same) to describe length and distance and compare lengths using uniform informal units and direct comparison.	Recognise and describe the attribute of length. Directly compare lengths by placing objects side by side and aligning the ends. Use informal ways of recording comparisons such as drawing, tracing or cutting and pasting.
Area	identify and describe the attribute of area and use informal and formal (metric and imperial) units for measurement.	MS1.2 Use everyday language (surface, inside, outside) to describe area and compare areas by covering completely with smaller shapes and direct comparison.	Recognise and explain the attribute of area. Directly compare two areas by direct comparison or superimposing one over the other. Use informal ways of recording such as drawing, tracing or cutting and pasting.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Volume and Capacity	identify and describe the attribute of volume and use informal and formal (metric and imperial) units for measuring capacity or volume.	MS1.3 Use everyday language (full, empty, about half-full) to describe capacity and compare the capacities of containers and the volumes of objects or substances using direct comparison.	Recognise and explain the attributes of volume and capacity. Measure capacity and volume using uniform informal units. Directly compare measures and explain reasoning in everyday language. Informally record comparisons using drawings, numerals and words.
Mass	understand, distinguish and describe the attribute of mass through indirect and direct comparisons, and use informal and formal (metric and imperial) units for measurement.	MS1.4 Use everyday language (heavy, light, hard to push/pull) to describe mass and compare, describe and order masses of two objects.	Recognise and explain the attribute of mass. Directly compare two objects by pushing, pulling or hefting or using an equal arm balance and order objects according to their masses. Use drawings and words to record comparisons informally.
Time	construct an understanding of, and describe the passage of time, its measurement and representations, through the use of everyday language and experiences.	MS1.5 Identify and sequence events, describe the duration of activities using everyday language, and read clocks on the hour.	Use everyday language to describe the duration of events. Identify and order events in time. State and order days of the week and seasons. Classify days into weekdays and weekend days. Read time on the hour on digital and analogue clocks using the term 'o'clock'.

Space and Geometry

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students manipulate, sort and then describe 3D objects and 2D shapes using everyday language. Students represent and describe the position of objects using everyday language.		
Three-dimensional Space	construct verbal, visual and mental representations of three-dimensional objects, their characteristics and properties, and different orientations.	SG1.1 Recognise, visualise and sort 3D objects, represent and describe them using everyday language.	Arrange and sort 3D objects found in the environment. Use everyday language to describe features of 3D objects. Recognise and use informal names for 3D objects.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Two-dimensional Space	construct verbal, visual and mental representations of lines, angles and two-dimensional shapes, their characteristics and properties, and different orientations.	SG1.2 Recognise, visualise, classify and use everyday language to describe representations of 2D shapes.	Rearrange, classify and explain properties of 2D shapes. Identify and name circles, squares, triangles and rectangles in pictures and the environment, and presented in different orientations. Construct and model 2D shapes using a range of materials. Use flips to create tessellating designs.
		SG1.2 (con"d) Recognise, visualise, classify and use everyday language to describe representations of 2D shapes.	Reorganise an arrangement by combining and partitioning to form new shapes. Recognise, identify and sketch straight and curved lines. Recognise, identify and define closed shapes and open lines. Understand and recognise different types of corners. Compare and classify corners into groups.
Position	develop their representation of position through precise language and the use of grids and compass directions.	SG1.3 Give and follow simple directions to familiar locations in their environment.	Provide and follow simple directions. Describe position using everyday language.

Working Mathematically

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Major Learning Outcomes	<p>Students interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 1 content.</p> <p>Students strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 1 content to justify their conjectures.</p> <p>Students critically reflect upon the results of their conjectures and use concrete materials and/or pictorial representations to evaluate conclusions.</p> <p>Students describe mathematical situations using everyday language, actions, materials and informal recordings.</p>	
Interpreting &/or Posing Questions	interpret and/or pose questions in relation to mathematical situations and their mathematical experiences using the relevant Year level mathematics.	WM1.1 Interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 1 content.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Strategically Thinking & Representing	strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.	WM1.2 Use objects, actions, imagery, technology and/or trial and error to examine and analyse, and to represent their interpretations of, mathematical problems.
Reasoning & Justifying	develop and utilise processes when investigating relationships, checking solutions and giving reasons to justify their conclusions.	WM1.3 Integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 1 content to justify conjectures.
Reflecting & Evaluating	reflect on their experiences and critical understanding to make connections with, and generalisations about, existing knowledge and understanding to explain answers and evaluate conclusions.	WM1.4 Reflect critically upon the results of conjectures and use concrete materials and/or pictorial representations to evaluate conclusions.
Communicating Mathematically	develop and use appropriate language and representations to formulate, express and communicate mathematical ideas.	WM1.5 Describe mathematical situations using everyday language, actions, materials and informal recordings.

Year Two

Number and Operations

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students count, order, read, write, partition and regroup numbers up to at least 100 and use a range of mental strategies, informal recording methods and materials to add, subtract, multiply and divide.</p> <p>Students model and describe objects and collections divided into halves and quarters and apply these in solving problems.</p> <p>Students sort, order and count coins up to one tala and perform simple monetary calculations.</p> <p>Students recognise, describe and order the element of chance in familiar activities.</p>		
Whole numbers	develop an understanding of the ways numbers are represented, the role of place value, and relationships among numbers and number systems.	NR2.1 Recognise and count by threes, fives and tens, order, read and represent two- and three-digit numbers up to at least 150, and count, sort and order Sāmoan coins.	<p>Count forwards to at least 150 and backwards by threes, fives and tens from any starting point.</p> <p>Count forwards and backwards by tens, on and off the decade.</p> <p>Recognise, read, partition, regroup, order, and represent two- and three-digit numbers up to at least 150, using place value.</p> <p>Read and use the ordinal names to at least 'thirty-first'.</p> <p>Count, sort and order Sāmoan coins using face value.</p>
Addition and Subtraction	develop fluency with number facts and computation using addition and subtraction and construct an appreciation of the relationship between those facts and the two operations.	NR2.2 Model and represent addition and subtraction involving one- and two-digit numbers by applying a range of mental strategies and informal recording methods.	<p>Model addition and subtraction using concrete materials.</p> <p>Illustrate addition and subtraction by using a variety of mental strategies and informal recording methods.</p> <p>Represent and record number sentences using drawings, numerals, symbols and words.</p>
Multiplication and Division	develop fluency with number facts and computation using multiplication and division and construct an appreciation of the relationship between those facts and the two operations.	NR2.3 Model and represent multiplication and division by applying a variety of mental strategies and concrete materials including the use of groups, arrays and sharing.	<p>Rhythmic and skip count by ones, twos, threes, fives and tens.</p> <p>Apply arrays, equal groups and repeated addition to model multiplication.</p> <p>Model and represent division by using the strategies of sharing, arrays and repeated subtraction.</p> <p>Record using drawings, numerals, symbols and words.</p>

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Fractions and Decimals	develop an understanding of fractions as parts of unit wholes, as parts of a set, as locations on number lines, and as divisions of whole numbers.	NR2.4 Identify, interpret and demonstrate common uses of halves and quarters of everyday shapes, objects, sets and collections.	Construct, explain and interpret a half or a quarter of a whole object. Construct, explain and interpret a half or a quarter of a set or collection of objects. Represent half as $\frac{1}{2}$ and quarter as $\frac{1}{4}$. <i>See Whole Number substrand for money concepts.</i>
Chance	construct an understanding of chance and likelihood as applied in everyday situations and develop an appreciation of the difference between theoretical and experimental probabilities.	NR2.5 Recognise, describe and order the element of chance in everyday events using words such as impossible, possible, might, certain, and unlikely.	Recognise, describe and order the element of chance in familiar daily activities. Describe the element of chance using everyday language such as impossible, possible, might, certain, and unlikely.

Patterns and Algebra

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students describe, create and continue a variety of number patterns and relate addition and subtraction facts to at least 50. Students solve word problems involving the application of patterns and relationships in relation to the Year 2 content.		
Patterns and Algebra	demonstrate fluency in generating, describing, recording, extending and representing geometric and numeric patterns as well as construct an understanding of the relationships and change between numbers and apply these in solving problems.	PA2.1a Generate, represent and extend a variety of number patterns including simple growing patterns, and provide missing elements in a pattern.	Generate, represent and extend a variety of number patterns and provide missing elements. Analyse and describe change in growing patterns and use tables to record or extend patterns.
		PA2.1b Model quantitative relationships involving addition and subtraction number facts to at least 50, using objects, pictures and/or numbers	Record equivalent number relationships using the 'equals' sign. Model and extend quantitative relationships involving addition and subtraction facts up to at 50. Make generalisations about number relationships.

Data Analysis

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	Students gather and organise data, display data using column and picture graphs.		
Data Analysis	formulate questions that can be answered by collecting, organising, tabulating, graphing and analysing data.	DA2.1 Design investigations, collect and record data using tallies, organise and represent data using tables, picture graphs, bar and column graphs, read and make connection between lists, tables and data displays, and interpret results.	Collect and record data using tallies. Represent data using concrete materials, pictures and bar and column graphs. Picture graphs use one object, symbol or picture to represent one data value. Read and make connections between lists and picture graphs and bar and column graphs of data about themselves and explain interpretations.

Measurement

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students estimate and measure and record using informal units for length, area, volume, capacity, mass and time. Students compare and order objects according to their attributes and record findings. Students use formal units (metre and centimetre and feet and inches) to measure length and distance. Students use a calendar to identify the date and name and order the months and the seasons of the year. Students use informal units to compare and order the duration of events and tell the time on the half-hour.		
Length	identify and describe the attribute of length and use informal and formal (metric and imperial) units for measurement.	MS2.1 Use uniform informal units (pencils, footprints, hand spans) and formal units (metres and centimetres & yards and feet) to estimate, measure, compare and record lengths and distances.	Estimate and measure length and distance, by placing multiple copies of informal units of the same size end to end without gaps or overlaps. Identify and justify the need for formal units (metres and yards), and use them to estimate and measure length and distance. Recognise the need for smaller formal units such as centimetres and feet. Develop 'real-life' benchmarks for a length of one metre and one yard. Use number and type of informal or formal units to record measurements of length.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Area	identify and describe the attribute of area and use informal and formal (metric and imperial) units for measurement.	<p>MS2.2 Use uniform informal units to estimate, measure, compare and record areas of regular and irregular shapes.</p>	<p>Estimate area by placing multiple copies of informal units of the same size, in rows or columns without gaps or overlaps.</p> <p>Informally measure area by counting informal units and describe part left over.</p> <p>Informally compare and order two or more areas by cutting and covering.</p> <p>Use number and type of informal units to record measurements.</p>
Volume and Capacity	identify and describe the attribute of volume and use informal and formal (metric and imperial) units for measuring capacity or volume.	<p>MS2.3 Use uniform informal units to estimate, measure, compare and record volumes and capacities.</p>	<p>Develop common referents for measures using appropriate informal units to make comparisons and estimates of volume and capacity.</p> <p>Measure, compare and order capacities of at least two containers and volumes of at least two objects.</p> <p>Use number and type of informal units used to record measurements.</p>
Mass	understand, distinguish and describe the attribute of mass through indirect and direct comparisons, and use informal and formal (metric and imperial) units for measurement.	<p>MS2.4 Use informal units to estimate, measure, compare and record masses of at least two objects.</p>	<p>Use an equal arm balance and appropriate uniform informal units to estimate and measure the mass of an object.</p> <p>Measure, compare and order masses of at least two objects.</p> <p>Estimate differences in mass using uniform informal units.</p> <p>Use number and type of informal units to record measurements.</p>
Time	construct an understanding of, and describe, the passage of time, its measurement and representations, through the use of everyday language and experiences.	<p>MS2.5 Use repeated informal units and methods to measure and compare the duration of events and read clocks on the half-hour.</p>	<p>Identify and choose repeated informal units to measure and compare the duration of events.</p> <p>State and order the seasons of the year.</p> <p>Use calendar to identify day and date and order months of the year.</p> <p>Tell time on the hour and half-hour on digital and analogue clocks.</p>

Space and Geometry

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students sort, describe, and represent 3D objects including cones, cubes, cylinders, spheres and prisms, and recognise them in pictures and the environment. Students represent and describe the position of objects using informal mathematical language.		
Three-dimensional Space	construct verbal, visual and mental representations of three-dimensional objects, their characteristics and properties, and different orientations.	SG2.1 Name, explain and model 3D object including cones, cubes, cylinders, spheres and prisms, and identify them in pictures and the environment.	Identify, label, explain, classify and represent cones, cubes, cylinders, spheres and prisms. Identify and name 3D objects in pictures and the environment, and presented in different orientations. Understand, identify and recognise that 3D objects appear different from different views.
Two-dimensional Space	construct verbal, visual and mental representations of lines, angles and two-dimensional shapes, their characteristics and properties, and different orientations.	SG2.2a Recognise, visualise, classify, model, describe and examine various 2D shape including hexagons, rhombuses and trapeziums.	Rearrange, label, compare, describe, build models of, and draw hexagons, rhombuses and trapeziums presented in different orientations. Use slides and turns to create tessellating designs. Understand and recognise a line of symmetry of a rectangle and a square. Define 2D shapes using the terms 'sides' and 'corners'. Identify and name parallel, vertical and horizontal lines in pictures and the environment.
		SG2.2b Recognise and describe corners as angles in practical situations.	Understand, recognise and describe corners as angles. Understand and recognise arms and vertex of the angle in a corner. Place one angle on top of another to directly compare angles.
Position	develop their representation of position through precise language and the use of grids and compass directions.	SG2.3 Construct models and draw, describe using everyday language and interpret simple maps showing relative position of objects.	Use models and drawings to represent the position of objects. Use everyday language, including 'left' and 'right' to describe the position of objects.

Working Mathematically

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Major Learning Outcomes	<p>Students interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 2 content.</p> <p>Students use objects, diagrams, imagery and technology to examine and analyse, and to represent their interpretations of, mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 2 content to justify their conjectures, answers and solutions.</p> <p>Students reflect upon the results of their conjectures and use concrete materials and/or pictorial representations to explain their results and evaluate conclusions.</p> <p>Students describe mathematical situations and methods using everyday language, some mathematical language, actions, materials, diagrams and symbols.</p>	
Interpreting &/or Posing Questions	interpret and/or pose questions in relation to mathematical situations and their mathematical experiences using the relevant year level mathematics.	WM2.1 Interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 2 content.
Strategically Thinking & Representing	strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.	WM2.2 Use objects, diagrams, imagery and technology to examine and analyse, and to represent their interpretations of, mathematical problems.
Reasoning & Justifying	develop and utilise processes when investigating relationships, checking solutions and giving reasons to justify their conclusions.	WM2.3 Integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 2 content to justify their conjectures and answers.
Reflecting & Evaluating	reflect on their experiences and critical understanding to make connections with, and generalisations about, existing knowledge and understanding to explain answers and evaluate conclusions.	WM2.4 Reflect upon the results of their conjectures and use concrete materials and/or pictorial representations to explain their results and evaluate conclusions.
Communicating Mathematically	develop and use appropriate language and representations to formulate, express and communicate mathematical ideas.	WM2.5 Describe mathematical situations and methods using everyday language, some mathematical language, actions, materials, diagrams and symbols.

Year Three

Number and Operations

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students count, order, read, write, partition, regroup and record numbers up to 999 and use mental and written strategies, including the formal written algorithm, to solve addition and subtraction problems involving numbers of up to three digits.</p> <p>Students use mental strategies to recall multiplication facts up to 100 and related division facts and use informal written strategies for multiplication and division of two-digit numbers by one-digit numbers.</p> <p>Students model, compare and represent eighths and thirds in everyday situations and they model, compare, represent, add and subtract decimals to two decimal places.</p> <p>Students perform simple calculations with money up to \$5 and use estimation to check their solutions.</p> <p>Students order events from least likely to most likely and identify and record all the outcomes for a simple chance experiment.</p>		
Whole numbers	develop an understanding of the ways numbers are represented, the role of place value, and relationships among numbers and number systems.	NR3.1 Recognise, count, order, read and record numbers up to 999.	<p>Count forwards to, and backwards from, 999 by tens and hundreds from any starting point.</p> <p>Recognise, read, partition, regroup, represent and order numbers up to 999 using place value.</p> <p><i>See Fractions and Decimals substrand for money concepts.</i></p>
Addition and Subtraction	develop fluency with number facts and computation using addition and subtraction and construct an appreciation of the relationship between those facts and the two operations.	NR3.2 Model and represent addition and subtraction involving two- and three-digit numbers up to 999 by applying various mental and written strategies and perform simple money calculations.	<p>Model addition and subtraction involving two- and three-digit numbers by applying a range of mental strategies.</p> <p>Describe, justify and record methods for adding and subtracting.</p> <p>Represent and record addition and subtraction by applying informal strategies and formal written algorithms.</p>

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Multiplication and Division	develop fluency with number facts and computation using multiplication and division and construct an appreciation of the relationship between those facts and the two operations.	NR3.3 Model and represent multiplication and division by applying a range of mental and informal written strategies.	Develop mental fluency with number facts up to 10×10 . Extend skip counting to by fours, sevens, eights and nines. Find multiples and squares of numbers. Interpret division problems without remainders and link these to relationships between operations \times , $+$ and \div . Use efficient mental and informal written strategies for multiplying or dividing a two-digit number by a one-digit operator using multiplication facts up to 10×10 .
Fractions and Decimals	develop an understanding of fractions as parts of unit wholes, as parts of a set, as locations on number lines, and as divisions of whole numbers.	NR3.4 Model, compare, represent and interpret simple fractions (including eighths and thirds) and decimals, add and subtract decimals with two decimal places, and solve simple money calculations.	Model, compare and represent fractions with denominators 2, 4, and 8 and extending to fractions with denominator 3. Find equivalence between halves, quarters and eighths. Add and subtract decimals with the same number of decimal places (to two decimal places). Represent money values in multiple ways and calculate change in simple transactions.
Chance	construct an understanding of chance and likelihood as applied in everyday situations and develop an appreciation of the difference between theoretical and experimental probabilities.	NR3.5 Describe events as likely or unlikely and order events from least to most likely, interpret and record outcomes of simple chance experiments.	Order events from least likely to most likely. Explore, identify, interpret and record all outcomes of a simple chance situation. Discuss the degree of likelihood using words such as certain, equally likely, more or less likely, and never.

Patterns and Algebra

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students generate, describe and record number patterns and relate multiplication and division facts to at least 100. Students solve word problems involving the application of patterns and relationships in relation to the mathematics in the Year 3 content.		
Patterns and Algebra	demonstrate fluency in generating, describing, recording, extending and representing geometric and numeric patterns as well as construct an understanding of the relationships and change between numbers and apply these in solving problems.	PA3.1a Record and describe geometric and number repeating and growing patterns using words and change, find missing terms and make predictions using tables and change.	Create, describe and extend number patterns using a range of strategies. Analyse and describe change in growing patterns and use tables to make predictions.
		PA3.1b Model quantitative relationships involving multiplication and division number facts to at least 10×10 , using objects, pictures and/or numbers and complete missing values in simple number sentences.	Model and extend quantitative relationships involving multiplication and division facts to at least 10×10 . Determine the value of a missing number in simple number sentences involving one operation.

Data Analysis

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	Students gather and organise data, display data using tables and interpret the results.		
Data Analysis	formulate questions that can be answered by collecting, organising, tabulating, graphing and analysing data.	DA3.1 Design an investigation to answer a question about a familiar situation, conduct investigation, collect and organise data using lists and tables and explain the results to answer questions.	Design investigations to answer familiar questions, decide data to collect, carry out the investigation, classify and organise data using tables. Read and make connections between lists and tables of data about themselves and explain interpretations.

Measurement

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	Students estimate, measure, compare and record length, area, volume, capacity and mass using some formal units relevant to the content for Year 3.		
	Students read and record time in quarter-hour in digital and analogue notation and make comparisons between time units.		
Length	identify and describe the attribute of length and use informal and formal (metric and imperial) units for measurement.	MS3.1 Use formal units (metres, centimetres and millimetres & yards, feet and inches) to estimate, measure, compare, order and record lengths and distances.	Use formal units: metres, millimetres and centimetres & yards, feet and inches to estimate, measure, compare, order and record lengths and distances. Carry out simple unit conversion within each measurement system (e.g. between metres and centimetres & between yards and feet). Develop 'real-life' benchmarks for a length of one foot and one centimetre. Use benchmarks to estimate the perimeter of tabletops, desktops, windows and classroom floor. Use decimal notation to one place to record lengths and distances.
Area	identify and describe the attribute of area and use informal and formal (metric and imperial) units for measurement.	MS3.2 Understand the need for, and use, formal units (square centimetre and square inches) to estimate, measure, compare and record the areas of surfaces.	Understand the need for, and use, formal units: square centimetres and square inches to measure area. Use square centimetres and square inches to estimate, measure, compare and record areas. Construct and use a square grid overlay to measure area of different shapes.
Volume and Capacity	identify and describe the attribute of volume and use informal and formal (metric and imperial) units for measuring capacity or volume.	MS3.3 Use formal units (litres and cubic centimetres and quarts and cubic inches) and convert between units within each system to estimate, measure, compare and record volumes and capacities.	Understand the need for, and use, formal units: litres and quarts to measure capacity and cubic centimetre and cubic inches to measure volume. Use formal units (litres and cubic centimetres & quarts and cubic inches) to estimate, measure and compare capacity and volume. Construct three-dimensional objects using cubic centimetre and cubic inch blocks and counting to determine volume. Use formal units to record measurements of capacity and volume.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Mass	understand, distinguish and describe the attribute of mass through indirect and direct comparisons, and use informal and formal (metric and imperial) units for measurement.	MS3.4 Estimate, measure, compare and record masses using formal units (kilograms and pounds).	Understand the need for, and use, formal units (kilograms and pounds) to measure mass. Use formal units to estimate, measure, compare and record masses. Use formal units to record mass using integral values.
Time	construct an understanding of, and describe the passage of time, its measurement and representations, through the use of everyday language and experiences.	MS3.5 Read digital and analogue clocks to the quarter-hour, record time using the correct notation and interpret simple timetables and timelines.	Understand and recognise the coordinated movements of the hands on a clock to indicate quarter to and quarter past. Read and record time in 15-minute intervals. Compare and sequence events according to their duration. Tell time to the quarter-hour on digital and analogue clocks. Read and interpret simple timetables, timelines and calendars.

Space and Geometry

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	Students make, compare and describe 3D objects including pyramids, and represent them in drawings. Students manipulate, compare, sketch and name 2D shapes and describe their features. Students compare angles using informal means. Students use simple maps and grids to represent position and follow routes.		
Three-dimensional Space	construct verbal, visual and mental representations of three-dimensional objects, their characteristics and properties, and different orientations.	SG3.1 Compare, describe, model, and sketch 3D objects including pyramids and prisms.	Model, compare, describe and sketch 3D objects including pyramids and prisms. Compare and contrast pyramids and prisms.
Two-dimensional Space	construct verbal, visual and mental representations of lines, angles and two-dimensional shapes, their characteristics and properties, and different orientations.	SG3.2a Recognise, visualise, classify, model, describe and examine 2D shapes including pentagons and parallelograms presented in different orientations and compare and describe special groups of quadrilaterals.	Rearrange, label, compare, describe, build models of, and draw pentagons and parallelograms presented in different orientations. Compare and describe features of special groups of quadrilaterals. Use reflections to create tessellating designs. Find all lines of symmetry for a given 2D shape. Create symmetrical shapes using a line of symmetry.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
		SG3.2b Recognise, understand, compare and define angles in openings and slopes and classify angles as right angle or not right angle.	Recognise, identify and name perpendicular lines. Describe angles using everyday language and classify them into 'right' and 'not right' angles. Understand and recognise the two arms and vertex of the angle in an opening and a slope where one arm is visible. Compare angles of adjacent sides of shapes to a right angle.
Position	develop their representation of position through precise language and the use of grids and compass directions.	SG3.3 Represent position using simple maps, grids and compass points and follow pathways.	Draw simple maps and plans to represent the relative position of objects. Determine the directions N, S, E and W given one of the directions. Describe the location of an object on a simple map using grid coordinates or directions.

Working Mathematically

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Major Learning Outcomes	<p>Students interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 3 content.</p> <p>Students strategically use diagrams, imagery and technology to examine and analyse, and to represent their interpretations of, mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 3 content to justify their conjectures, answers and solutions.</p> <p>Students critically reflect upon the results of their conjectures and use concrete materials and/or pictorial representations to explain their results and evaluate conclusions.</p> <p>Students describe mathematical situations and methods using everyday and some mathematical language and diagrams.</p>	
Interpreting &/or Posing Questions	interpret and/or pose questions in relation to mathematical situations and their mathematical experiences using the relevant year level mathematics.	WM3.1 Interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 3 content.
Strategically Thinking & Representing	strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.	WM3.2 Use diagrams, imagery and technology to examine and analyse, and to represent their interpretations of, mathematical problems.
Reasoning & Justifying	develop and utilise processes when investigating relationships, checking solutions and giving reasons to justify their conclusions.	WM3.3 Integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 3 content to justify their conjectures, answers and solutions.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Reflecting & Evaluating	reflect on their experiences and critical understanding to make connections with, and generalisations about, existing knowledge and understanding to explain answers and evaluate conclusions.	WM3.4 Reflect critically upon the results of their conjectures and use concrete materials and/or pictorial representations to explain their results and evaluate conclusions.
Communicating Mathematically	develop and use appropriate language and representations to formulate, express and communicate mathematical ideas.	WM3.5 Describe mathematical situations and methods using everyday and some mathematical language and diagrams.

Year Four

Number and Operations

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students count, order, read, write, partition, regroup and record numbers up to at least 9999 and use mental and written strategies, including the formal written algorithm, to solve addition and subtraction problems involving numbers of up to four digits.</p> <p>Students use mental strategies to recall multiplication facts up to at least 100 and related division facts and use informal written strategies for multiplication and division of two-digit numbers by one-digit numbers.</p> <p>Students model, compare and represent fifths, tenths, hundredths and sixths on the number line and recognise percentages in everyday situations and they model, compare, represent, add and subtract decimals to two decimal places.</p> <p>Students perform simple calculations with money and use estimation to check their solutions.</p> <p>Students describe and compare chance events in social and experimental contexts.</p>		
Whole Numbers	develop an understanding of the ways numbers are represented, the role of place value, and relationships among numbers and number systems.	NR4.1 Recognise, count, order, read and record numbers up to 9999.	Count forwards to, and backwards from, 9999 by hundreds and thousands, on and off the decade. Recognise, read, partition, regroup, represent and order numbers up to 9999 using place value. <i>See Fractions and Decimals substrand for money concepts.</i>
Addition and subtraction	develop fluency with number facts and computation using addition and subtraction and construct an appreciation of the relationship between those facts and the two operations.	NR4.2 Model and represent addition and subtraction involving two-, three- and four-digit numbers up to 9999 by applying mental, written and formal strategies.	Model addition and subtraction involving up to four-digit numbers by applying a range of mental and written strategies. Describe, justify and record methods for adding and subtracting. Represent and record addition and subtraction by applying a formal written algorithm.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Multiplication and Division	develop fluency with number facts and computation using multiplication and division and construct an appreciation of the relationship between those facts and the two operations.	NR4.3 Model and represent multiplication and division by applying various mental and formal written strategies.	Develop mental fluency for number facts up to 12×12 . Find factors and cubes of numbers. Interpret remainders in division problems and as fractions and decimals. Use efficient mental and informal written strategies for multiplying or dividing a two-digit number by a one-digit operator using multiplication facts up to 12×12 .
Fractions and Decimals	develop an understanding of fractions as parts of unit wholes, as parts of a set, as locations on number lines, and as divisions of whole numbers.	NR4.4 Model, compare and represent simple fractions (including fifths, tenths, hundredths and sixths) and decimals, multiply and divide decimals with two decimal places, and interpret everyday percentages.	Model, compare and represent fractions with denominators 2, 3, 4, and 8 and extending to denominators 6, 5, 10, and 100. Find equivalence between halves, tenths and hundredths; fifths, tenths and hundreds and thirds and sixths. Model, compare and represent decimals to two decimal places. Multiply and divide decimals with the same number of decimal places (to two decimal places). Recognise percentages in everyday situations. Relate a common percentage (benchmark) to a fraction or decimal. Solve problems involving calculations with money.
Chance	construct an understanding of chance and likelihood as applied in everyday situations and develop an appreciation of the difference between theoretical and experimental probabilities.	NR4.5 Describe, order and compare likelihood of events with chance experiments and recognise that there will be variation in results and expected outcomes.	Predict the outcomes of chance experiments involving equally likely events. Collect and organise data to compare likelihood of events under various conditions. Determine the likelihood of outcomes of experiments with small numbers of trials.

Patterns and Algebra

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students generate, describe, and record number patterns using a variety of strategies and complete simple number sentences by calculating missing values.</p> <p>Students relate multiplication and division facts to at least 12×12.</p> <p>Students solve word problems involving the application of patterns and relationships in relation to the mathematics in the Year 4 content.</p>		
Patterns and Algebra	demonstrate fluency in generating, describing, recording, extending and representing geometric and numeric patterns as well as construct an understanding of the relationships and change between numbers and apply these in solving problems.	PA4.1a Generate, describe and record number patterns using a variety of strategies and using change, find missing terms, and make predictions.	<p>Create, describe and extend number patterns and complete simple number sentences using various strategies.</p> <p>Analyse and describe change in growing patterns and use tables and graphs to base conclusions.</p>
		PA4.1b Model quantitative relationships involving multiplication and division number facts to at least 12×12 , using objects, pictures and complete complex number sentences by calculating missing values.	<p>Model and extend quantitative relationships involving multiplication and division facts to at least 12×12.</p> <p>Determine the value of a missing number in simple number sentences involving two operations.</p>

Data Analysis

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students conduct surveys, and classify and organise data to answer a specific question they have posed.</p> <p>Students present the information in tables and graphs and interpret the results.</p>		
Data Analysis	formulate questions that can be answered by collecting, organising, tabulating, graphing and analysing data.	DA4.1 Conduct an investigation, collect and organise data into tables, use picture graphs, column graphs and grid paper to display data and interpret the results.	<p>Plan and undertake investigations to answer questions about familiar situations; classify and organise data using tables.</p> <p>Represent data using column graphs (i.e. vertical and horizontal) and picture graphs on grid paper with labelled axes and scale of one to one between data and symbols.</p> <p>Read and interpret data presented in tables, column graphs and picture graphs.</p>

Measurement

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students estimate, measure, compare and record length, area, volume, capacity and mass using formal units relative to the content for Year 4.		
	Students read and record time in hours and minutes in digital and analogue notation and make comparisons between time units.		
Length	identify and describe the attribute of length and use informal and formal (metric and imperial) units for measurement.	MS4.1 Use formal units to estimate, measure, order, compare and record lengths, distances and perimeters and convert between units within each measurement system (between metres, centimetres and millimetres & between yards, feet and inches).	Use formal units: metres, centimetres and millimetres & yards, feet and inches to estimate, measure, compare, order and record lengths and distances. Carry out simple unit conversion within each measurement system (e.g. between metres, centimetres and millimetres & between yards, feet and inches). Develop ‘real-life’ benchmarks for a length of one millimetre and one inch. Estimate using benchmarks and measure using formal units the perimeter of two-dimensional shapes. Use decimal notation to two places to record lengths and distances.
Area	identify and describe the attribute of area and use informal and formal (metric and imperial) units for measurement.	MS4.2 Understand the need for, and use, larger formal units (square metres and square feet) to estimate, measure, compare and record the areas of surfaces and convert between units within each system.	Understand the need for, and use, larger formal units: square metres and square feet to measure area. Convert between area units within each measurement system. Use square metres and square feet to estimate, measure, compare and record areas. Explore what happens to perimeters and areas of rectangles when the shape is changed in some ways.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Volume and Capacity	identify and describe the attribute of volume and use informal and formal (metric and imperial) units for measuring capacity or volume.	MS4.3 Use smaller formal units (millilitres and pints) and fluid ounces to estimate, measure, compare and record volumes and capacities and convert between units within each system.	Understand the need for, and use, smaller formal units: millilitres and pints to measure capacity and volume. Use formal units to estimate, measure and compare capacity and volume. Compare, estimate and measure volume of objects using rise in water level or overflows. Convert measurements from one unit to another within each measurement system. Convert between pints, fluid ounces, millilitres and cubic inches. Use formal units to record measurements using decimal notation to one decimal place.
Mass	understand, distinguish and describe the attribute of mass through indirect and direct comparisons, and use informal and formal (metric and imperial) units for measurement.	MS4.4 Estimate, measure, compare and record masses using grams and ounces.	Understand the need for, and use, smaller formal units (grams and ounces) to measure mass. Use formal units to estimate, measure and compare masses. Use formal units to record mass using decimal notation to one decimal place.
Time	construct an understanding of, and describe the passage of, time, its measurement and representations, through the use of everyday language and experiences.	MS4.5 Read digital and analogue clocks to the minute, record time using the correct notation, understand equivalent representations of time, and make comparisons between time units.	Understand, recognise, read and record time in one-minute intervals. Make comparisons between time units. Use digital and analogue notations to read and record time. Convert between units of time. Tell time to the minute on digital and analogue clocks. Read and interpret simple timetables, timelines and calendars of real-life situations.

Space and Geometry

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students name, describe and sketch particular 3D objects and 2D shapes. Students identify, compare and describe angles including 'right angle' in practical situations. Students use coordinates to describe position and compass points to give and follow directions.		
Three-dimensional Space	construct verbal, visual and mental representations of three-dimensional objects, their characteristics and properties, and different orientations.	SG4.1 Compare, explain and model 3D objects including cylinders, cones and spheres; construct nets from everyday packages; and describe cross-sections of 3D objects.	Name, explain, classify, model and draw prisms, cylinders, cones and spheres showing depth. Examine and construct nets from everyday packages. Explore, identify and describe cross-sections of 3D objects.
Two-dimensional Space	construct verbal, visual and mental representations of lines, angles and two-dimensional shapes, their characteristics and properties, and different orientations.	SG4.2a Recognise, visualise, classify, model, describe, name and examine 2D shapes including octagons and hexagons, and describe their features.	Rearrange, label, compare, describe, build models of, and draw 2D shapes including octagons and hexagons presented in different orientations. Group 2D shapes using multiple attributes. Use translations and rotations to create tessellating designs. Use symmetry and identify symmetry in the environment and tapa designs to create symmetrical patterns and pictures.
		SG4.2b Recognise, understand, compare and define angles in turns and classify angles as equal to, greater than or less than a right angle.	Recognise and describe 2D shapes using the terms 'parallel sides' and 'right angles'. Describe and sort angles into groups of 'equal to', 'greater than' or 'less than' a right angle. Understand and recognise the angle in a turn where one arm is visible. Compare and order angles of adjacent sides of shapes in relation to a right angle.
Position	develop their representation of position through precise language and the use of grids and compass directions.	SG4.3 Describe position using coordinates and use compass directions to give and follow directions.	Represent position and follow routes using simple maps and grids. Determine the directions NE, NW, SE and SW, given one of the directions. Use coordinates or compass directions to describe the location of an object on a simple map.

Working Mathematically

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Major Learning Outcomes	Students interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 4 content.	
	Students strategically select and use appropriate mental or written strategies, or technology, to examine and analyse, to represent their interpretations of, and to solve, mathematical problems.	
	Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 4 content to justify their conjectures, answers and solutions.	
	Students critically reflect upon the results of their conjectures and explain their results and evaluate conclusions.	
	Students use some appropriate terminology to describe their mathematical ideas and to make connections between their learning and other experiences.	
Interpreting &/or Posing Questions	interpret and/or pose questions in relation to mathematical situations and their mathematical experiences using the relevant Year level mathematics.	WM4.1 Interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 4 content.
Strategically Thinking & Representing	strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.	WM4.2 Select and use appropriate mental or written strategies, or technology, to examine and analyse, to represent their interpretations of, and to solve, mathematical problems.
Reasoning & Justifying	develop and utilise processes when investigating relationships, checking solutions and giving reasons to justify their conclusions.	WM4.3 Integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 4 content to justify their conjectures, answers and solutions.
Reflecting & Evaluating	reflect on their experiences and critical understanding to make connections with, and generalisations about, existing knowledge and understanding to explain answers and evaluate conclusions.	WM4.4 Reflect critically upon the results of their conjectures and explain their answers and evaluate conclusions.
Communicating Mathematically	develop and use appropriate language and representations to formulate, express and communicate mathematical ideas.	WM4.5 Use some appropriate terminology to describe mathematical ideas and to make connections between their learning and other experiences.

Year Five

Number and Operations

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students count, order, read, write, partition, regroup and record numbers up to at least 99999, selecting and applying appropriate mental, written or calculator strategies for the four operations. Students compare, order and perform calculations with simple fractions including twelfths, decimals and simple percentages and apply the four operations to money in real-life situations. Students place the likelihood of simple events in order on a number line from 0 to 1.		
Whole Numbers	develop an understanding of the ways numbers are represented, the role of place value, and relationships among numbers and number systems.	NR5.1 Recognise, order, read and write numbers up to 99999.	Count forwards to 99999 and backwards by hundreds and thousands. Recognise, read, partition, regroup, write and order numbers up to 99999 using place value. <i>See Fractions and Decimals substrand for money concepts.</i>
Addition and Subtraction	develop fluency with number facts and computation using addition and subtraction and construct an appreciation of the relationship between those facts and the two operations.	NR5.2 Select and apply appropriate strategies for addition and subtraction with counting numbers up to five digits.	Model addition and subtraction with counting numbers of up to five digits by applying appropriate mental, written or calculator strategies.
Multiplication and Division	develop fluency with number facts and computation using multiplication and division and construct an appreciation of the relationship between those facts and the two operations.	NR5.3 Model and represent multiplication and division by identifying and choosing multiple mental and formal strategies.	Select and apply appropriate and efficient mental, written or calculator strategies for multiplication and division and interpret their solutions in the context of a problem. Explore prime and composite numbers. Use formal written algorithms for multiplication (limit operators to one-digit numbers) and division (limit operators to single digits).

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Fractions and Decimals	develop an understanding of fractions as parts of unit wholes, as parts of a set, as locations on number lines, and as divisions of whole numbers.	<p>NR5.4 Model, compare, represent, order and calculate fluently with decimals, fractions (including twelfths) with the same denominators, and benchmark percentages.</p>	<p>Model, compare and represent fractions with denominators 2, 3, 4, 5, 6, 8, 10 and 100 and extending to denominator 12. Find equivalence between halves, sixths and twelfths; halves, quarters and twelfths; and thirds, sixths and twelfths. Express a mixed numeral as an improper fraction, and vice versa. Add and subtract fractions with the same denominator. Add and subtract decimals with different decimal places. Multiply simple fractions by whole numbers. Calculate simple (benchmark) percentage of quantities. Multiply and divide decimals by whole numbers in everyday contexts. Solve problems involving the four operations and money in authentic situations.</p>
Chance	construct an understanding of chance and likelihood as applied in everyday situations and develop an appreciation of the difference between theoretical and experimental probabilities.	<p>NR5.5 Predict, compare and order the likelihood of simple events on a number line from 0 to 1 using chance words and data from chance events.</p>	<p>Use the number line from 0 to 1 to order the likelihood of simple events. Compare and contrast the likelihood of outcomes of experiments with small numbers of trials with those with large numbers of trials.</p>

Patterns and Algebra

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students record and describe geometric and number repeating and growing patterns using words. Students construct, verify and complete number sentences involving the four operations. Students solve word problems involving the application of patterns and relationships in relation to the mathematics in the Year 5 content.		
Patterns and Algebra	demonstrate fluency in generating, describing, recording, extending and representing geometric and numeric patterns as well as construct an understanding of the relationships and change between numbers and apply these in solving problems.	PA5.1a Record and describe geometric and number repeating and growing patterns that involve multiples and one operation, using words.	Record and describe in multiple ways, geometric and number repeating and growing patterns that involve one operation. Construct, verify and complete number sentences involving one operation. Record and describe number patterns using words. Analyse and describe change in growing patterns and use tables and graphs to make and test predictions. Record and describe number patterns using words. Analyse and describe change in growing patterns and use tables and graphs to make and test predictions.
		PA5.1b Construct, verify and complete simple number sentences involving four operations with a variety of numbers.	Build, verify and complete number sentences involving the four operations with whole numbers.

Data Analysis

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	Students draw and interpret a variety of graphs using a scale of many-to-one correspondence.		
Data Analysis	formulate questions that can be answered by collecting, organising, tabulating, graphing and analysing data.	DA5.1 Construct picture graphs, column and line graphs with many-to-one scales, read and explain data displayed in a range of graphs using many-to-one correspondence between data and symbols.	Undertake investigations, collect and display data using picture graphs, column and line graphs with many-to-one scales. Read and interpret data presented in picture graphs, column and line graphs with scales of many-to-one.

Measurement

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students select and use the appropriate units, in relation to Year 5 content, to estimate, measure and calculate length, area, volume, capacity and mass.</p> <p>Students convert measurements from one unit to another within each measurement system, and record in decimal notation.</p> <p>Students use am and pm notation in real-life situations and construct timelines and simple timetables.</p>		
Length	<p>identify and describe the attribute of length and use informal and formal (metric and imperial) units for measurement.</p>	<p>MS5.1 Select and apply appropriate formal units (kilometres, metres, centimetres or millimetres; miles, yards, feet or inches) and tools to measure lengths, distances and perimeters and convert between metres and kilometres and between feet and miles.</p>	<p>Select and apply the appropriate unit and tool to measure lengths, distances and perimeters.</p> <p>Carry out simple unit conversion within each measurement system (e.g. between metres and kilometres & between yards/feet and miles).</p> <p>Explore the effect of the selected unit on precision of measurements.</p> <p>Develop, understand and use a formula to calculate and compare perimeters of squares and rectangles.</p> <p>Develop strategies for estimating perimeters of irregular shapes.</p> <p>Use decimal notation to three places to record lengths.</p>
Area	<p>identify and describe the attribute of area and use informal and formal (metric and imperial) units for measurement.</p>	<p>MS5.2 Choose and use the appropriate unit to calculate area of squares and rectangles, and recognise the need for larger formal units: square kilometres, hectares and square miles and convert between units within each system.</p>	<p>Identify and use the appropriate unit to calculate area.</p> <p>Understanding the need for square kilometres, hectares and square miles.</p> <p>Convert between area units within each measurement system.</p> <p>Investigate to find a general relationship between length, breadth and area of squares and rectangles.</p> <p>Explore and generalise the effect of keeping perimeter of a rectangle constant while area is varied and vice versa.</p>

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Volume and Capacity	identify and describe the attribute of volume and use informal and formal (metric and imperial) units for measuring capacity or volume.	MS5.3 Identify and choose the appropriate unit (including cubic metres, cubic feet and gallon) to estimate and measure volume and capacity, including volume of rectangular prisms and convert between units within each system.	Estimate and measure the volume and capacity of rectangular prisms. Understand the need for, and use, larger formal units (cubic metres, cubic feet and gallons) to measure volume and capacity. Chooses appropriate formal units to estimate, measure and compare capacity and volume. Explore multiple ways of determining volume of rectangular prisms using metric and imperial units. Convert measurements from one unit to another within each measurement system. Use formal units to record measurements using decimal notation to two decimal places.
Mass	understand, distinguish and describe the attribute of mass through indirect and direct comparisons, and use informal and formal (metric and imperial) units for measurement.	MS5.4 Select and use the appropriate unit to find and measure the mass of objects and convert between units within each system.	Understand the need for, and use, larger formal units (tonne and tons) to measure mass. Choose appropriate units to measure mass and convert between kilograms and grams and between pounds and ounces. Use formal units to record mass using decimal notation to two decimal places.
Time	construct an understanding of, and describe, the passage of time, its measurement and representations, through the use of everyday language and experiences.	MS5.5 Use am/pm notation in authentic situations, estimate and measure duration of events, compare Pacific time zones, interpret timetables, and construct and interpret timelines with scales.	Use and interpret am/pm notation in real-life situations. Estimate, measure and compare duration of events. Interpret and compare Pacific time zones. Construct and interpret simple timelines with scales. Read and interpret timetables involving am/pm time.

Space and Geometry

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	<p>Students identify 3D objects, including particular prisms and pyramids, on the basis of their properties, and visualise, sketch and construct them given drawings of different views.</p> <p>Students manipulate, classify and draw 2D shapes and describe side and angle properties.</p> <p>Students measure, construct and classify angles and make simple calculations using scale.</p> <p>Students use their mapping skills to describe position both in their physical environment and in maps.</p>		
Three-dimensional Space	construct verbal, visual and mental representations of three-dimensional objects, their characteristics and properties, and different orientations.	SG5.1 Distinguish between, and name, different types of different prisms and pyramids, visualise, draw and build 3D objects given drawings of different views and nets.	Distinguish between different types of prisms (triangular and rectangular prisms) based on their properties. Visualise, draw and construct 3D objects given sketches of different views.
Two-dimensional Space	construct verbal, visual and mental representations of lines, angles and two-dimensional shapes, their characteristics and properties, and different orientations.	SG5.2a Identify right-angled, isosceles, equilateral and scalene triangles; explore angle properties of triangles and quadrilaterals and identify and draw regular and irregular 2D shapes from side and angle descriptions.	Rearrange, label, compare, classify and draw 2D shapes and describe side and angle properties. Identify right-angled, isosceles, equilateral and scalene triangles. Identify and draw regular and irregular triangles and quadrilaterals from descriptions. Enlarge and reduce shapes. Identify shapes that have line symmetry. Explore and generalise side and angle properties of scalene, isosceles and equilateral triangles and quadrilaterals.
		SG5.2b Recognise, understand, compare, measure, construct, and classify angles of sizes up to 180 degrees.	Describe, measure and classify angles as right and straight. Recognise the need for a formal unit for the measurement of angles.
Position	develop their representation of position through precise language and the use of grids and compass directions.	SG5.3 Describe locations and pathways in their physical environment using a coordinate system and grid reference.	Interpret and use scales on maps and plans. Recognise and understand that the same location can be represented by maps or plans using different scales.

Working Mathematically

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Major Learning Outcomes	<p>Students interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 5 content.</p> <p>Students undertake investigations, selecting appropriate technological applications and problem-solving strategies to examine and analyse, to represent their interpretations of, and to solve mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 5 content to justify their conjectures, answers and solutions.</p> <p>Students compare and analyse different solutions and make appropriate decisions that are consistent with the mathematical situation and their own interpretations.</p> <p>Students use appropriate mathematical terminology and some conventions to describe their mathematical ideas, interpretations and solutions.</p>	
Interpreting &/or Posing Questions	interpret and/or pose questions in relation to mathematical situations and their mathematical experiences using the relevant year level mathematics.	WM5.1 Interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 5 content.
Strategically Thinking & Representing	strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.	WM5.2 Undertake investigation, selecting appropriate technological applications and problem-solving strategies.
Reasoning & Justifying	develop and utilise processes when investigating relationships, checking solutions and giving reasons to justify their conclusions.	WM5.3 Integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 5 content to justify their conjectures, answers and solutions.
Reflecting & Evaluating	reflect on their experiences and critical understanding to make connections with, and generalisations about, existing knowledge and understanding to explain answers and evaluate conclusions.	WM5.4 Compare and analyse different solutions and make appropriate decisions that are consistent with the mathematical situation and their own interpretations.
Communicating Mathematically	develop and use appropriate language and representations to formulate, express and communicate mathematical ideas.	WM5.5 Use appropriate mathematical terminology and some conventions to describe their mathematical ideas, interpretations and solutions.

Year Six

Number and Operations

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students count, order, read, write, partition, regroup and record numbers of any size using place value; select and apply appropriate mental, written or calculator strategies for the four operations and interpret their solutions in the context of a problem.</p> <p>Students compare, order and perform calculations with fractions including ninths, decimals and percentages and apply the four operations to money in real-life situations.</p> <p>Students assign numerical values to the likelihood of simple events occurring and order them on the number line.</p>		
Whole Numbers	develop an understanding of the ways numbers are represented, the role of place value, and relationships among numbers and number systems.	NR6.1 Recognise, order, read and write numbers of any size and explore other counting systems.	<p>Identify differences between Roman, Hindu-Arabic, and Sāmoan counting systems.</p> <p>Recognise, read, partition, regroup, write and order numbers of any size using place value.</p> <p>Record numbers in expanded notation.</p> <p>Recognise and describe the role of zero in relation to positive and negative numbers.</p> <p><i>See Fractions and Decimals substrand for money concepts.</i></p>
Addition and Subtraction	develop fluency with number facts and computation using addition and subtraction and construct an appreciation of the relationship between those facts and the two operations.	NR6.2 Select and apply appropriate strategies for addition and subtraction with counting numbers of any size.	Select and apply appropriate mental, written or calculator strategies for addition and subtraction with counting numbers of any size.
Multiplication and Division	develop fluency with number facts and computation using multiplication and division and construct an appreciation of the relationship between those facts and the two operations.	NR6.3 Model multiplication and division by choosing and applying appropriate and efficient strategies.	<p>Select and apply appropriate and efficient mental, written or calculator strategies for multiplication and division and interpret their solutions in the context of a problem.</p> <p>Determine whether any given number is prime or composite.</p> <p>Use formal written algorithms for multiplication (limit operators to two-digit numbers) and division (limit operators to two digits).</p>

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Fractions and Decimals	develop an understanding of fractions as parts of unit wholes, as parts of a set, as locations on number lines, and as divisions of whole numbers.	NR6.4 Model, compare, represent, order and calculate fluently with decimals, fractions (including ninths) with related denominators and other percentages.	Model, compare and represent fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12 and 100 and extending to 9. Find equivalence between fractions. Express a mixed numeral as an improper fraction, and vice versa. Add and subtract fractions where one denominator is a multiple of the other. Multiply fractions by whole numbers. Calculate unit fractions and percentage of quantities. Add and subtract decimals to three decimal places. Solve problems involving the four operations and money in authentic situations.
Chance	construct an understanding of chance and likelihood as applied in everyday situations and develop an appreciation of the difference between theoretical and experimental probabilities.	NR6.5 Quantify with fractions, decimals and percentages the likelihood of simple events and order on a number line and make and test predictions about ‘population’ based on sample data.	Quantify using simple fractions, decimals and percentages the likelihood of simple events occurring. Compare and contrast the probability of outcomes from experiments and by reasoning from equally likely events. Investigate variation in probabilities as the chance experiment is repeated again. Describe in words a general rule for finding probability.

Patterns and Algebra

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students record and describe geometric and number repeating and growing patterns using tables and words.		
	Students construct, verify and complete number sentences involving the four operations with a variety of numbers.		
	Students solve word problems involving the application of repeating and growing patterns in relation to the mathematics in the Year 6 content.		
Patterns and Algebra	demonstrate fluency in generating, describing, recording, extending and representing geometric and numeric patterns as well as construct an understanding of the relationships and change between numbers and apply these in solving problems.	PA6.1a Record, analyse and describe geometric and number repeating and growing patterns that involve two operations using words, tables and general rules.	Construct simple geometric and number repeating and growing patterns involving two operations and different types of numbers. Construct a table of values for geometric and number patterns. Describe a pattern in words in more than one way. Determine a general rule for the pattern. Record and describe number patterns, quantitative relationships and change using words, tables and general rules.
		PA6.1b Construct, verify and complete complex number sentences involving the four operations with a variety of numbers.	Build, verify and complete number sentences involving the four operations with whole numbers.

Data Analysis

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students gather, organise data, display data using tables and graphs, and make judgements in relation to this data.		
	Students read and interpret picture, simple line, pie and divided bar graphs with scale; and utilise data to find the average score.		
Data Analysis	formulate questions that can be answered by collecting, organising, tabulating, graphing and analysing data.	DA6.1 Construct divided bar graphs with scales of many-to-one, select an appropriate display for data, interpret a variety of graphs with scales of many-to-one correspondence, and utilise data to find average.	Construct divided bar graphs with many-to-one scales. Read and interpret picture graphs, column and line graphs, and divided bar graphs with scales of many-to-one correspondence and make judgements in relation to the data. Find the mean (average) for a small set of data.

Measurement

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students select and use any unit to estimate, measure and calculate length, area, volume, capacity and mass. Students use 24-hour time in real-life situations and construct timelines and timetables.		
Length	identify and describe the attribute of length and use informal and formal (metric and imperial) units for measurement.	MS6.1 Work fluently to estimate, measure, order, compare and record lengths, distances and perimeters using the metric and imperial units and convert measurements between the two systems.	Understand, select and use units of appropriate size and work fluently with the metric and imperial units of length. Carry out simple conversion between measurement systems (e.g. between miles and kilometres, yards and metres, feet & inches and centimetres & millimetres) Develop, understand and use a formula to calculate perimeters of equilateral and isosceles triangles. Use decimal notation up to three places to record lengths.
Area	identify and describe the attribute of area and use informal and formal (metric and imperial) units for measurement.	MS6.2 Choose and use the appropriate unit to calculate areas of shapes including the area of triangles and surface areas of rectangular prisms.	Calculate area by identifying and choosing an appropriate unit. Determine equivalence of area measures between the metric and imperial systems. Investigate to find a general relationship between length of base, perpendicular height and area of triangles. Read and interpret scales on maps and simple scale drawings to calculate an area. Informally find surface area of rectangular prisms by using a square grid overlay or counting unit squares.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Volume and Capacity	identify and describe the attribute of volume and use informal and formal (metric and imperial) units for measuring capacity or volume.	MS6.3 Identify and choose the appropriate unit to estimate and measure volume and capacity, including the volume of irregular solids.	Identify and choose the appropriate method and unit to measure volume and capacity. Investigate, demonstrate and determine the relationship between cubic centimetres and millilitres and cubic inches and millilitres. Choose appropriate formal units and tools to estimate, measure and compare capacity and volume. Explore the use of water displacement to determine volume of irregular solids using metric and imperial units. Convert measurements from one unit to another within each measurement system. Use formal units to record volume and capacity using decimal notation to three decimal places.
Mass	understand, distinguish and describe the attribute of mass through indirect and direct comparisons, and use informal and formal (metric and imperial) units for measurement.	MS6.4 Select and use the appropriate unit and measuring device to find the mass of objects.	Identify and choose the appropriate unit and device to measure mass. Work fluently within each measurement system and convert between kilograms and tonnes and between pounds and tons. Explore and determine the mass of 1 litre or 1 pound of water. Use formal units to record mass using decimal notation to three decimal places.
Time	construct an understanding of, and describe, the passage of time, its measurement and representations, through the use of everyday language and experiences.	MS6.5 Use 24-hour time and notation in real-life situations, convert between 12-hour and 24-hour notations and solve authentic problems involving time duration.	Read, interpret and convert time between am/pm and 24-hour notations. Create and interpret a timeline of real-life events using a scale. Read and interpret timetables involving 24-hour time.

Space and Geometry

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	Students construct and classify 3D objects and 2D shapes and compare and describe their properties. Students measure, construct and classify angles and make calculations using scale. Students use a variety of mapping skills to identify positions on a map.		
Three-dimensional Space	construct verbal, visual and mental representations of three-dimensional objects, their characteristics and properties, and different orientations.	SG6.1 Distinguish between 3D objects, including hexagonal prisms and pyramids and visualise, draw and build them given sketches of different views.	Distinguish between, build and sort 3D objects including hexagonal prisms and pyramids, identify and explain their properties. Visualise, draw and construct 3D objects given sketches of different views.
Two-dimensional Space	construct verbal, visual and mental representations of lines, angles and two-dimensional shapes, their characteristics and properties, and different orientations.	SG6.2a Identify and draw regular and irregular 2D shapes (pentagons, hexagons and octagons) and their diagonals; and identify and name parts of a circle.	Identify and draw regular and irregular 2D shapes from descriptions. Identify and name parts of a circle. Enlarge and reduce pictures and maps. Identify shapes that have rotational symmetry. Explore and generalise side and angle properties of 2D shapes including parallelograms and rhombuses. Investigate properties of circles.
		SG6.2b Recognise, understand, compare, measure, construct and classify angles of sizes up to 360 degrees.	Classify angles as acute, obtuse, reflex or a revolution. Measure in degrees and construct angles using a protractor.
Position	develop their representation of position through precise language and the use of grids and compass directions.	SG6.3 Use scales, legends and compass directions to identify positions on a map.	Make simple calculations using scale. Draw maps and plans from an aerial view.

Working Mathematically

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Major Learning Outcomes	Students interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 6 content.	
	Students select and apply appropriate problem-solving strategies, including technological applications, in undertaking investigations to examine and analyse, to represent mathematical situations, and to solve mathematical problems.	
	Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 6 content to justify their conjectures, answers and solutions.	
	Students critically reflect upon the results of their decisions, provide valid justifications, and present evaluations of why one method is preferred to another.	
	Students use mathematical terminology and conventions in a variety of ways to describe their representations, mathematical understanding and answers.	
Interpreting &/or Posing Questions	interpret and/or pose questions in relation to mathematical situations and their mathematical experiences using the relevant year level mathematics.	WM6.1 Interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 6 content.
Strategically Thinking & Representing	strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.	WM6.2 Select and apply appropriate problem-solving strategies, including technological applications, in undertaking investigations to solve mathematical problems.
Reasoning & Justifying	develop and utilise processes when investigating relationships, checking solutions and giving reasons to justify their conclusions.	WMS6.3 Integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 6 content to justify their conjecture, answer and solutions.
Reflecting & Evaluating	reflect on their experiences and critical understanding to make connections with, and generalisations about, existing knowledge and understanding to explain answers and evaluate conclusions.	WM6.4 Reflect critically upon the results of their decisions, provide valid justifications, and present evaluations of why one method is preferred to another.
Communicating Mathematically	develop and use appropriate language and representations to formulate, express and communicate mathematical ideas.	WM6.5 Use mathematical terminology and conventions in a variety of ways to describe their representations, mathematical understanding and answers.

Year Seven

Number and Operations

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students demonstrate a range of mental strategies to enhance their computational skills; operate competently with directed numbers, fractions (including sevenths) and percentages, and apply these in a range of practical contexts.</p> <p>Students demonstrate familiarity with the concepts of ratio, rates and the probability of simple events and apply these when solving problems.</p> <p>Students use index notation for numbers with positive integral indices and explore prime factorisation, squares and related square roots.</p> <p>Students investigate special groups of positive whole numbers and apply a range of strategies to aid computation.</p> <p>Students solve probability problems involving simple events.</p>		
Whole Numbers	develop an understanding of the ways numbers are represented, the role of place value, and relationships among numbers and number systems.	<i>Operations with Whole Numbers</i> NR7.1 Identify and describe the properties of special groups of whole numbers, use index notation (positive indices only), explore other number systems with different bases, and apply multiple strategies to perform computation.	<i>Operations with Whole Numbers</i> Investigate other number systems with different bases. Explore groups of positive whole numbers. Use mental and informal strategies to perform computation.
Addition and Subtraction	develop fluency with number facts and computation using addition and subtraction and construct an appreciation of the relationship between those facts and the two operations.	<i>Operations with Whole Numbers</i> <i>cont'd</i>	<i>Operations with Whole Numbers</i> <i>cont'd</i> Use index notation for positive integral indices. Express a number as a product of its prime factors. Investigate squares and related square roots. Divide three- and four-digit numbers by a three-digit number.
Multiplication and Division	develop fluency with number facts and computation using multiplication and division and construct an appreciation of the relationship between those facts and the two operations.	<i>Integers</i> NR7.2 Order and operate fluently with integers (directed numbers).	<i>Integers</i> Solve computation and word problems involving addition, subtraction, multiplication and division with directed numbers. Use grouping symbols to simplify expressions.

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Fractions and Decimals	develop an understanding of fractions as parts of unit wholes, as parts of a set, as locations on number lines, and as divisions of whole numbers.	<p><i>Fractions, Decimals and Percentages</i> NR7.3</p> <p>Understand and work fluently with fractions (including sevenths), decimals, percentages, ratios and rates, represent and order decimals, and convert between fractions, decimals and percentages.</p>	<p><i>Fractions, Decimals and Percentages</i></p> <p>Determine highest common factor (HCF) and lowest common multiple (LCM).</p> <p>Model and represent equivalent fractions.</p> <p>Understand, become fluent in and solve authentic problems involving operations with fractions (including sevenths), decimals, percentages, and mixed numerals.</p> <p>Solve problems involving multiplicative situations using ratios and rates.</p>
		<p><i>Financial Literacy</i> NR7.4</p> <p>Solve problems involving fractions, decimals, ratios and/or percentages to compare prices and simple interest.</p>	<p><i>Financial Literacy</i></p> <p>Solve simple consumer problems including those involving earning and spending money.</p> <p>Calculate simple interest using a calculator and table of values.</p> <p>Calculate profit and loss, wages, salary, commission, overtime and bonuses.</p>
Chance	construct an understanding of chance and likelihood as applied in everyday situations and develop an appreciation of the difference between theoretical and experimental probabilities.	<p><i>Probability</i> NR7.5</p> <p>Identify equally likely outcomes and calculate probabilities and relative frequencies from data.</p>	<p><i>Probability</i></p> <p>Construct sample space of simple experiments with equally likely outcomes and, by reasoning, find the probability of simple events.</p> <p>Compare experimental data and expected data.</p> <p>Describe a general formula for finding probability of an event.</p> <p>Estimate probabilities using relative frequencies of chance experiments.</p>

Patterns and Algebra

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students extend and generalise number patterns to demonstrate an understanding of the use of pronumerals and the language of algebra including the use of basic index notation.</p> <p>Students develop tables of values from simple relationships and illustrate these relationships on the number plane.</p> <p>Students construct and interpret line, travel and conversion graphs.</p> <p>Students solve word problems involving the application of patterns and relationships in relation to Year 7 content.</p>		
Patterns and Algebra	<p>demonstrate fluency in generating, describing, recording, extending and representing geometric and numeric patterns as well as construct an understanding of the relationships and change between numbers and apply these in solving problems.</p>	<p><i>Algebraic Techniques</i> PA7.1 Extend and generalise number patterns using word equations.</p> <p><i>Number Patterns</i> PA7.2 Create, record, analyse and generalise number patterns using words and pronumerals and illustrate patterns on graphs.</p> <p><i>Algebraic Techniques</i> PA7.3 Construct and simplify simple algebraic expressions and equations.</p> <p><i>Linear Relationships</i> PA7.4 Interpret the number plane and locate ordered pairs and graphs and interpret simple linear relationships created from simple number patterns and equations.</p>	<p><i>Algebraic Techniques</i> Extend and generalise number patterns involving the four operations using word equations.</p> <p><i>Number Patterns</i> Model, extend, record and describe number patterns and quantitative relationships using words and letters.</p> <p><i>Algebraic Techniques</i> Construct, expand, factorise and simplify simple algebraic expressions.</p> <p><i>Linear Relationships</i> Use the number plane to locate ordered pairs. Construct and interpret graphs of simple linear relationships generated from simple number patterns and equations.</p>

Data Analysis

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students construct and interpret graphs, tables, charts and statistical information.</p> <p>Students construct and interpret sector, dot plots and stem-and-leaf plots.</p>		
Data Analysis	<p>formulate questions that can be answered by collecting, organising, tabulating, graphing and analysing data.</p>	<p><i>Data Representation</i> DA7.1 Draw, read and interpret sector graphs, dot plots and stem-and-leaf plots, tables and charts.</p>	<p>Construct graphs (sector, dot plots and stem-and-leaf plots), tables and charts.</p> <p>Read and interpret sector (pie) graphs and dot and stem-and-leaf plots.</p>

Measurement

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students use formulae and Pythagoras' theorem to calculate area and perimeter of a variety of polygons and simple composite figures. Students find surface area and volume of prisms.		
	Students describe the limit of accuracy of their measures.		
	Students compare time zones in the Pacific and interpret and use tables and charts related to time.		
Length	identify and describe the attribute of length and use informal and formal (metric and imperial) units for measurement.	<i>Perimeter and Area</i> MS7.1 Calculate perimeter of simple composite figures comprising rectangles and/or triangles and develop a practical understanding of Pythagoras' theorem and use it to find lengths of right-angled triangles.	<i>Perimeter and Area</i> Select and apply techniques and tools to accurately find length measures to appropriate levels of precision. Carry out simple unit conversion between the metric and imperial units of length. Develop, understand and use Pythagoras' theorem to calculate lengths of right-angled triangles. Develop, understand and use formula to calculate the perimeter of a variety of polygons including parallelograms and simple composite figures made of rectangles and/or triangles.
Area	identify and describe the attribute of area and use informal and formal (metric and imperial) units for measurement.	MS7.2 Develop formulae and calculate the area of a variety of polygons and simple composite figures.	Develop formulae and calculate the area of a variety of polygons including parallelogram and simple composite figures.
Volume and Capacity	identify and describe the attribute of volume and use informal and formal (metric and imperial) units for measuring capacity or volume.	<i>Surface Area and Volume</i> MS 7.3 Find the surface area and volume of right prisms and convert between units of volume within each measurement system.	<i>Surface Area and Volume</i> Investigate, demonstrate, generalise and develop a formula to calculate the surface area of rectangular and triangular prisms. Investigate, demonstrate, generalise and develop a formula to calculate the volume of right prisms. Convert between units of volume within each measurement system and between systems.
Mass	understand, distinguish and describe the attribute of mass through indirect and direct comparisons, and use informal and formal (metric and imperial) units for measurement.		
Time	construct an understanding of, and describe, the passage of time, its measurement and representations, through the use of everyday language and experiences.	<i>Time</i> MS7.4 Use mental and calculator strategies to determine time duration, compare time across Pacific time zones and interpret various timetables.	<i>Time</i> Calculate time duration using multiple strategies and involving time units. Explain and use Pacific time zones to determine and compare time across the Pacific. Interpret tables and charts related to time.

Space and Geometry

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students describe and sketch 3D solids including polyhedra and classify them in terms of their properties.</p> <p>Students classify, construct and determine the properties of triangles and quadrilaterals; and identify congruent 2D figures stating the relevant conditions.</p> <p>Students identify and name angles formed by the intersection of straight lines, including those related to transversals on sets of parallel lines, and make use of the relationships between them.</p>		
Three-dimensional Space	construct verbal, visual and mental representations of three-dimensional objects, their characteristics and properties, and different orientations.	<p><i>Properties of Solids</i> SG7.1 Investigate, describe and draw 3D solids including polyhedra, and sort them on the basis of their properties.</p>	<p><i>Properties of Solids</i> Explain and sketch 3D solids including polyhedra. Classify 3D solids according to their properties and develop definitions of classes of shapes.</p>
Two-dimensional Space	construct verbal, visual and mental representations of lines, angles and two-dimensional shapes, their characteristics and properties, and different orientations.	<p><i>Properties of Geometrical Figures</i> SG7.2 Recognise, sort, generalise and describe properties of triangles; and explore congruent triangles and state the relevant conditions.</p> <p><i>Angles</i> SG7.3 Recognise, understand and state angles formed by the intersection of straight lines, including those related to transversals on sets of parallel lines, and make use of the relationships between them.</p>	<p><i>Properties of Geometrical Figures</i> Recognise, identify, sort and generalise the properties of triangles. Explore congruent triangles and state relevant conditions. Identify and name shapes that are congruent.</p> <p><i>Angles</i> Identify and name angles formed by transversals on sets of parallel lines, and make use of the relationships between them. Use angle properties to find unknown angles.</p>

Working Mathematically

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Major Learning Outcomes	<p>Students interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 7 content.</p> <p>Students use multiple representations such as mathematical terminology, diagrams, text and tables to communicate mathematical ideas, and to make connections between concepts and processes within and between mathematical contexts as they solve mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 7 content to justify their strategies, answers and solutions.</p> <p>Students compare the strengths and weaknesses of different strategies and solutions.</p> <p>Students apply their mathematical skills and understanding in analysing real-life situations and in systematically formulating questions or problems that they then investigate, analyse and solve, using technology where appropriate.</p>	

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Interpreting &/or Posing Questions	interpret and/or pose questions in relation to mathematical situations and their mathematical experiences using the relevant year level mathematics.	WM7.1 Interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 7 content.
Strategically Thinking & Representing	strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.	WM7.2 Use mathematical terminology, diagrams, text and tables to communicate mathematical ideas, and link concepts and processes within and between mathematical contexts as they solve mathematical problems.
Reasoning & Justifying	develop and utilise processes when investigating relationships, checking solutions and giving reasons to justify their conclusions.	WM7.3 Integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 7 content to justify their strategies and answers.
Reflecting & Evaluating	reflect on their experiences and critical understanding to make connections with, and generalisations about, existing knowledge and understanding to explain answers and evaluate conclusions.	WM7.4 Compare the strengths and weaknesses of different strategies and solutions.
Communicating Mathematically	develop and use appropriate language and representations to formulate, express and communicate mathematical ideas.	WM7.5 Apply their mathematical skills and understanding in analysing real-life situations and in systematically formulating questions or problems that they then investigate, analyse and solve, using technology where appropriate.

Year Eight

Number and Operations

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students operate competently with mixed numerals (including elevenths) and decimals and apply these in a range of practical contexts, including problems related to discounts and profit and loss; apply the concepts of ratio, rates and the probability of complementary events to solve problems.</p> <p>Students use index notation for numbers with positive and negative integral indices and use prime factorisation to explore cubes and related cube roots; and investigate divisibility tests and other counting systems.</p>		
Whole Numbers	develop an understanding of the ways numbers are represented, the role of place value, and relationships among numbers and number systems.	<p><i>Operations with Whole Numbers</i> NR8.1</p> <p>Use index notation (including negative indices), explore divisibility, apply multiple strategies to perform computation and solve authentic problems.</p>	<p><i>Operations with Whole Numbers</i></p> <p>Explore tests of divisibility. Apply multiple strategies to perform calculations.</p>
Addition and Subtraction	develop fluency with number facts and computation using addition and subtraction and construct an appreciation of the relationship between those facts and the two operations.	<p><i>Operations with Whole Numbers</i> <i>cont'd</i></p>	<p><i>Operations with Whole Numbers</i> <i>cont'd</i></p> <p>Investigate cubes and related cube roots. Use index notation for negative integral indices. Divide four-digit numbers by a four-digit number.</p>
Multiplication and Division	develop fluency with number facts and computation using multiplication and division and construct an appreciation of the relationship between those facts and the two operations.	<p><i>Integers</i> NR8.2</p> <p>Calculate fluently with integers.</p>	<p><i>Integers</i></p> <p>Compute and solve word problems involving the four operations and directed numbers including the application of these in a range of authentic contexts. Apply order of operations to simplify expressions involving grouping symbols.</p>

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Fractions and Decimals	develop an understanding of fractions as parts of unit wholes, as parts of a set, as locations on number lines, and as divisions of whole numbers.	<p><i>Fractions, Decimals and Percentages</i> NR8.3 Understand and work fluently with fractions (including elevenths), decimals, percentages, ratios and rates.</p> <p><i>Financial Literacy</i> NR8.4 Solve problems involving fractions, decimals, ratios and/or percentages to compare prices and compound interest.</p>	<p><i>Fractions, Decimals and Percentages</i> Perform operations with fractions (including elevenths), decimals and mixed numerals. Solve problems involving multiplicative situations using ratios, rates and proportions.</p> <p><i>Financial Literacy</i> Solve complex consumer problems including compound interest and various options of deferred payments. Calculate compound interest using a calculator and table of values. Calculate and compare total costs of purchasing goods using credit cards, lay-by, loans etc. Determine ‘best-buy’ option.</p>
Chance	construct an understanding of chance and likelihood as applied in everyday situations and develop an appreciation of the difference between theoretical and experimental probabilities.	<p><i>Probability</i> NR8.5 Identify complementary events and use Venn diagrams to illustrate relationship between events and their complements.</p>	<p><i>Probability</i> Recognise and determine probability of complementary events. Use probability of complementary events to solve problems.</p>

Patterns and Algebra

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students extend and generalise number patterns using pronumerals and the language of algebra such as in surface area, volume and capacity formulae, including the use of complex index notation.		
	Students develop tables of values from simple linear relationships and illustrate these relationships on the number plane and in the form of word and algebraic equations.		
Students construct and interpret step and simple linear graphs; and solve word problems involving the application of simple linear relationships in relation to the Year 8 content.			
Patterns and Algebra	demonstrate fluency in generating, describing, recording, extending and representing geometric and numeric patterns as well as construct an understanding of the relationships and change between numbers and apply them in solving problems.	<i>Algebraic Techniques</i> PA8.1 Use letters to represent numbers and translate between words and algebraic symbols.	<i>Algebraic Techniques</i> Use letters as algebraic symbols to represent numbers and quantities. Translate descriptions of quantitative relationships into algebraic symbols and between algebraic symbols and quantitative descriptions. Identify, manipulate and simplify simple equivalent algebraic expressions.
		<i>Number Patterns</i> PA8.2 Create, record, analyse and generalise number patterns using words and algebraic symbols in a variety of ways.	<i>Number Patterns</i> Describe number patterns and quantitative relationships using words. Translate descriptions of quantitative relationships and number patterns in word problems and displayed in multiple representations using algebraic symbols. Use a grid to represent number patterns and quantitative relationships.
		<i>Algebraic Techniques</i> PA8.3 Use the algebraic symbol system to simplify, expand and factorise complex algebraic expressions.	<i>Algebraic Techniques</i> Construct, expand, factorise, simplify and solve simple algebraic equations. Substitute into algebraic expressions. Use algebra to solve linear equations, simple inequalities and word problems.
		<i>Linear Relationships</i> PA8.4 Use algebraic techniques to solve linear equations and simple inequalities and graphs and interpret linear relationships on the number plane.	<i>Linear Relationships</i> Represent in multiple ways linear relationships generated from number patterns and equations and interpret their graphs in the context of the problem.

Data Analysis

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	<p>Students construct and interpret graphs, frequency tables and histograms.</p> <p>Students analyse discrete and continuous data; consider sampling versus census, prediction and possible misrepresentation of data.</p> <p>Students calculate the mean, mode, median and range.</p>		
Data Analysis	<p>formulate questions that can be answered by collecting, organising, tabulating, graphing and analysing data.</p>	<p><i>Data Representation</i> DA8.1 Draw, read and interpret a variety of graphs including conversion and step graphs, tables including frequency tables for grouped data, and charts, and interpret other statistical information.</p>	<p><i>Data Representation</i> Construct, read and interpret a variety of graphs and plots, tables, and charts. Identify the types of variables used in graphs. Select and justify the choice of measure of centre and spread used. Identify misrepresentation of data in graphs including those published in newspapers and magazines. Complete frequency tables for grouped data. Construct frequency histograms and polygons.</p>
		<p><i>Data Analysis and Evaluation</i> DS8.2 Undertake an investigation to answer key questions, collect data using either a census or a sample, and determine measures of location and spread.</p>	<p><i>Data Analysis and Evaluation</i> Use sampling and census. Predict proportions and expected number using sample data and diagrams. Determine mean, median, mode and range, use these measures to compare data sets and explain their reasoning.</p>

Measurement

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcomes	Students find areas of circles and calculate surface area and volume of cylinders. Students use formulae to calculate perimeter and area of circles and complex figures. Students describe the limit of accuracy of their measures. Students perform calculations of time that involved mixed units and use international time zones.		
Length	identify and describe the attribute of length and use informal and formal (metric and imperial) units for measurement.	<i>Perimeter and Area</i> MS8.1 Develop a practical understanding of, and calculate circumference of, circles and determine perimeter of more complex composite figures comprising rectangles, triangles and/or circles.	<i>Perimeter and Area</i> Investigate, demonstrate, generalise and develop a formula to find the circumference of circles and perimeter of more complex figures comprising rectangles, triangles and/or circles.
Area	identify and describe the attribute of area and use informal and formal (metric and imperial) units for measurement.	MS8.2 Develop a practical understanding of, and calculate area of, circles and determine area of more complex composite figures comprising rectangles, triangles and/or circles.	Investigate, demonstrate, generalise and develop a formula to find the area of circles. Convert between metric and imperial units of area.
Volume and Capacity	identify and describe the attribute of volume and use informal and formal (metric and imperial) units for measuring capacity or volume.	<i>Surface Area and Volume</i> MS8.3 Calculate surface area of and volume of cylinders.	<i>Surface Area and Volume</i> Investigate, demonstrate, generalise and develop a formula to calculate the surface area of cylinders. Investigate, demonstrate, generalise and develop a formula to calculate the volume of cylinders. Convert between units of volume within each measurement system and between systems.
Mass	understand, distinguish and describe the attribute of mass through indirect and direct comparisons, and use informal and formal (metric and imperial) units for measurement.		
Time	construct an understanding of, and describe the passage of, time, its measurement and representations, through the use of everyday language and experiences.	<i>Time</i> MS8.4 Use multiple strategies to calculate time and duration involving mixed time units, notations and international time zones, and read and interpret a variety of time charts.	<i>Time</i> Work fluently with calculations involving mixed time units, notations and international time zones. Interpret a variety of tables and charts related to time.

Space and Geometry

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>	KEY IDEAS
Major Learning Outcome	Students' knowledge of the properties of 2D and 3D geometrical figures, angles, parallel lines, perpendicular lines, congruent figures, similar figures and scale drawings enable them to solve numerical exercises on finding unknown lengths and angles in figures.		
Three-dimensional Space	construct verbal, visual and mental representations of three-dimensional objects, their characteristics and properties, and different orientations.	<i>Properties of Solids</i> SG8.1 Investigate, identify and generalise properties of 3D objects, build models of polyhedra, and develop Euler's formula.	<i>Properties of Solids</i> Investigate and generalise properties of classes of 3D objects. Explore and build Platonic solids. Examine and generalise the relationships between faces, vertices and edges of convex polyhedra. Explore and sketch isometric drawings of 3D solids.
Two-dimensional Space	construct verbal, visual and mental representations of lines, angles and two-dimensional shapes, their characteristics and properties, and different orientations.	<i>Properties of Geometrical Figures</i> SG8.2 Recognise, sort, generalise and describe properties of quadrilaterals; explore congruent and similar figures and state the relevant conditions; and construct and interpret scale drawings.	<i>Properties of Geometrical Figures</i> Recognise, identify, sort and generalise the properties of quadrilaterals. Interpret and construct scale drawings. Complete simple numerical exercises based on geometrical properties. Explore similar and congruent figures and state relevant conditions. Identify and name shapes that are similar.
		<i>Angles</i> SG8.3 Use knowledge of 2D and 3D geometrical figures to solve numerical exercises in finding lengths and angles in figures.	<i>Angles</i> Classify angles and determine angle relationships. Construct parallel and perpendicular lines and determine associated angle properties. Use triangle, angle and line properties to find unknown angles and lengths.

Working Mathematically

SUBSTRAND	ACHIEVEMENT OBJECTIVES <i>STUDENTS LEARN TO</i>	LEARNING OUTCOMES <i>STUDENTS WILL DEMONSTRATE SUCH LEARNING WHEN THEY CAN</i>
Major Learning Outcomes	<p>Students interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 8 content.</p> <p>Students use multiple representations such as mathematical terminology, diagrams, text and tables to communicate mathematical ideas, and to make connections between concepts and processes within and between mathematical contexts as they solve mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 8 content to justify their strategies, answers and solutions.</p> <p>Students critically reflect upon and evaluate the strengths and weaknesses of different strategies and solutions.</p> <p>Students apply their mathematical skills and understanding in analysing real-life situations and in systematically formulating questions or problems that they then investigate, analyse and solve, using technology where appropriate.</p>	
Interpreting &/or Posing Questions	interpret and/or pose questions in relation to mathematical situations and their mathematical experiences using the relevant year level mathematics.	WM8.1 Interpret and/or pose questions, when investigating mathematical situations and their mathematical experiences using Year 8 content.
Strategically Thinking & Representing	strategically develop, choose and utilise a range of strategies, including the identification and utilisation of appropriate technology, to investigate, and represent and solve problems.	WM8.2 Analyse a mathematical or real-life situation, solving problems using technology where appropriate.
Reasoning & Justifying	develop and utilise processes when investigating relationships, checking solutions and giving reasons to justify their conclusions.	WM8.3 Integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 8 content to justify their strategies and answers.
Reflecting & Evaluating	reflect on their experiences and critical understanding to make connections with, and generalisations about, existing knowledge and understanding to explain answers and evaluate conclusions.	WM8.4 Critically reflect upon and evaluate the strengths and weaknesses of different strategies and solutions.
Communicating Mathematically	develop and use appropriate language and representations to formulate, express and communicate mathematical ideas.	WM8.5 Apply their mathematical skills and understanding in analysing real-life situations and in systematically formulating questions or problems that they then investigate and solve, using technology where appropriate.

Mathematics

Progressions by Strand and Year Level for:

- Major Outcomes
- Content: scope and continuum of key ideas
- Overview of Learning Outcomes

The strands: major learning outcomes by year level

WORKING MATHEMATICALLY	NUMBER & OPERATIONS	PATTERNS & ALGEBRA	DATA ANALYSIS	MEASUREMENT	SPACE & GEOMETRY
<p>Year 1 Major Outcomes</p> <p>Students interpret and/ or pose questions, when investigating mathematical situations and their mathematical experiences using Year 1 content.</p> <p>Students use objects, actions, imagery, technology and/ or trial and error to examine and analyse, and to represent their interpretations of, mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 1 content to justify their conjectures.</p> <p>Students reflect upon the results of their conjectures and use concrete materials and/ or pictorial representations to evaluate conclusions.</p> <p>Students describe mathematical situations using everyday language, actions, materials and informal recordings.</p>	<p>Year 1 Major Outcomes</p> <p>Students count, order, read, write, partition and regroup numbers up to 50 and use a range of mental strategies, informal recording methods and materials to add, subtract, multiply and divide.</p> <p>Students model and describe objects and collections divided into halves.</p> <p>Students sort, order and count coins up to 50 sense.</p> <p>Students recognise and describe the element of chance in familiar activities.</p>	<p>Year 1 Major Outcomes</p> <p>Students describe, create and continue a variety of number patterns and relate addition and subtraction facts to 50.</p> <p>Students solve word problems involving the application of patterns and relationships in relation to the Year 1 content.</p>	<p>Year 1 Major Outcomes</p> <p>Students collect data about themselves and their surroundings and use objects or pictures to represent information.</p> <p>Students organise the objects or pictures into a data display using a scale of one-to-one correspondence, and interpret the information presented.</p>	<p>Year 1 Major Outcomes</p> <p>Students compare objects directly in terms of their length, area, volume, capacity and mass and use everyday and comparative language to describe these attributes.</p> <p>Students demonstrate an understanding of the need for formal units of length.</p> <p>Students name and order days of the week; and sequence events and tell time on the hour using analogue and digital clocks.</p>	<p>Year 1 Major Outcomes</p> <p>Students manipulate, sort, and then describe 3D objects and 2D shapes using everyday language.</p> <p>Students represent and describe the position of objects using everyday language.</p>

WORKING MATHEMATICALLY	NUMBER & OPERATIONS	PATTERNS & ALGEBRA	DATA ANALYSIS	MEASUREMENT	SPACE & GEOMETRY
<p>Year 2 Major Outcomes</p> <p>Students interpret and/ or pose questions, when investigating mathematical situations and their mathematical experiences using Year 2 content.</p> <p>Students strategically develop and choose objects, diagrams, imagery and technology to examine and analyse, and to represent their interpretations of, mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 2 content to justify their conjectures, answers and solutions.</p> <p>Students critically reflect upon the results of their conjectures and use concrete materials and/or pictorial representations to explain their results and evaluate conclusions.</p> <p>Students describe mathematical situations and methods using everyday language, some mathematical language, actions, materials, diagrams and symbols.</p>	<p>Year 2 Major Outcomes</p> <p>Students count, order, read, write, partition and regroup numbers up to at least 100 and use a range of mental strategies, informal recording methods and materials to add, subtract, multiply and divide.</p> <p>Students model and describe objects and collections divided into halves and quarters and apply these in solving problems.</p> <p>Students sort, order and count coins up to one tala and perform simple monetary calculations.</p> <p>Students recognise, describe and order the element of chance in familiar activities.</p>	<p>Year 2 Major Outcomes</p> <p>Students describe, create and continue a variety of number patterns and relate addition and subtraction facts to at least 50.</p> <p>Students solve word problems involving the application of patterns and relationships in relation to the Year 2 content.</p>	<p>Year 2 Major Outcomes</p> <p>Students gather and organise data, and display data using column and picture graphs.</p>	<p>Year 2 Major Outcomes</p> <p>Students estimate and measure and record using informal units for length, area, volume, capacity, mass and time.</p> <p>Students compare and order objects according to their attributes and record findings.</p> <p>Students use formal units (metre and centimetre and feet and inches) to measure length and distance.</p> <p>Students use a calendar to identify the date and name and order the months and the seasons of the year.</p> <p>Students use formal units to compare and order the duration of events and tell the time on the half-hour.</p>	<p>Year 2 Major Outcomes</p> <p>Students sort, describe and represent 3D objects including cones, cubes, cylinders, spheres and prisms, and recognise them in pictures and the environment.</p> <p>Students represent and describe the position of objects using informal mathematical language.</p>

WORKING MATHEMATICALLY	NUMBER & OPERATIONS	PATTERNS & ALGEBRA	DATA ANALYSIS	MEASUREMENT	SPACE & GEOMETRY
<p>Year 3 Major Outcomes</p> <p>Students interpret and/ or pose questions, when investigating mathematical situations and their mathematical experiences using Year 3 content.</p> <p>Students use diagrams, imagery and technology to examine and analyse, and to represent their interpretations of, mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalise about, existing knowledge and understanding in terms of Year 3 content to justify their conjectures, answers and solutions.</p> <p>Students reflect upon the results of their conjectures and use concrete materials and/or pictorial representations to explain their results and evaluate conclusions.</p> <p>Students describe mathematical situations and methods using everyday and some mathematical language and diagrams.</p>	<p>Year 3 Major Outcomes</p> <p>Students count, order, read, write, partition, regroup and record numbers up to 999 and use mental and written strategies, including the formal written algorithm, to solve addition and subtraction problems involving numbers of up to three digits.</p> <p>Students use mental strategies to recall multiplication facts up to 100 and related division facts and use informal written strategies for multiplication and division of two-digit numbers by one-digit numbers.</p> <p>Students model, compare and represent eighths and thirds in everyday situations and they model, compare, represent, add and subtract decimals to two decimal places.</p> <p>Students perform simple calculations with money up to \$5 and use estimation to check their solutions.</p> <p>Students order events from least likely to most likely and identify and record all the outcomes for a simple chance experiment.</p>	<p>Year 3 Major Outcomes</p> <p>Students generate, describe and record number patterns and relate multiplication and division facts to at least 100.</p> <p>Students solve word problems involving the application of patterns and relationships in relation to the mathematics in the Year 3 content.</p>	<p>Year 3 Major Outcomes</p> <p>Students gather and organise data, and display data using tables and interpret the results.</p>	<p>Year 3 Major Outcomes</p> <p>Students estimate, measure, compare and record length, area, volume, capacity and mass using some formal units relevant to the content for Year 3.</p> <p>Students read and record time in quarter-hour in digital and analogue notation and make comparisons between time units.</p>	<p>Year 3 Major Outcomes</p> <p>Students make, compare and describe 3D objects including pyramids, and represent them in drawings.</p> <p>Students manipulate, compare, sketch and name 2D shapes and describe their features.</p> <p>Students compare angles using informal means.</p> <p>Students use simple maps and grids to represent position and follow routes.</p>

WORKING MATHEMATICALLY	NUMBER & OPERATIONS	PATTERNS & ALGEBRA	DATA ANALYSIS	MEASUREMENT	SPACE & GEOMETRY
<p>Year 4 Major Outcomes</p> <p>Students interpret and/ or pose questions, when investigating mathematical situations and their mathematical experiences using Year 4 content.</p> <p>Students select and use appropriate mental or written strategies, or technology, to examine and analyse, to represent their interpretations of, and to solve, mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 4 content to justify their conjectures, answers and solutions.</p> <p>Students reflect upon the results of their conjectures and explain their results and evaluate conclusions.</p> <p>Students use some appropriate terminology to describe their mathematical ideas and to make connections between their learning and other experiences.</p>	<p>Year 4 Major Outcomes</p> <p>Students count, order, read, write, partition, regroup, and record numbers up to at least 9999 and use mental and written strategies, including the formal written algorithm, to solve addition and subtraction problems involving numbers of up to four digits.</p> <p>Students use mental strategies to recall multiplication facts up to at least 100 and related division facts and use informal written strategies for multiplication and division of two-digit numbers by one-digit numbers.</p> <p>Students model, compare and represent fifths, tenths, hundredths, and sixths on the number line and recognise percentages in everyday situations and they model, compare, represent, add and subtract decimals to two decimal places.</p> <p>Students perform simple calculations with money and use estimation to check their solutions.</p> <p>Students describe and compare chance events in social and experimental contexts.</p>	<p>Year 4 Major Outcomes</p> <p>Students generate, describe, and record number patterns using a variety of strategies and complete simple number sentences by calculating missing values.</p> <p>Students relate multiplication and division facts to at least 12×12.</p> <p>Students solve word problems involving the application of patterns and relationships in relation to the mathematics in the Year 4 content.</p>	<p>Year 4 Major Outcomes</p> <p>Students conduct surveys, and classify and organise data to answer a specific question they have posed. Students present the information in tables and graphs and interpret the results.</p>	<p>Year 4 Major Outcomes</p> <p>Students estimate, measure, compare and record length, area, volume, capacity and mass using formal units relative to the content for Year 4.</p> <p>Students read and record time in hours and minutes in digital and analogue notation and make comparisons between time units.</p>	<p>Year 4 Major Outcomes</p> <p>Students name, describe and sketch particular 3D objects and 2D shapes.</p> <p>Students identify, compare and describe angles including 'right angle' in practical situations.</p> <p>Students use coordinates to describe position and compass points to give and follow directions.</p>

WORKING MATHEMATICALLY	NUMBER & OPERATIONS	PATTERNS & ALGEBRA	DATA ANALYSIS	MEASUREMENT	SPACE & GEOMETRY
<p>Year 5 Major Outcomes</p> <p>Students interpret and/ or pose questions, when investigating mathematical situations and their mathematical experiences using Year 5 content. Students undertake investigations, selecting appropriate technological applications and problem-solving strategies to examine and analyse, to represent their interpretations of, and to solve mathematical problems. Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 5 content to justify their conjectures, answers and solutions. Students compare and analyse different solutions and make appropriate decisions that are consistent with the mathematical situation and their own interpretations. Students use appropriate mathematical terminology and some conventions to describe their mathematical ideas, interpretations and solutions.</p>	<p>Year 5 Major Outcomes</p> <p>Students count, order read, write, partition, regroup and record numbers up to at least 99999, selecting and applying appropriate mental, written or calculator strategies for the four operations. Students compare, order and perform calculations with simple fractions including twelfths, decimals and simple percentages and apply the four operations to money in real-life situations. Students place the likelihood of simple events in order on a number line from 0 to 1.</p>	<p>Year 5 Major Outcomes</p> <p>Students record and describe geometric and number repeating and growing patterns using words. Students construct, verify and complete number sentences involving the four operations. Students solve word problems involving the application of patterns and relationships in relation to the mathematics in the Year 5 content.</p>	<p>Year 5 Major Outcomes</p> <p>Students draw and interpret a variety of graphs using a scale of many-to-one correspondence.</p>	<p>Year 5 Major Outcomes</p> <p>Students select and use the appropriate units, in relation to Year 5 content, to estimate, measure and calculate length, area, volume, capacity and mass. Students convert measurements from one unit to another within each measurement system, and record in decimal notation. Students use am and pm notation in real-life situations and construct timelines and simple timetables.</p>	<p>Year 5 Major Outcomes</p> <p>Students identify 3D objects, including particular prisms and pyramids, on the basis of their properties, and visualise, sketch and construct them given drawings of different views. Students manipulate, classify and draw 2D shapes and describe side and angle properties. Students measure, construct and classify angles and make simple calculations using scale. Students use their mapping skills to describe position both in their physical environment and in maps.</p>

WORKING MATHEMATICALLY	NUMBER & OPERATIONS	PATTERNS & ALGEBRA	DATA ANALYSIS	MEASUREMENT	SPACE & GEOMETRY
<p>Year 6 Major Outcomes</p> <p>Students interpret and/ or pose questions, when investigating mathematical situations and their mathematical experiences using Year 6 content.</p> <p>Students select and apply appropriate problem-solving strategies, including technological applications, in undertaking investigations to examine and analyse, to represent mathematical situations, and to solve mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 6 content to justify their conjectures, answers and solutions.</p> <p>Students reflect critically upon the results of their decisions, provide valid justifications, and present evaluations of why one method is preferred to another.</p> <p>Students use mathematical terminology and conventions in a variety of ways to describe their representations, mathematical understanding and answers.</p>	<p>Year 6 Major Outcomes</p> <p>Students count, order read, write, partition, regroup and record numbers of any size using place value; select and apply appropriate mental, written or calculator strategies for the four operations and interpret their solutions in the context of a problem.</p> <p>Students compare, order and perform calculations with fractions including ninths, decimals and percentages and apply the four operations to money in real-life situations.</p> <p>Students assign numerical values to the likelihood of simple events occurring and order them on the number line.</p>	<p>Year 6 Major Outcomes</p> <p>Students record and describe geometric and number repeating and growing patterns using tables and words.</p> <p>Students construct, verify and complete number sentences involving the four operations with a variety of numbers.</p> <p>Students solve word problems involving the application of repeating and growing patterns in relation to the mathematics in the Year 6 content.</p>	<p>Year 6 Major Outcomes</p> <p>Students gather, organise data, display data using tables and graphs, and make judgements in relation to this data.</p> <p>Students read and interpret picture, simple line, pie and divided bar graphs with scale; and utilise data to find the average score.</p>	<p>Year 6 Major Outcomes</p> <p>Students select and use any unit to estimate, measure and calculate length, area, volume, capacity and mass.</p> <p>Students use 24-hour time in real-life situations and construct timelines and timetables.</p>	<p>Year 6 Major Outcomes</p> <p>Students construct and classify 3D objects and 2D shapes and compare and describe their properties.</p> <p>Students measure, construct and classify angles and make calculations using scale.</p> <p>Students use a variety of mapping skills to identify positions on a map.</p>

WORKING MATHEMATICALLY	NUMBER & OPERATIONS	PATTERNS & ALGEBRA	DATA ANALYSIS	MEASUREMENT	SPACE & GEOMETRY
<p>Year 7 Major Outcomes</p> <p>Students interpret and/ or pose questions, when investigating mathematical situations and their mathematical experiences using Year 7 content. Students use multiple representations such as mathematical terminology, diagrams, text and tables to communicate mathematical ideas, and to make connections between concepts and processes within and between mathematical contexts as they solve mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 7 content to justify their strategies, answers and solutions.</p> <p>Students compare the strengths and weaknesses of different strategies and solutions.</p> <p>Students apply their mathematical skills and understanding in analysing real-life situations and in systematically formulating questions or problems that they then investigate, analyse and solve, using technology where appropriate.</p>	<p>Year 7 Major Outcomes</p> <p>Students demonstrate a range of mental strategies to enhance their computational skills; operate competently with directed numbers, fractions (including sevenths) and percentages, and apply these in a range of practical contexts.</p> <p>Students demonstrate familiarity with the concepts of ratio, rates and the probability of simple events and apply these when solving problems.</p> <p>Students use index notation for numbers with positive integral indices and explore prime factorisation, squares and related square roots.</p> <p>Students investigate special groups of positive whole numbers and apply a range of strategies to aid computation.</p> <p>Students solve probability problems involving simple events.</p>	<p>Year 7 Major Outcomes</p> <p>Students extend and generalise number patterns to demonstrate an understanding of the use of pronumerals and the language of algebra including the use of basic index notation.</p> <p>Students develop tables of values from simple relationships and illustrate these relationships on the number plane.</p> <p>Students construct and interpret line, travel and conversion graphs.</p> <p>Students solve word problems involving the application of patterns and relationships in relation to Year 7 content.</p>	<p>Year 7 Major Outcomes</p> <p>Students construct and interpret graphs, tables, charts, and statistical information.</p> <p>Students construct and interpret sector, dot plots, and stem-and-leaf plots.</p>	<p>Year 7 Major Outcomes</p> <p>Students use formulae and Pythagoras' theorem to calculate area and perimeter of a variety of polygons and simple composite figures.</p> <p>Students find surface area and volume of prisms.</p> <p>Students describe the limit of accuracy of their measures.</p> <p>Students compare time zones in the Pacific and interpret and use tables and charts related to time.</p>	<p>Year 7 Major Outcomes</p> <p>Students describe and sketch 3D solids including polyhedra and classify them in terms of their properties.</p> <p>Students classify, construct and determine the properties of triangles and quadrilaterals; and identify congruent 2D figures stating the relevant conditions.</p> <p>Students identify and name angles formed by the intersection of straight lines, including those related to transversals on sets of parallel lines, and make use of the relationships between them.</p>

WORKING MATHEMATICALLY	NUMBER & OPERATIONS	PATTERNS & ALGEBRA	DATA ANALYSIS	MEASUREMENT	SPACE & GEOMETRY
<p>Year 8 Major Outcomes</p> <p>Students interpret and/ or pose questions, when investigating mathematical situations and their mathematical experiences using Year 8 content.</p> <p>Students use multiple representations such as mathematical terminology, algebraic notation, diagrams, text and tables to communicate mathematical ideas, and to make connections between concepts and processes within and between mathematical contexts when solving mathematical problems.</p> <p>Students integrate mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 8 content to justify their strategies, answers and solutions.</p> <p>Students reflect upon and evaluate the strengths and weaknesses of different strategies and solutions.</p> <p>Students apply their mathematical skills and understanding in analysing real-life situations and in systematically formulating questions or problems that they then investigate and solve, using technology where appropriate.</p>	<p>Year 8 Major Outcomes</p> <p>Students operate competently with mixed numerals (including elevanths) and decimals and apply these in a range of practical contexts, including problems related to discounts and profit and loss; apply the concepts of ratio, rates and the probability of complementary events to solve problems.</p> <p>Students use index notation for numbers with positive and negative integral indices and use prime factorisation to explore cubes and related cube roots; and investigate divisibility tests and other counting systems.</p>	<p>Year 8 Major Outcomes</p> <p>Students extend and generalise number patterns using pronumerals and the language of algebra such as in surface area, volume and capacity formulae, including the use of complex index notation.</p> <p>Students develop tables of values from simple linear relationships and illustrate these relationships on the number plane and in the form of word and algebraic equations.</p> <p>Students construct and interpret step and simple linear graphs; and solve word problems involving the application of simple linear relationships in relation to the Year 8 content.</p>	<p>Year 8 Major Outcomes</p> <p>Students construct and interpret graphs, frequency tables and histograms.</p> <p>Students analyse discrete and continuous data; consider sampling versus census; prediction and possible misrepresentation of data.</p> <p>Students calculate the mean, mode, median and range.</p>	<p>Year 8 Major Outcomes</p> <p>Students find areas of circles and calculate surface area and volume of cylinders.</p> <p>Students use formulae to calculate perimeter and area of circles and complex figures.</p> <p>Students describe the limit of accuracy of their measures.</p> <p>Students perform calculations of time that involved mixed units and use international time zones.</p>	<p>Year 8 Major Outcomes</p> <p>Students' knowledge of the properties of 2D and 3D geometrical figures, angles, parallel lines, perpendicular lines, congruent figures, similar figures and scale drawings enable them to solve numerical exercises on finding unknown lengths and angles in figures.</p>

Content: scope and continuum of key ideas

Number and Operations Strand: scope and continuum of key ideas

SUBSTRAND – WHOLE NUMBERS STUDENTS DEVELOP AN UNDERSTANDING OF THE WAYS NUMBERS ARE REPRESENTED, THE ROLE OF PLACE VALUE, AND RELATIONSHIPS AMONG NUMBERS AND NUMBER SYSTEMS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Count forwards by ones and twos to 50, from any starting point. Count backwards by ones and twos from any starting point, in the range 0 to 50.	Count forwards to at least 150 and backwards by threes, fives and tens from any starting point. Count forwards and backwards by tens, on and off the decade.	Count forwards to, and backwards from, 999 by tens and hundreds from any starting point.	Count forwards to, and backwards from, 9999 by hundreds and thousands, on and off the decade.	Count forwards to 99999 and backwards by hundreds and thousands.	Identify differences between Roman, Hindu-Arabic, and Sāmoan counting systems.		
Recognise, compare, order, read and represent numbers up to 50. Use place value to partition numbers into tens and units.	Recognise, read, partition, regroup, order and represent two- and three-digit numbers up to at least 150, using place value	Recognise, read, partition, regroup, represent and order numbers up to 999 using place value.	Recognise, read, partition, regroup, represent and order numbers up to 9999 using place value.	Recognise, read, partition, regroup, write and order numbers up to 99999 using place value.	Recognise, read, partition, regroup, write and order numbers of any size using place value. Record numbers in expanded notation.		
	Read and use the ordinal names to at least 'thirty-first'. Count, sort and order Sāmoan coins using face value.	See <i>Fractions and Decimals substrand for money concepts.</i>	See <i>Fractions and Decimals substrand for money concepts.</i>	See <i>Fractions and Decimals substrand for money concepts.</i>	Recognise and describe the role of zero in relation to positive and negative numbers. See <i>Fractions and Decimals substrand for money concepts.</i>	Operations with Whole Numbers Investigate other number systems with different bases. Explore groups of positive whole numbers. Use mental and informal strategies to perform computation.	Operations with Whole Numbers Explore tests of divisibility. Apply multiple strategies to perform calculations.

Number and Operations: scope and continuum of key ideas (contd.)

SUBSTRAND – ADDITION AND SUBTRACTION STUDENTS DEVELOP FLUENCY WITH NUMBER FACTS AND COMPUTATION USING ADDITION AND SUBTRACTION AND CONSTRUCT AN APPRECIATION OF THE RELATIONSHIP BETWEEN THOSE FACTS AND THE TWO OPERATIONS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
<p>Combine sets of objects to model addition.</p> <p>Take part of a set or collection away to model subtraction.</p> <p>Compare and contrast sets to determine 'how many more' using efficient strategies including counting on.</p>	<p>Model addition and subtraction using concrete materials.</p> <p>Illustrate addition and subtraction by using a variety of mental strategies and informal recording methods.</p>	<p>Model addition and subtraction involving two- and three-digit numbers by applying a range of mental strategies.</p> <p>Describe, justify and record methods for adding and subtracting.</p>	<p>Model addition and subtraction involving up to four-digit numbers by applying a range of mental and written strategies.</p> <p>Describe, justify and record methods for adding and subtracting.</p>	<p>Model addition and subtraction with counting numbers of up to five digits by applying appropriate mental, written or calculator strategies.</p>	<p>Select and apply appropriate mental, written or calculator strategies for addition and subtraction with counting numbers of any size.</p>	<p>Integers</p> <p>Solve computation and word problems involving addition and subtraction with directed numbers.</p> <p>Use grouping symbols to simplify expressions.</p>	<p>Integers</p> <p>Compute and solve word problems involving the four operations and directed numbers including the application of these in a range of authentic contexts.</p> <p>Apply order of operations to simplify expressions involving grouping symbols.</p>
<p>Represent and record addition and subtraction informally.</p>	<p>Represent and record number sentences using drawings, numerals, symbols and words.</p>	<p>Represent and record addition and subtraction by applying informal strategies and a formal written algorithm.</p>	<p>Represent and record addition and subtraction by applying a formal written algorithm.</p>				

SUBSTRAND – MULTIPLICATION AND DIVISION STUDENTS DEVELOP FLUENCY WITH NUMBER FACTS AND COMPUTATION USING MULTIPLICATION AND DIVISION AND CONSTRUCT AN APPRECIATION OF THE RELATIONSHIP BETWEEN THOSE FACTS AND THE TWO OPERATIONS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Construct and represent equal groups, sets or rows of objects. Group and share sets equally. Identify 'non-equal' sets.	Rhythmic and skip count by ones, twos, threes, fives and tens. Apply arrays, equal groups and repeated addition to model multiplication. Model and represent division by using the strategies of sharing, arrays and repeated subtraction.	Develop mental fluency with number facts up to 10×10 . Extend skip counting to by fours, sevens, eights and nines. Find multiples and squares of numbers. Interpret division problems without remainders and link these to relationships between operations \times , \div and \div . Construct factor trees for a given number.	Develop mental fluency for number facts up to 12×12 . Find multiples and cubes of numbers. Interpret remainders in division problems and as fractions and decimals.	Select and apply multiple mental, written or calculator strategies for multiplication and division. Explore prime and composite numbers.	Select and apply appropriate and efficient mental, written or calculator strategies for multiplication and division and interpret their solutions in the context of a problem. Determine whether any given number is prime or composite.	Operations with Whole Numbers Use index notation for positive integral indices. Express a number as a product of its prime factors. Investigate squares and related square roots. Divide three- and four-digit numbers by a three-digit number.	Operations with Whole Numbers Investigate cubes and related cube roots. Use index notation for negative integral indices. Divide four-digit numbers by a four-digit number.
Record grouping and sharing informally.	Record using drawings, numerals, symbols and words.	Use efficient mental and informal written strategies for multiplying or dividing a two-digit number by a one-digit operator using multiplication facts up to 10×10 .	Use efficient mental and informal written strategies for multiplying or dividing a two-digit number by a one-digit operator using multiplication facts up to 12×12 .	Use formal written algorithms for multiplication (limit operators to one-digit numbers) and division (limit operators to single digits).	Use formal written algorithms for multiplication (limit operators to two-digit numbers) and division (limit operators to two-digits).		

Number and Operations Strand: scope and continuum of key ideas (contd.)

SUBSTRAND – FRACTIONS AND DECIMALS

STUDENTS DEVELOP AN UNDERSTANDING OF FRACTIONS AS PARTS OF UNIT WHOLE, AS PARTS OF A SET, AS LOCATIONS ON NUMBER LINES, AND AS DIVISIONS OF WHOLE NUMBERS.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Construct and model two equal parts of an object, set or collection. Identify, explain and model halves using everyday objects or sets.	Construct, explain and interpret a half or a quarter of a whole object. Construct, explain and interpret a half or a quarter of a set or collection of objects. Represent half as $\frac{1}{2}$ and quarter as $\frac{1}{4}$. <i>See Whole Number Substrand for money concepts.</i>	Model, compare and represent fractions with denominators 2, 4, and 8 and extending to denominator 3. Find equivalence between halves, quarters and eighths. Add and subtract decimals with the same number of decimal places (to two decimal places). Represent money values in multiple ways and calculate change in simple transactions.	Model, compare and represent fractions with denominators 2, 3, 4, and 8 and extending to denominators 6, 5, 10, and 100. Find equivalence between halves tenths and hundredths; fifths, tenths and hundreds and thirds and sixths. Model, compare and represent decimals to two decimal places Multiply and divide decimals with the same number of decimal places (to two decimal places). Recognise percentages in everyday situations. Relate a common percentage (benchmark) to a fraction or decimal. Solve problems involving calculations with money.	Model, compare and represent fractions with denominators 2, 3, 4, 5, 6, 8, 10, 4, 5, 6, 8, 10 and 100 and extending to denominator 12. Find equivalence between halves, sixths and twelfths; halves, quarters and twelfths; and thirds, sixths and twelfths. Express a mixed numeral as an improper fraction, and vice versa. Add and subtract fractions where one denominator is a multiple of the other. Multiply fractions by whole numbers. Calculate unit fractions and percentage of quantities. Add and subtract decimals with different decimal places. Multiply simple fractions by whole numbers. Calculate simple (benchmark) percentage of quantities. Multiply and divide decimals by whole numbers in everyday contexts. Solve problems involving the four operations and money in authentic situations.	Model, compare and represent fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12 and 100 and extending to 9. Find equivalence between fractions Express a mixed numeral as an improper fraction, and vice versa. Add and subtract fractions where one denominator is a multiple of the other. Multiply fractions by whole numbers. Calculate unit fractions and percentage of quantities. Add and subtract decimals to three decimal places. Solve problems involving the four operations and money in authentic situations.	Fractions, Decimals and Percentages Determine highest common factor (HCF) and lowest common multiple (LCM). Model and represent equivalent fractions. Understand, become fluent and solve authentic problems involving operations with fractions (including sevenths), decimals, percentages, and mixed numerals. Solve problems involving multiplicative situations using ratios, rates and proportions. Financial Literacy Solve complex consumer problems including compound interest and various options of deferred payments. Calculate compound interest using a calculator and table of values. Calculate and compare total costs of purchasing goods using credit cards, lay-by, loans etc. Determine 'best-buy' option.	Fractions, Decimals and Percentages Perform operations with fractions (including eighths), decimals and mixed numerals. Solve problems involving multiplicative situations using ratios, rates and proportions. Financial Literacy Solve complex consumer problems including compound interest and various options of deferred payments. Calculate compound interest using a calculator and table of values. Calculate and compare total costs of purchasing goods using credit cards, lay-by, loans etc. Determine 'best-buy' option.

SUBSTRAND – CHANCE
STUDENTS CONSTRUCT AN UNDERSTANDING OF CHANCE AND LIKELIHOOD AS APPLIED IN EVERYDAY SITUATIONS AND DEVELOP AN APPRECIATION OF THE DIFFERENCE BETWEEN THEORETICAL AND EXPERIMENTAL PROBABILITIES.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
<p>Identify the element of chance in familiar activities.</p> <p>Describe chance using everyday language such as yes, no, and maybe.</p>	<p>Recognise, describe and order the element of chance in familiar daily activities.</p> <p>Describe the element of chance using everyday language such as impossible, possible, might, certain, and unlikely.</p>	<p>Order events from least likely to most likely.</p> <p>Explore, identify, interpret, and record all outcomes of a simple chance situation.</p> <p>Discuss the degree of likelihood using words such as certain, equally likely, more or less likely, and never.</p>	<p>Predict the outcomes of chance experiments involving equally likely events.</p> <p>Collect and organise data to compare likelihood of events under various conditions.</p> <p>Determine the probability of outcomes of experiments with small numbers of trials.</p>	<p>Use the number line from 0 to 1 to order the likelihood of simple events.</p> <p>Compare and contrast the probability of outcomes of experiments with small numbers of trials with those with large numbers of trials.</p>	<p>Quantify using simple fractions, decimals and percentages the likelihood of simple events occurring.</p> <p>Compare and contrast the probability of outcomes from experiments and by reasoning from equally likely events.</p> <p>Investigate variation in probabilities as the chance experiment is repeated again.</p> <p>Describe in words a general rule for finding probability.</p>	<p>Probability</p> <p>Construct sample space of simple experiments with equally likely outcomes and by reasoning, find the probability of simple events.</p> <p>Compare experimental data and expected data.</p> <p>Describe a general formula for finding probability of an event.</p> <p>Estimate probabilities using relative frequencies of chance experiments.</p>	<p>Probability</p> <p>Recognise and determine probability of complementary events.</p> <p>Use probability of complementary events to solve problems.</p>

Patterns and Algebra Strand: scope and continuum of key ideas

SUBSTRAND – PATTERNS AND ALGEBRA STUDENTS DEMONSTRATE FLUENCY IN GENERATING, DESCRIBING, RECORDING, EXTENDING AND REPRESENTING GEOMETRIC AND NUMERIC PATTERNS AS WELL AS CONSTRUCT AN UNDERSTANDING OF THE RELATIONSHIPS AND CHANGE BETWEEN NUMBERS AND APPLY THESE IN SOLVING PROBLEMS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Identify, describe, generate and extend repeating patterns of sounds and/or actions, shapes and numbers.	Generate, represent and extend a variety of number patterns and provide missing elements.	Create, describe and extend number patterns using a range of strategies.	Create, describe and extend number patterns and complete simple number sentences using various strategies.	Record and describe in multiple ways, geometric and number repeating and growing patterns that involve one operation. Construct, verify and complete number sentences involving one operation.	Construct simple geometric and number repeating and growing patterns involving two operations and different types of numbers. Construct a table of values for geometric and number patterns. Describe a pattern in words in more than one way. Determine a general rule for the pattern.	Algebraic Techniques Extend and generalise number patterns involving the four operations using word equations.	Algebraic Techniques Use letters as algebraic symbols to represent numbers and quantities. Translate descriptions of quantitative relationships into algebraic symbols and between algebraic symbols and quantitative descriptions. Identify, manipulate and simplify simple equivalent algebraic expressions.
Model and extend simple number patterns that increase up to 50 or decrease from 50. Analyse change and describe how growing patterns are generated.	Model and extend quantitative relationships involving addition and subtraction facts up to at least 50. Make generalisations about number relationships. Analyse and describe change in growing patterns and use tables to record or extend patterns.	Model and extend quantitative relationships involving multiplication and division facts to at least 10×10 . Analyse and describe change in growing patterns and use tables to make predictions.	Model and extend quantitative relationships involving multiplication and division facts to at least 12×12 . Analyse and describe change in growing patterns and use tables and graphs to base conclusions.	Record and describe number patterns using words. Analyse and describe change in growing patterns and use tables and graphs to make and test predictions.	Record and describe number patterns, quantitative relationships and change using words, tables and general rules.	Number Patterns Model, extend, record and describe number patterns and quantitative relationships using words and letters.	Number Patterns Describe number patterns and quantitative relationships using words. Translate descriptions of quantitative relationships and number patterns in word problems and displayed in multiple representations using algebraic symbols. Use a grid to represent number patterns and quantitative relationships.

SUBSTRAND – PATTERNS AND ALGEBRA STUDENTS DEMONSTRATE FLUENCY IN GENERATING, DESCRIBING, RECORDING, EXTENDING AND REPRESENTING GEOMETRIC AND NUMERIC PATTERNS AS WELL AS CONSTRUCT AN UNDERSTANDING OF THE RELATIONSHIPS AND CHANGE BETWEEN NUMBERS AND APPLY THESE IN SOLVING PROBLEMS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Describe equality of sets using the term 'is the same as'.	Record equivalent number relationships using the 'equals' sign.	Determine the value of a missing number in simple number sentences involving one operation.	Determine the value of a missing number in simple number sentences involving two operations.	Build, verify and complete number sentences involving the four operations with whole numbers.	Build, verify and complete number sentences involving the four operations with different types of numbers.	Algebraic Techniques Construct, expand, factorise and simplify simple algebraic expressions. Linear Relationships Use the number plane to locate ordered pairs. Construct and interpret graphs of simple linear relationships generated from simple number patterns and equations.	Algebraic Techniques Construct, expand, factorise, simplify and solve simple algebraic equations. Substitute into algebraic expressions. Use algebra to solve linear equations, simple inequalities and word problems. Linear Relationships Represent in multiple ways linear relationships generated from number patterns and equations and interpret their graphs in the context of the problem

Data Analysis Strand: scope and continuum of key ideas

SUBSTRAND – DATA ANALYSIS STUDENTS FORMULATE QUESTIONS THAT CAN BE ANSWERED BY COLLECTING, ORGANISING, TABULATING, GRAPHING AND ANALYSING DATA.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Design an investigation to answer a question about students and their environment. Collect and organise data to answer questions. Organise actual objects, pictures of the objects or students themselves into a data display.	Collect and record data using tallies. Represent data using concrete materials, pictures and bar and column graphs. Picture graphs use one object, symbol or picture to represent one data value.	Design investigations to answer familiar questions, decide data to collect, carry out the investigation, classify and organise data using tables.	Plan and undertake investigations to answer questions about familiar situations, classify and organise data using tables. Represent data using column graphs (i.e. vertical and horizontal) and picture graphs on grid paper with labelled axes and scale of one-to-one between data and symbols.	Undertake investigations, collect and display data using picture graphs, column and line graphs with many-to-one scales.	Construct divided bar graphs with many-to-one scales.	Construct graphs (sector, dot plots and stem-and-leaf plots), tables and charts	Data Representation Construct, read and interpret a variety of graphs and plots, tables, and charts.
Record and interpret picture graphs and people graphs.	Read and make connections between lists and picture graphs and bar and column graphs of data about themselves and explain interpretations	Read and make connections between lists and tables of data about themselves and explain interpretations.	Read and interpret data presented in tables, column graphs and picture graphs.	Read and interpret data presented in picture graphs, column and line graphs with scales of many-to-one.	Read and interpret picture graphs, column and line graphs, and divided bar graphs with scales of many-to-one correspondence and make judgements in relation to the data.	Read and interpret sector (pie) graphs and dot and stem-and-leaf plots.	Identify the types of variables used in graphs. Select and justify the choice of measure of centre and spread used. Identify misrepresentation of data in graphs including those published in newspapers and magazines.

SUBSTRAND – DATA ANALYSIS STUDENTS FORMULATE QUESTIONS THAT CAN BE ANSWERED BY COLLECTING, ORGANISING, TABULATING, GRAPHING AND ANALYSING DATA.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
					Find the mean (average) for a small set of data.		Complete frequency tables for grouped data. Construct frequency histograms and polygons. Data Analysis and Evaluation Use sampling and census. Predict proportions and expected number using sample data and diagrams. Determine mean, median, mode and range, use these measures to compare data sets and explain their reasoning.

Measurement Strand: scope and continuum of key ideas

SUBSTRAND – LENGTH STUDENTS IDENTIFY AND DESCRIBE THE ATTRIBUTE OF LENGTH AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASUREMENT.						
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<p>Recognise and describe the attribute of length.</p> <p>Directly compare lengths by placing objects side by side and aligning the ends.</p>	<p>Estimate and measure length and distance, by placing multiple copies of informal units of the same size, end to end without gaps or overlaps.</p> <p>Identify and justify the need for formal units (metres and yards), and use them to estimate and measure length and distance.</p> <p>Recognise the need for smaller formal units such as centimetres and feet.</p>	<p>Use formal units: metres, millimetres and centimetres & yards, feet and inches to estimate, measure, compare, order and record lengths and distances.</p> <p>Carry out simple unit conversion within each measurement system (e.g. between metres and centimetres & between yards and feet).</p>	<p>Use formal units: metres, centimetres and millimetres & yards, feet and inches to estimate, measure, compare, order and record lengths and distances.</p> <p>Carry out simple unit conversion within each measurement system (e.g. between metres and kilometers & between yards/feet and miles).</p> <p>Explore the effect of the selected unit on precision of measurements.</p>	<p>Select and apply the appropriate unit and tool to measure lengths, distances and perimeters.</p> <p>Carry out simple unit conversion within each measurement system (e.g. between metres and kilometers & between yards/feet and miles).</p> <p>Explore the effect of the selected unit on precision of measurements.</p>	<p>Understand, select and use units of appropriate size and work fluently with the metric and imperial units of length.</p> <p>Carry out simple conversion between measurement systems (e.g. between miles, yards and metres, and feet & inches and centimetres & millimetres).</p>	<p>Perimeter and Area</p> <p>Select and apply techniques and tools to accurately find length measures to appropriate levels of precision</p> <p>Carry out simple unit conversion between the metric and imperial units of length</p>
	<p>Develop 'real-life' benchmarks for a length of one metre and one yard.</p>	<p>Develop 'real-life' benchmarks for a length of one foot and one centimetre.</p> <p>Use benchmarks to estimate the perimeter of tabletops, desktops, windows and classroom floor.</p>	<p>Develop 'real-life' benchmarks for a length of one millimetre and one inch.</p> <p>Estimate using benchmarks and measure using formal units the perimeter of two-dimensional shapes.</p>	<p>Develop, understand and use a formula to calculate and compare perimeters of squares and rectangles.</p> <p>Develop strategies for estimating perimeters of irregular shapes.</p>	<p>Develop, understand and use a formula to calculate perimeters of equilateral and isosceles triangles.</p>	<p>Develop, understand and use Pythagoras' theorem to calculate lengths of right-angled triangles.</p> <p>Develop, understand and use a formula to calculate the perimeter of a variety of polygons including parallelograms and simple composite figures made of rectangles and/or triangles.</p>
						<p>Perimeter and Area</p> <p>Investigate, demonstrate, generalise and develop a formula to find the circumference of circles and perimeter of more complex figures comprising rectangles, triangles and/or circles.</p>

SUBSTRAND – LENGTH STUDENTS IDENTIFY AND DESCRIBE THE ATTRIBUTE OF LENGTH AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASUREMENT.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Use informal ways of recording comparisons such as drawing, tracing or cutting and pasting.	Use number and type of informal or formal units to record measurements of length.	Use decimal notation to one place to record lengths and distances.	Use decimal notation to two places to record lengths and distances.	Use decimal notation to three places to record lengths.	Use decimal notation up to three places to record lengths.		
Recognise and explain the attribute of area.	Estimate area by placing multiple copies of informal units of the same size, in rows or columns without gaps or overlaps. Informally measure area by counting informal units and describe part left over.	Understand the need for, and use, formal units: square centimetres and square inches to measure area.	Understand the need for, and use, larger formal units: square metres and square feet to measure area. Convert between area units within each measurement system.	Identify and use the appropriate unit to calculate area. Understanding the need for square kilometres, hectares and square miles. Convert between area units within each measurement system.	Calculate area by identifying and choosing an appropriate unit. Determine equivalence of area measures between the metric and imperial systems.	Develop formulae and calculate the area of a variety of polygons including parallelogram and simple composite figures.	Investigate, demonstrate, and generalise, and develop a formula to find the area of circles. Convert between metric and imperial units of area.
Directly compare two areas by direct comparison or superimposing one over the other. Use informal ways of recording such as drawing, tracing or cutting and pasting.	Informally compare and order two or more areas by cutting and covering. Use number and type of informal units to record measurements.	Use square centimetres and square inches to estimate, measure, compare and record areas. Construct and use a square grid overlay to measure area of different shapes.	Use square metres and square feet to estimate, measure, compare and record areas. Explore what happens to perimeters and areas of rectangles when the shape is changed in some ways.	Investigate to find a general relationship between length, breadth and area of squares and rectangles. Explore and generalise the effect of keeping perimeter of a rectangle constant while area is varied and vice versa	Investigate to find a general relationship between length of base, perpendicular height and area of triangles. Read and interpret scales on maps and simple scale drawings to calculate an area. Informally find surface area of rectangular prisms by using a square grid overlay or counting unit squares.	Surface Area and Volume. Investigate, demonstrate, generalise, and develop a formula to calculate the surface area of rectangular and triangular prisms.	Surface Area and Volume. Investigate, demonstrate, generalise, and develop a formula to calculate the surface area of cylinders.
SUBSTRAND – AREA STUDENTS IDENTIFY AND DESCRIBE THE ATTRIBUTE OF AREA AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASUREMENT.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8

Measurement Strand: scope and continuum of key ideas (contd.)

SUBSTRAND – VOLUME AND CAPACITY STUDENTS IDENTIFY AND DESCRIBE THE ATTRIBUTE OF VOLUME AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASURING CAPACITY OR VOLUME.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Recognise and explain the attributes of volume and capacity.	Develop common referents for measures using appropriate informal units to make comparisons and estimates of volume and capacity.	Understand the need for, and use, formal units: litres and quarts to measure capacity and cubic centimetre and cubic inches to measure volume.	Understand the need for, and use, smaller formal units: millilitres and pints to measure capacity and volume.	Estimate and measure the volume and capacity of rectangular prisms. Understand the need for, and use, larger formal units (cubic metres, cubic feet and gallons) to measure volume and capacity.	Identify and choose the appropriate method and unit to measure volume and capacity. Investigate, demonstrate and determine the relationship between cubic centimetres and millilitres and cubic inches and millilitres.	Investigate, demonstrate, generalise and develop a formula to calculate the volume of right prisms.	Investigate, demonstrate, generalise and develop a formula to calculate the volume of cylinders.
Measure capacity and volume using uniform informal units. Directly compare measures and explain reasoning in everyday language.	Measure, compare and order capacities of at least two containers and volumes of at least two objects.	Use formal units (litres and cubic centimetres & quarts and cubic inches) to estimate, measure and compare capacity and volume. Construct 3D objects using cubic centimetre and cubic inch blocks and counting to determine volume.	Use formal units to estimate, measure and compare capacity and volume. Compare, estimate and measure volume of objects using rise in water level or overflows. Convert measurements from one unit to another within each measurement system. Convert between pints, millilitres and cubic inches.	Chooses appropriate formal units to estimate, measure and compare capacity and volume. Explore multiple ways of determining volume of rectangular prisms using metric and imperial units. Convert measurements from one unit to another within each measurement system.	Chooses appropriate formal units and tools to estimate, measure and compare capacity and volume. Explore the use of water displacement to determine volume of irregular solids using metric and imperial units. Convert measurements from one unit to another within each measurement system.	Convert between units of volume within each measurement system and between systems.	Convert between units of volume within each measurement system and between systems.
Informally record comparisons using drawings, numerals and words.	Use number and type of informal units used to record measurements.	Use formal units to record measurements of capacity and volume.	Use formal units to record measurements using decimal notation to one decimal place.	Use formal units to record measurements using decimal notation to two decimal places.	Use formal units to record volume and capacity using decimal notation to three decimal places.		

SUBSTRAND – MASS STUDENTS UNDERSTAND, DISTINGUISH AND DESCRIBE THE ATTRIBUTE OF MASS THROUGH INDIRECT AND DIRECT COMPARISONS, AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASUREMENT.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Recognise and explain the attribute of mass.	Use an equal arm balance and appropriate uniform informal units to estimate and measure the mass of an object.	Understand the need for, and use, formal units (kilograms and pounds) to measure mass.	Understand the need for, and use, smaller formal units (grams and ounces) to measure mass.	Understand the need for, and use, larger formal units (tonne and tons) to measure mass.	Identify and choose the appropriate unit and device to measure mass.		
Directly compare two objects by pushing, pulling or hefting or using an equal arm balance and order objects according to their masses.	Measure, compare and order masses of at least two objects. Estimate differences in mass using uniform informal units.	Use formal units to estimate, measure, compare and record masses.	Use formal units to estimate, measure and compare masses.	Choose appropriate units to measure mass and convert between kilograms and grams and between pounds and ounces.	Work fluently within each measurement system and convert between kilograms and tonnes and between pounds and tons. Explore and determine the mass of 1 litre or 1 pound of water.		
Use drawings and words to record comparisons informally.	Use number and type of informal units to record measurements.	Use formal units to record mass using integral values.	Use formal units to record mass using one decimal place.	Use formal units to record mass using decimal notation to two decimal places.	Use formal units to record mass using decimal notation to three decimal places.		

Measurement Strand: scope and continuum of key ideas (contd.)

SUBSTRAND – TIME STUDENTS CONSTRUCT AN UNDERSTANDING OF, AND DESCRIBE, THE PASSAGE OF TIME, ITS MEASUREMENT AND REPRESENTATIONS, THROUGH THE USE OF EVERYDAY LANGUAGE AND EXPERIENCES.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Use everyday language to describe the duration of events. Identify and order events in time. State and order days of the week and seasons. Classify days into weekdays and weekend days.	Identify and choose repeated informal units to measure and compare the duration of events. State and order the seasons of the year. Use calendar to identify day and date and order months of the year.	Understand and recognise the coordinated movements of the hands on a clock to indicate quarter to and quarter past. Read and record time in 15-minute intervals. Compare and sequence events according to their duration.	Understand, recognise, read and record time in one-minute intervals. Make comparisons between time units. Use digital and analogue notations to read and record time. Convert between units of time.	Use and interpret am/pm notation in real life situations. Estimate, measure and compare duration of events. Interpret and compare Pacific time zones.	Read, interpret and convert time between am/pm and 24-hour notations. Create and interpret a timeline of real-life events using a scale.	Time Calculate time duration using multiple strategies and involving time units. Explain and use Pacific time zones to determine and compare time across the Pacific.	Time Work fluently with calculations involving mixed time units, notations and international time zones.
Read time on the hour on digital and analogue clocks using the term 'o'clock'.	Tell time on the hour and half-hour on digital and analogue clocks.	Tell time to the quarter-hour on digital and analogue clocks. Read and interpret simple timetables, timelines and calendars.	Tell time to the minute on digital and analogue clocks. Read and interpret simple timetables, timelines and calendars of real-life situations.	Construct and interpret simple timelines with scales. Read and interpret timetables involving am/pm time.	Read and interpret timetables involving 24-hour time.	Interpret tables and charts related to time.	Interpret a variety of tables and charts related to time.

Space and Geometry Strand: scope and continuum of key ideas

SUBSTRAND – THREE-DIMENSIONAL SPACE STUDENTS CONSTRUCT VERBAL, VISUAL AND MENTAL REPRESENTATIONS OF THREE-DIMENSIONAL OBJECTS, THEIR CHARACTERISTICS AND PROPERTIES, AND DIFFERENT ORIENTATIONS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
<p>Arrange and sort 3D objects found in the environment.</p> <p>Use everyday language to describe features of 3D objects.</p> <p>Recognise and use informal names for 3D objects.</p>	<p>Identify, label, explain, classify and represent cones, cubes, cylinders, spheres and prisms.</p> <p>Identify and name 3D objects in pictures and the environment, and presented in different orientations.</p> <p>Understand, identify and recognise that 3D objects appear different from different views.</p>	<p>Model, compare, describe and sketch 3D objects including pyramids and prisms.</p> <p>Compare and contrast pyramids and prisms.</p>	<p>Name, explain, classify, model and draw prisms, cylinders, cones and spheres showing depth.</p> <p>Examine and construct nets from everyday packages.</p> <p>Explore, identify and describe cross-sections of 3D objects.</p>	<p>Distinguish between different types of prisms (triangular and rectangular prisms) based on their properties.</p> <p>Visualise, draw and construct 3D objects given sketches of different views.</p>	<p>Distinguish between, build and sort 3D objects including hexagonal prisms and pyramids, identify and explain their properties.</p> <p>Visualise, draw and construct 3D objects given sketches of different views.</p>	<p>Properties of Solids</p> <p>Explain and sketch 3D solids including polyhedra.</p> <p>Classify 3D solids according to their properties and develop definitions of classes of shapes.</p>	<p>Properties of Solids</p> <p>Investigate and generalise properties of classes of 3D objects.</p> <p>Explore and build Platonic solids.</p> <p>Examine and generalise the relationships between faces, vertices and edges of convex polyhedra.</p> <p>Explore and sketch isometric drawings of 3D solids.</p>
SUBSTRAND – TWO-DIMENSIONAL SPACE STUDENTS CONSTRUCT VERBAL, VISUAL AND MENTAL REPRESENTATIONS OF LINES, ANGLES AND TWO-DIMENSIONAL SHAPES, THEIR CHARACTERISTICS AND PROPERTIES, AND DIFFERENT ORIENTATIONS.							
<p>Rearrange, classify and explain properties of 2D shapes</p> <p>Identify and name circles, squares, triangles and rectangles in pictures and the environment, and presented in different orientations.</p> <p>Construct and model 2D shapes using a range of materials.</p>	<p>Rearrange, label, compare, describe, build models of and draw hexagons, rhombuses and trapeziums presented in different orientations.</p>	<p>Rearrange, label, compare, describe, build models of and draw pentagons and parallelograms presented in different orientations.</p> <p>Compare and describe features of special groups of quadrilaterals.</p>	<p>Rearrange, label, compare, describe, build models of and draw 2D shapes including octagons presented in different orientations.</p> <p>Group 2D shapes using multiple attributes.</p>	<p>Rearrange, label, compare, classify and draw 2D shapes and describe side and angle properties.</p> <p>Identify right-angled, isosceles, equilateral and scalene triangles.</p> <p>Identify and draw regular and irregular triangles and quadrilaterals from descriptions.</p>	<p>Identify and draw regular and irregular 2D shapes from descriptions.</p> <p>Identify and name parts of a circle.</p>	<p>Properties of Geometrical Figures</p> <p>Recognise, identify, sort and generalise the properties of triangles.</p>	<p>Properties of Geometrical Figures</p> <p>Recognise, identify, sort and generalise the properties of quadrilaterals.</p> <p>Interpret and construct scale drawings.</p> <p>Complete simple numerical exercises based on geometrical properties.</p>
<p>Use flips to create tessellating designs.</p>	<p>Use slides and turns to create tessellating designs.</p>	<p>Use reflections to create tessellating designs.</p>	<p>Use translations and rotations to create tessellating designs.</p>	<p>Enlarge and reduce shapes.</p>	<p>Enlarge and reduce pictures and maps.</p>	<p>Explore congruent triangles and state relevant conditions.</p>	<p>Explore similar and congruent figures and state relevant conditions.</p>

Space and Geometry Strand: scope and continuum of key ideas (contd.)

SUBSTRAND – TWO-DIMENSIONAL SPACE (CONTD.) STUDENTS CONSTRUCT VERBAL, VISUAL AND MENTAL REPRESENTATIONS OF LINES, ANGLES AND TWO-DIMENSIONAL SHAPES, THEIR CHARACTERISTICS AND PROPERTIES, AND DIFFERENT ORIENTATIONS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Reorganise an arrangement by combining and partitioning to form new shapes.	Understand and recognise a line of symmetry of a rectangle and a square.	Find all lines of symmetry for a given 2D shape. Create symmetrical shapes using a line of symmetry.	Use symmetry and identify symmetry in the environment and tap designs to create symmetrical patterns and pictures.	Identify shapes that have line symmetry.	Identify shapes that have rotational symmetry.	Identify and name shapes that are congruent.	Identify and name shapes that are similar.
Recognise, identify and sketch straight and curved lines. Recognise, identify and define closed shapes and open lines.	Define 2D shapes using the terms 'sides' and 'corners'. Identify and name parallel, vertical and horizontal lines in pictures and the environment.	Recognise, identify and name perpendicular lines.	Recognise and describe 2D shapes using the terms 'parallel sides' and 'right angles'.	Explore and generalise side and angle properties of scalene, isosceles and equilateral triangles and quadrilaterals.	Explore and generalise side and angle properties of 2D shapes including parallelograms and rhombuses. Investigate properties of circles.		
Understand and recognise different types of corners.	Understand, recognise and describe corners as angles.	Describe angles using everyday language and classify them into 'right' and 'not right' angles.	Describe and sort angles into groups of 'equal to', 'greater than' or 'less than' a right angle.	Describe, measure and classify angles as right and straight.	Classify angles as acute, obtuse, reflex, or a revolution.	Angles Identify and name angles formed by transversals on sets of parallel lines, and make use of the relationships between them.	Angles Classify angles and determine angle relationships. Construct parallel and perpendicular lines and determine associated angle properties.
Compare and classify corners into groups.	Understand and recognise arms and vertex of the angle in a corner. Place one angle on top of another to directly compare angles.	Understand and recognise the two arms and vertex of the angle in an opening and a slope where one arm is visible. Compare angles of adjacent sides of shapes to a right angle.	Understand and recognise the angle in a turn where one arm is visible. Compare and order angles of adjacent sides of shapes in relation to a right angle.	Recognise the need for a formal unit for the measurement of angles.	Measure in degrees and construct angles using a protractor.	Use angle properties to find unknown angles.	Use triangle, angle and line properties to find unknown angles and lengths.

SUBSTRAND – POSITION STUDENTS DEVELOP THEIR REPRESENTATION OF POSITION THROUGH PRECISE LANGUAGE AND THE USE OF GRIDS AND COMPASS DIRECTIONS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Provide and follow simple directions.	Use models and drawings to represent the position of objects.	Draw simple maps and plans to represent the relative position of objects.	Represent position and follow routes using simple maps and grids.	Interpret and use scales on maps and plans.	Make simple calculations using scale.		
Describe position using everyday language.	Describe the position of objects using everyday language, including 'left' and 'right'.	Determine the directions N, S, E and W, given one of the directions. Describe the location of an object on a simple map using grid coordinates or directions.	Determine the directions NE, NW, SE and SW, given one of the directions. Use coordinates or compass directions to describe the location of an object on a simple map.	Recognise and understand that the same location can be represented by maps or plans using different scales.	Draw maps and plans from an aerial view.		

Overview of learning outcomes

Each outcome is given a code name, denoting the strand, year level and substrand, to facilitate cross-referencing throughout the syllabus.

WM	Working Mathematically
NR	Number and Operations
PA	Patterns and Algebra
DA	Data Analysis
MS	Measurement
SG	Space and Geometry

For example:

NR2.3 Models and represents multiplication and division by applying a variety of mental strategies and concrete materials including the use of groups of, arrays and sharing

This refers to an outcome from the Number and Operations strand in Year 2. The last number indicates that this outcome belongs to the third substrand or set of Number and Operations outcomes.

Working Mathematically Strand: learning outcomes

PROCESS –INTERPRETING &/OR POSING QUESTIONS STUDENTS INTERPRET AND/OR POSE QUESTIONS IN RELATION TO MATHEMATICAL SITUATIONS AND THEIR MATHEMATICAL EXPERIENCES USING THE RELEVANT YEAR LEVEL MATHEMATICS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
WM1.1 Interprets and/or poses questions, when investigating mathematical situations and their mathematical experiences using Year 1 content.	WM2.1 Interprets and/or poses questions, when investigating mathematical situations and their mathematical experiences using Year 2 content.	WMS3.1 Interprets and/or poses questions, when investigating mathematical situations and their mathematical experiences using Year 3 content.	WMS4.1 Interprets and/or poses questions, when investigating mathematical situations and their mathematical experiences using Year 4 content.	WMS5.1 Interprets and/or poses questions, when investigating mathematical situations and their mathematical experiences using Year 5 content.	WMS6.1 Interprets and/or poses questions, when investigating mathematical situations and their mathematical experiences using Year 6 content.	WMS7.1 Interprets and/or poses questions, when investigating mathematical situations and their mathematical experiences using Year 7 content.	WMS8.1 Interprets and/or poses questions, when investigating mathematical situations and their mathematical experiences using Year 8 content.
PROCESS – STRATEGICALLY THINKING & REPRESENTING STUDENTS STRATEGICALLY DEVELOP, CHOOSE AND UTILISE A RANGE OF STRATEGIES, INCLUDING THE IDENTIFICATION AND UTILISATION OF APPROPRIATE TECHNOLOGY, TO INVESTIGATE, AND REPRESENT AND SOLVE, PROBLEMS.							
WM1.2 Uses objects, actions, imagery, technology and/ or trial and error to examine and analyse, and to represent their interpretations of, mathematical problems.	WM2.2 Uses objects, diagrams, imagery and technology to examine and analyse, and to represent their interpretations of, mathematical problems.	WM3.2 Uses diagrams, imagery and technology to examine and analyse, and to represent their interpretations of, mathematical problems.	WM4.2 Selects and uses appropriate mental or written strategies, or technology, to examine and analyse, to represent their interpretations of, mathematical problems.	WM5.2 Undertakes investigation, selecting appropriate technological applications and problem-solving strategies.	WM6.2 Selects and applies appropriate problem-solving strategies, including technological applications, in undertaking investigations to solve mathematical problems.	WM7.2 Uses mathematical terminology, diagrams, text and tables to communicate mathematical ideas, and links concepts within and between mathematical contexts as they solve mathematical problems.	WM8.2 Analyses a mathematical or real-life situation, solving problems using technology where appropriate.

Working Mathematically Strand: learning outcomes (contd.)

PROCESSES – REASONING & JUSTIFYING & JUSTIFYING STUDENTS DEVELOP AND UTILISE PROCESSES WHEN INVESTIGATING RELATIONSHIPS, CHECKING SOLUTIONS AND GIVING REASONS TO JUSTIFY THEIR CONCLUSIONS.							
WM1.3 Integrates mathematical ideas and makes connections with, and generalisations about, existing knowledge and understanding in terms of Year 1 content to justify conjectures.	WM2.3 Integrates mathematical ideas and make connections with, and generalisations about, existing knowledge and understanding in terms of Year 2 content to justify their conjectures and answers.	WM3.3 Integrates mathematical ideas and makes connections with, and generalisations about, existing knowledge and understanding in terms of Year 3 content to justify their conjectures, answers and solutions.	WM4.3 Integrates mathematical ideas and makes connections with, and generalisations about, existing knowledge and understanding in terms of Year 4 content to justify their conjectures, answers and solutions.	WM5.3 Integrates mathematical ideas and makes connections with, and generalisations about, existing knowledge and understanding in terms of Year 5 content to justify their conjectures, answers and solutions.	WM6.3 Integrates mathematical ideas and makes connections with, and generalisations about, existing knowledge and understanding in terms of Year 6 content to justify their conjectures, answers and solutions.	WM7.3 Integrates mathematical ideas and makes connections with, and generalisations about, existing knowledge and understanding in terms of Year 7 content to justify their strategies and answers.	WM8.3 Integrates mathematical ideas and makes connections with, and generalisations about, existing knowledge and understanding in terms of Year 8 content to justify their strategies and answers.
PROCESS – REFLECTING & EVALUATING STUDENTS REFLECT ON THEIR EXPERIENCES AND CRITICAL UNDERSTANDING TO MAKE CONNECTIONS WITH, AND GENERALISATIONS ABOUT, EXISTING KNOWLEDGE AND UNDERSTANDING TO EXPLAIN ANSWERS AND EVALUATE CONCLUSIONS.							
WM1.4 Reflects upon the results of conjectures and uses concrete materials and/or pictorial representations to evaluate conclusions.	WM2.4 Reflects upon the results of their conjectures and uses concrete materials and/or pictorial representations to explain their results and evaluate conclusions.	WM3.4 Reflects upon the results of their conjectures and uses concrete materials and/or pictorial representations to explain their results and evaluate conclusions.	WM4.4 Reflects upon the results of their conjectures and explains their answers and evaluates conclusions.	WM5.4 Compares and analyses different solutions and makes appropriate decisions that are consistent with the mathematical situation and their own interpretations.	WM6.4 Reflects upon the results of their decisions, provide valid justifications, and present evaluations of why one method is preferred to another.	WM7.4 Compares the strengths and weaknesses of different strategies and solutions.	WM8.4 Reflects upon and evaluates the strengths and weaknesses of different strategies and solutions.

PROCESS – COMMUNICATING MATHEMATICALLY
 STUDENTS DEVELOP AND USE APPROPRIATE LANGUAGE AND REPRESENTATIONS TO FORMULATE, EXPRESS AND COMMUNICATE MATHEMATICAL IDEAS.

<p>WM1.5 Describes mathematical situations using everyday language, actions, materials and informal recordings.</p>	<p>WM2.5 Describes mathematical situations and methods using everyday language, some mathematical language, actions, materials, diagrams and symbols.</p>	<p>WM3.5 Describes mathematical situations and methods using everyday and some mathematical language and diagrams.</p>	<p>WM4.5 Uses some appropriate terminology to describe mathematical ideas and to make connections between their learning and other experiences.</p>	<p>WM5.5 Uses appropriate mathematical terminology and some conventions to describe their mathematical ideas, interpretations and solutions.</p>	<p>WM6.5 Uses mathematical terminology and conventions in a variety of ways to describe their representations, mathematical understanding and answers.</p>	<p>WM7.5 Applies their mathematical skills and understanding in analysing real-life situations and in systematically formulating questions or problems that they then investigate, analyse and solve, using technology where appropriate.</p>	<p>WM8.5 Applies their mathematical skills and understanding in analysing real-life situations and in systematically formulating questions or problems that they then investigate and solve, using technology where appropriate.</p>
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Number and Operations Strand: learning outcomes

SUBSTRAND – WHOLE NUMBERS STUDENTS DEVELOP AN UNDERSTANDING OF THE WAYS NUMBERS ARE REPRESENTED, THE ROLE OF PLACE VALUE, AND RELATIONSHIPS AMONG NUMBERS AND NUMBER SYSTEMS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
NR1.1 Recognises and counts to and from 50 by ones and twos, and orders, reads and represents numbers in the range 0 to 50.	NR2.1 Recognises and counts by threes, fives and tens, orders, reads and represents two- and three-digit numbers up to at least 150, and counts, sorts and orders Samoan coins.	NR3.1 Recognises, counts, orders, reads and records numbers up to 999.	NR4.1 Recognises, counts, orders, reads and records numbers up to 9999.	NR5.1 Recognises, orders, reads and writes numbers up to 99999.	NR6.1 Recognises, orders, reads and writes numbers of any size and explores other counting systems.		
SUBSTRAND – ADDITION AND SUBTRACTION STUDENTS DEVELOP FLUENCY WITH NUMBER FACTS AND COMPUTATION USING ADDITION AND SUBTRACTION AND CONSTRUCT AN APPRECIATION OF THE RELATIONSHIP BETWEEN THOSE FACTS AND THE TWO OPERATIONS.							
NR1.2 Models, combines and separates sets of objects, describes additive, including counting on, and sharing strategies using everyday language and records using informal methods.	NR2.2 Models and represents addition and subtraction involving one- and two-digit numbers by applying a range of mental strategies and informal recording methods.	NR3.2 Models and represents addition and subtraction involving two- and three-digit numbers up to 999 by applying various mental and written strategies and performs simple money calculations.	NR4.2 Models and represents addition and subtraction involving two-, three- and four-digit numbers up to 9999 by applying mental, written and formal strategies.	NR5.2 Selects and applies appropriate strategies for addition and subtraction with counting numbers up to five digits.	NR6.2 Selects and applies appropriate strategies for addition and subtraction with counting numbers of any size.	Operations with Whole Numbers NR7.1 Identifies and describes the properties of special groups of whole numbers, uses index notation (positive indices only), explores other number systems with different bases, and applies multiple strategies to perform computation.	Operations with Whole Numbers NR8.1 Uses index notation (including negative indices), explores divisibility, applies multiple strategies to perform computation and solves authentic problems.

SUBSTRAND – MULTIPLICATION AND DIVISION STUDENTS DEVELOP FLUENCY WITH NUMBER FACTS AND COMPUTATION USING MULTIPLICATION AND DIVISION AND CONSTRUCT AN APPRECIATION OF THE RELATIONSHIP BETWEEN THOSE FACTS AND THE TWO OPERATIONS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
<p>NR1.3 Models and represents multiplication and division by grouping, sharing and counting sets and collections of objects, justifies and explains using everyday language such as equal grouping and sharing equally and records using informal methods.</p>	<p>NR2.3 Models and represents multiplication and division by applying a variety of mental strategies and concrete materials including the use of groups, arrays and sharing.</p>	<p>NR3.3 Models and represents multiplication and division by applying a range of mental and informal written strategies.</p>	<p>NR4.3 Models and represents multiplication and division by applying various mental and formal written strategies.</p>	<p>NR5.3 Models and represents multiplication and division by identifying and choosing multiple mental and formal strategies.</p>	<p>NR6.3 Models multiplication and division by choosing and applying appropriate and efficient strategies.</p>	<p>Integers NR7.2 Orders, adds and subtracts fluently with integers (directed numbers).</p>	<p>Integers NR8.2 Calculates fluently with integers.</p>
SUBSTRAND – FRACTIONS AND DECIMALS STUDENTS DEVELOP AN UNDERSTANDING OF FRACTIONS AS PARTS OF UNIT WHOLE, AS PARTS OF A SET, AS LOCATIONS ON NUMBER LINES, AND AS DIVISIONS OF WHOLE NUMBERS.							
<p>NR1.4 Models halves as two equal parts of an object, recognises and creates halves of collections found in everyday situations.</p>	<p>NR2.4 Identifies, interprets and demonstrates common uses of halves and quarters of everyday shapes, objects, sets and collections.</p>	<p>NR3.4 Models, compares, represents and interprets simple fractions (including eighths and thirds) and decimals, adds and subtracts decimals with two decimal places, and solves simple money calculations.</p>	<p>NR4.4 Models, compares and represents simple fractions (including fifths, tenths, hundredths and sixths) and decimals, multiplies with two decimal places, and interprets everyday percentages.</p>	<p>NR5.4 Models, compares, represents, orders and calculates fluently with decimals, fractions (including twelfths) with the same denominators, and benchmark percentages.</p>	<p>NR6.4 Models, compares, represents, orders and calculates fluently with decimals, fractions (including ninths) with related denominators and other percentages.</p>	<p>Fractions, Decimals and Percentages NR7.3 Understands and works fluently with fractions (including sevenths), decimals, percentages, ratios and rates, represents and orders decimals, and converts between fractions, decimals and percentages.</p> <p>Financial Literacy NR7.4 Solves problems involving fractions, decimals, ratios and/or percentages to compare prices and simple interest</p>	<p>Fractions, Decimals and Percentages NR8.3 Understands and works fluently with fractions (including elevenths), decimals, percentages, ratios and rates.</p> <p>Financial Literacy NR8.4 Solves problems involving fractions, decimals, ratios and/or percentages to compare prices and compound interest.</p>

Number and Operations Strand: learning outcomes (contd.)

SUBSTRAND – CHANCE STUDENTS CONSTRUCT AN UNDERSTANDING OF CHANGE AND LIKELIHOOD AS APPLIED IN EVERYDAY SITUATIONS AND DEVELOP AN APPRECIATION OF THE DIFFERENCE BETWEEN THEORETICAL AND EXPERIMENTAL PROBABILITIES.						
NR1.5 Identifies the element of chance in familiar activities and describes chance using words such as yes, no and maybe.	NR2.5 Recognises, describes and orders the element of chance in everyday events using words such as impossible, possible, might, certain, and unlikely.	NR3.5 Describes events as likely or unlikely and orders events from least to most likely, interprets and records outcomes of simple chance experiments.	NR4.5 Describes, orders and compares likelihood of events with chance experiments and recognises that there will be variation in results and expected outcomes.	NR5.5 Predicts, compares and orders the likelihood of simple events on a number line from zero to one using chance words and data from chance events.	NR6.5 Quantifies with fractions, decimals and percentages the likelihood of simple events and orders on a number line and makes and tests predictions about 'population' based on sample data.	Probability NR7.5 Identifies equally likely outcomes and calculates probabilities and relative frequencies from data. Probability NR8.5 Identifies complementary events and uses Venn diagrams to illustrate relationship between events and their complements.

Patterns and Algebra Strand: learning outcomes

SUBSTRAND – PATTERNS AND ALGEBRA STUDENTS DEMONSTRATE FLUENCY IN GENERATING, DESCRIBING, RECORDING, EXTENDING AND REPRESENTING GEOMETRIC AND NUMERIC PATTERNS AS WELL AS CONSTRUCT AN UNDERSTANDING OF THE RELATIONSHIPS AND CHANGE BETWEEN NUMBERS AND APPLY THESE IN SOLVING PROBLEMS.						
Year 1 PA1.1a Identifies, describes, copies, generates and extends repeating patterns as sequences and/ or actions, shapes or simple numeric patterns that decrease or increase.	Year 2 PA2.1a Generates, represents and extends a variety of number patterns including simple growing patterns, and provides missing elements in a pattern.	Year 3 PA3.1a Records and describes geometric and number repeating and growing patterns using words and completes simple number sentences by calculating missing values.	Year 4 PA4.1a Generates, describes and records number patterns using a variety of strategies and completes complex number sentences by calculating missing values.	Year 5 PA5.1a Records and describes geometric and number repeating and growing patterns that involve multiples and one operation, using words.	Year 6 PA6.1a Records, analyses and describes geometric and number repeating and growing patterns that involve two operations using words, tables and general rules.	Year 7 Algebraic Techniques PA7.1 Extends and generalises number patterns using word equations. Year 8 Algebraic Techniques PA8.1 Uses letters to represent numbers and translates between words and algebraic symbols.

SUBSTRAND – PATTERNS AND ALGEBRA STUDENTS DEMONSTRATE FLUENCY IN GENERATING, DESCRIBING, RECORDING, EXTENDING AND REPRESENTING GEOMETRIC AND NUMERIC PATTERNS AS WELL AS CONSTRUCT AN UNDERSTANDING OF THE RELATIONSHIPS AND CHANGE BETWEEN NUMBERS AND APPLY THESE IN SOLVING PROBLEMS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
PA1.1b Models quantitative relationships involving addition and subtraction number facts to 50, using objects, pictures and/or numbers.	PA2.1b Models quantitative relationships involving addition and subtraction number facts to at least 50, using objects, pictures and/or numbers.	PA3.1b Models quantitative relationships involving multiplication and division number facts to at least 10, using objects, pictures and/or numbers.	PA4.31b Models quantitative relationships involving multiplication and division number facts to at least 12, using objects, pictures and/or numbers.	PA5.1b Constructs, verifies and completes simple number sentences involving four operations with a variety of numbers.	PA6.1b Constructs, verifies and completes complex number sentences involving the four operations with a variety of numbers.	Number Patterns PA7.2 Creates, records, analyses and generalises number patterns using words and pronumerals and illustrates patterns on graphs.	Number Patterns PA8.2 Creates, records, analyses and generalises number patterns using words and algebraic symbols in a variety of ways.
						Algebraic Techniques PA7.3 Constructs and simplifies simple algebraic expressions and equations.	Algebraic Techniques PA8.3 Uses the algebraic symbol system to simplify, expand and factorise complex algebraic expressions.
						Linear Relationships PA7.4 Interprets the number plane and locates ordered pairs and graphs and interprets simple linear relationships created from simple number patterns and equations.	Linear Relationships PA8.4 Uses algebraic techniques to solve linear equations and simple inequalities and graphs and interprets linear relationships on the number plane.

Data Analysis Strand: learning outcomes

SUBSTRAND – DATA ANALYSIS STUDENTS FORMULATE QUESTIONS THAT CAN BE ANSWERED BY COLLECTING, ORGANISING, TABULATING, GRAPHING AND ANALYSING DATA.						
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<p>DA1.1 Designs investigations and collects, organises, represents and interprets pictographs where one picture represents one data value including organising themselves into people graphs.</p>	<p>DA2.1 Designs investigations, collects and records data using tallies, organises and represents data using tables, pictographs, bar and column graphs, reads and makes connection between lists, tables and data displays, and interprets results.</p>	<p>DA3.1 Designs an investigation to answer a question about a familiar situation, conducts investigation, collects and organises data using lists and tables and explains the results to answer questions.</p>	<p>DA4.1 Conducts an investigation, collects and organises data into tables, uses pictographs, column graphs and grid paper to display data and interprets the results.</p>	<p>DA5.1 Constructs pictographs, column and line graphs with many-to-one scales, reads and explains data displayed in a range of graphs using many-to-one correspondence between data and symbols.</p>	<p>DA6.1 Constructs divided bar graphs with scales of many-to-one, selects an appropriate display for data, interprets a variety of graphs with scales of many-to-one correspondence, and utilises data to find average.</p>	<p>DA7.1 Draws, reads and interprets sector graphs, dot plots and stem-and-leaf plots, tables and charts.</p>
						<p>DA8.1 Draws, reads and interprets a variety of graphs including conversion and step graphs, tables including frequency tables for grouped data, and charts, and interprets other statistical information.</p>
						<p>Data Analysis and Evaluation DS8.2 Undertakes an investigation to answer key questions, collects data using either a census or a sample, and determines measures of location and spread.</p>

Measurement Strand: learning outcomes

SUBSTRAND – LENGTH STUDENTS IDENTIFY AND DESCRIBE THE ATTRIBUTE OF LENGTH AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASUREMENT.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
MS1.1 Uses everyday language (long, short, high, tall, low, the same) to describe length and distance and compares lengths using uniform informal units and direct comparison.	MS2.1 Uses uniform informal units (pencils, footprints, hand spans) and formal units (metres and centimetres & yards and feet) to estimate, measure, compare and record lengths and distances.	MS3.1 Uses formal units (metres, centimetres and millimetres & yards, feet and inches) to estimate, measure, compare, order and record lengths and distances.	MS4.1 Uses formal units to estimate, measure, order, compare and record lengths, distances and perimeters and converts between units within each measurement system (between metres, centimetres & millimetres & between yards, feet and inches).	MS5.1 Selects and applies appropriate formal units (kilometres, metres, centimetres or millimetres; miles, yards, feet or inches) and tools to measure lengths, distances and perimeters and converts between metres and kilometres and between feet and miles.	MS6.1 Works fluently to estimate, measure, order, compare distances and perimeters using the metric and imperial units and converts measurements between the two systems.	MS7.1 Calculates perimeter of simple composite figures comprising rectangles and/or triangles and develops a practical understanding of Pythagoras' theorem and uses it to find lengths of right-angled triangles.	MS8.1 Develops a practical understanding of, and calculates circumference of circles and determines perimeter of more complex composite figures comprising rectangles, triangles and/or circles.
SUBSTRAND – AREA STUDENTS IDENTIFY AND DESCRIBE THE ATTRIBUTE OF AREA AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASUREMENT.							
MS1.2 Uses everyday language (surface, inside, outside) to describe area and compares areas by covering completely with smaller shapes and direct comparison.	MS2.2 Uses uniform informal units to estimate, measure, compare and record areas of regular and irregular shapes.	MS3.2 Understands the need for, and uses, formal units (square centimetre and square inches) to estimate, measure, compare and record the areas of surfaces.	MS4.2 Understands the need for, and uses, larger formal units (square metres and square feet) to estimate, measure, compare and record the areas of surfaces and converts between units within each system.	MS5.2 Chooses and uses the appropriate unit to calculate area of squares and rectangles, and recognises the need for larger formal units: square kilometres, hectares and square miles and converts between units within each system.	MS6.2 Chooses and uses the appropriate unit to calculate areas of shapes including the area of triangles and surface areas of rectangular prisms.	MS7.2 Develops formulae and calculates the area of a variety of polygons and simple composite figures.	MS8.2 Develops a practical understanding of, and calculates area of circles and determines area of more complex composite figures comprising rectangles, triangles and/or circles.

Measurement Strand: learning outcomes (contd.)

SUBSTRAND – VOLUME AND CAPACITY STUDENTS IDENTIFY AND DESCRIBE THE ATTRIBUTE OF VOLUME AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASURING CAPACITY OR VOLUME.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
MS1.3 Uses everyday language (full, empty, about half-full) to describe capacity and compare the capacities of containers and the volumes of objects or substances using direct comparison.	MS2.3 Uses uniform informal units to estimate, measure, compare and record volumes and capacities.	MS3.3 Uses formal units (litres and cubic centimetres and quarts and cubic inches) and converts between units within each system to estimate, measure, compare and record volumes and capacities.	MS4.3 Use smaller formal units (millilitres and pints) to estimate, measure, compare and record volumes and capacities and converts between units within each system.	MS5.3 Identifies and chooses the appropriate unit (including cubic metres, cubic feet & gallon) to estimate and measure volume and capacity, including irregular solids.	MS6.3 Identifies and chooses the appropriate unit to estimate and measure volume and capacity, including irregular solids.	MS 7.3 Finds the surface area and volume of right prisms and converts between units of volume within each measurement system.	Surface Area and Volume MS8.3 Calculates surface area of and volume of cylinders.
SUBSTRAND – MASS STUDENTS UNDERSTAND, DISTINGUISH AND DESCRIBE THE ATTRIBUTE OF MASS THROUGH INDIRECT AND DIRECT COMPARISONS, AND USE INFORMAL AND FORMAL (METRIC AND IMPERIAL) UNITS FOR MEASUREMENT.							
MS1.4 Uses everyday language (heavy, light, hard to push/pull) to describe mass and compares, describes and orders masses of two objects.	MS2.4 Uses informal units to estimate, measure, compare and record masses of at least two objects.	MS3.4 Estimates, measures, compares and records masses using formal units (grams and ounces).	MS4.4 Estimates, measures, compares and records masses using kilograms and pounds.	MS5.4 Selects and uses the appropriate unit to find and measure the mass of objects and converts between units within each system.	MS6.4 Selects and uses the appropriate unit and measuring device to find the mass of objects.		

SUBSTRAND – TIME STUDENTS CONSTRUCT AN UNDERSTANDING OF, AND DESCRIBE, THE PASSAGE OF TIME, ITS MEASUREMENT AND REPRESENTATIONS, THROUGH THE USE OF EVERYDAY LANGUAGE AND EXPERIENCES.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
MS1.5 Identifies and sequences events, describes the duration of activities using everyday language, and reads clocks on the hour.	MS2.5 Uses repeated informal units and methods to measure duration of events and reads clocks on the half-hour.	MS3.5 Reads digital and analogue clocks to the quarter-hour, records time using the correct notation and interprets simple timetables and timelines.	MS4.5 Reads digital and analogue clocks to the minute, records time using the correct notation, understands equivalent representations of time, and makes comparisons between time units.	MS5.5 Uses am/pm notation in authentic situations, estimates duration of events, compares Pacific time zones, interprets timetables, and constructs and interprets timelines with scales.	MS6.5 Uses 24-hour time and notation in real-life situations, converts between 12-hour and 24-hour notations and solves authentic problems involving time duration.	Time MS7.4 Uses mental and calculator strategies to determine time duration, compares time across Pacific time zones and interprets various time tables.	Time MS8.4 Uses multiple strategies to calculate time and duration involving mixed time units, notations, and international time zones and reads and interprets a variety of time charts.

Space and Geometry Strand: learning outcomes

SUBSTRAND – THREE-DIMENSIONAL SPACE STUDENTS CONSTRUCT VERBAL, VISUAL AND MENTAL REPRESENTATIONS OF THREE-DIMENSIONAL OBJECTS, THEIR CHARACTERISTICS AND PROPERTIES, AND DIFFERENT ORIENTATIONS.							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
<p>SG1.1 Recognises, visualises and sorts 3D objects, represents and describes them using everyday language.</p>	<p>SG2.1 Names, explains and models 3D objects including cones, cubes, cylinders, spheres and prisms, and identifies them in pictures and the environment.</p>	<p>SG3.1 Compares, describes, models, and sketches 3D objects including pyramids and prisms.</p>	<p>SG4.1 Compares, explains and models 3D objects including cylinders, cones and spheres; constructs nets from everyday packages; and describes cross-sections of 3D objects.</p>	<p>SG5.1 Distinguishes different types of prisms and pyramids, visualises, draws and builds 3D objects given drawings of different views and nets.</p>	<p>SG6.1 Distinguishes between 3D objects, including hexagonal prisms and pyramids and visualises, draws and builds them given sketches of different views.</p>	<p>Properties of Solids SG7.1 Investigates, describes and draws 3D solids including polyhedra, and sorts them on the basis of their properties.</p>	<p>Properties of Solids SG8.1 Investigates, and identifies, generalises properties of 3D objects, builds models of polyhedra, and develops Euler’s formula.</p>
SUBSTRAND – TWO-DIMENSIONAL SPACE STUDENTS CONSTRUCT VERBAL, VISUAL AND MENTAL REPRESENTATIONS OF LINES, ANGLES AND TWO-DIMENSIONAL SHAPES, THEIR CHARACTERISTICS AND PROPERTIES, AND DIFFERENT ORIENTATIONS.							
<p>SG1.2 Recognises, visualises, classifies, and uses everyday language to describe representations of 2D shapes.</p>	<p>SG2.2a Recognises, visualises, classifies, models, describes and examines various 2D shapes including hexagons, rhombuses and trapeziums.</p>	<p>SG3.2a Recognises, visualises, classifies, models, describes and examines 2D shapes including pentagons and parallelograms presented in different orientations and compares and describes special groups of quadrilaterals.</p>	<p>SG4.2a Recognises, visualises, classifies, models, describes, names and examines 2D shapes including octagons and hexagons, and describes their features.</p>	<p>SG5.2a Identifies right-angled, isosceles, equilateral and scalene triangles; explores angle properties of triangles and quadrilaterals and identifies and draws regular and irregular 2D shapes from side and angle descriptions.</p>	<p>SG6.2a Identifies and draws regular and irregular 2D shapes (pentagons, hexagons and octagons) and their diagonals; and identifies and names parts of a circle.</p>	<p>Properties of Geometrical Figures SG7.2 Recognises, sorts, generalises and describes properties of triangles; and explores congruent triangles and states the relevant conditions.</p>	<p>Properties of Geometrical Figures SG8.2 Recognises, sorts, generalises and describes properties of quadrilaterals; explores congruent and similar figures and states the relevant conditions; and constructs and interprets scale drawing.</p>

SUBSTRAND – TWO-DIMENSIONAL SPACE (CONT.)
 STUDENTS CONSTRUCT VERBAL, VISUAL AND MENTAL REPRESENTATIONS OF LINES, ANGLES AND TWO-DIMENSIONAL SHAPES, THEIR CHARACTERISTICS AND PROPERTIES, AND DIFFERENT ORIENTATIONS.

SG2.2b Recognises and describes corners as angles in practical situations.	SG3.2b Recognises, understands, compares and defines angles in openings and slopes and classifies angles as right angle or not right angle.	SG4.2b Recognises, understands, compares and defines angles in turns and classifies angles as equal to, greater than or less than a right angle.	SG5.2b Recognises, understands, compares, measures, constructs, and classifies angles of sizes up to 180 degrees.	SG6.2b Recognises, understands, compares, measures, constructs, and classifies angles of sizes up to 360 degrees.	Angles SG7.3 Recognises, understands and states angles formed by the intersection of straight lines, including those related to transversals on sets of parallel lines, and makes use of the relationships between them.	Angles SG8.3 Uses knowledge of 2D and 3D geometrical figures to solve numerical exercises in finding lengths and angles in figures.
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SUBSTRAND – POSITION
 STUDENTS DEVELOP THEIR REPRESENTATION OF POSITION THROUGH PRECISE LANGUAGE AND THE USE OF GRIDS AND COMPASS DIRECTIONS.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
SG1.3 Gives and follows simple directions to familiar locations in their environment.	SG2.3 Constructs models and draws, describes using everyday language and interprets simple maps showing relative position of objects.	SG3.3 Represents position using simple maps, grids and compass points and follows pathways.	SG4.3 Describes position using coordinates and uses compass directions to give and follow directions.	SG5.3 Describes locations and pathways in their physical environment using a coordinate system and grid reference.	SG6.3 Uses scales, legends and compass directions to identify positions on a map.		