St John’s Grammar School Maths Policy

The goal of teachers should be to help people understand mathematics and to encourage them to believe it is both natural and enjoyable to continue using and learning mathematics. It is essential that we teach in such a way that students see mathematics as a sensible, natural and enjoyable part of their environment. (Willoughby, 2000)

Early Learning Centre Maths Policy

The Early Learning Centre curriculum places a strong emphasis on Maths because of the small child’s tendency towards order.

Many children come to the ELC already possessing a strong desire to order, sort and classify objects. The ELC builds from this natural propensity towards an interest in exactness, measurement and comparison and number.

The practical life and sensorial materials which are the basis of our prepared environment all assist in the formation of order.

The sensorial materials are an indirect preparation for the mathematical mind because they allow the child to establish relationships.

The materials have a built in control of error to encourage, not inhibit, the child’s natural development.

Observation and experimentation with materials for sorting, classifying, comparing, noting similarities and differences and sequencing all appeal to the child’s desire to make sense of his/her world. The manipulation of these objects is all done through the child’s play/work with not only specifically designed Montessori equipment but through many other activities such as sand play, water play, block play, box construction and cooking.

This sensitive stage for order is the forerunner of the child’s mathematical mind.
**Junior School Maths Policy**

All members of our staff are in the process of developing our new Mathematics Policy. (Refer to our Junior School Site Plan for the time frame). It is our aim that our policy is an agreed approach that marries our existing St John's Mathematics Program to that of the Australian Curriculum (Refer to Scope and Sequence Appendix 1). It is intended to be a working document to ensure most importantly children’s learning in Mathematics along with consistency and continuity in our teaching approach.

At St John’s Grammar School we believe that Mathematics is a tool for everyday life. It is a whole network of concepts and relationships which provide a way of viewing and making sense of the world.

It is our aim to develop:

- a positive attitude towards mathematics and an awareness of the fascination of mathematics
- competence and confidence in mathematical knowledge, concepts and skills
- an ability to solve problems, to reason, to think logically and to work systematically and accurately.
- initiative and an ability to work both independently and in cooperation with others
- an ability to communicate mathematically
- an ability to use and apply Mathematics across the curriculum and in real life
- an understanding of Mathematics through a process of enquiry and experiment

**Knowledge Skills and Understanding**

Currently our teachers are in the process of developing a collective understanding of what Mathematics looks like in the 21st century. As a Junior School staff we attend professional learning to teach us best practise and update ourselves on current research.

To encourage best practise, time allocation is given during Staff Meetings (Refer Appendix 3) for Staff to share current methodology. This ensures that throughout the school children are given opportunities for:

- practical activities and mathematical games
- problem solving
- individual, group and whole class discussions and activities
- open and closed tasks
- a range of methods of calculating eg. mental, pencil and paper and using a calculator
- working with computers as a mathematical tool
Each class teacher is responsible for the mathematics in their class. The approach to the teaching of mathematics within the school is based on these key principles:

- preferred a mathematics lesson is taught daily
- a clear focus on direct, instructional teaching and interactive oral work with the whole class and group
- an emphasis on mental calculation
- an expectation that all teachers refer to the Booker methodology and framework when developing their units. (Refer Appendix 2 for Booker matrix)
- an expectation that all teachers use common language when teaching Numeracy (Refer Appendix 4)

CROSS-CURRICULAR ISSUES

Throughout the whole curriculum opportunities exist to extend and promote mathematics. Teachers seek to take advantage of all opportunities.

SPECIAL EDUCATIONAL NEEDS

Children with SEN are taught within the daily mathematics lesson and are encouraged to take part when and where possible. Lessons are differentiated accordingly.

Extra provisions of support are given. Refer to Special Education Policy for both SEN support and Extension Mathematics program.

ASSESSMENT AND RECORD KEEPING

Teachers are expected to do a combination of formative and summative assessments to inform their programs.

Teachers plan assessment activities, this is planned with the parallel class to ensure consistency and to share workload.

In Term 4 all children are formally assessed as part of the School’s Assessment Policy.

The evaluation of termly plans by both Junior and Primary Coordinators will outline what has been taught and what has yet to be learned. This serves as a class record of progress. The teacher may wish to make notes on individual children whose progress differs markedly from the rest of the class, and the reasons for it. These notes and class record are passed to the child’s next teacher at the end of the school year.
REPORTING TO PARENTS

At St John’s Grammar School Reports are completed at the end of each Semester and parents are given opportunity to discuss their child’s progress on two separate occasions. Teachers use the information gathered from their half termly assessments to help them comment on individual children’s progress.

STAFFING AND RESOURCES

Practical Resources
All teachers should organise an area within the classroom dedicated to mathematics resources. Resource boxes will be distributed to each class and will be audited at the end of each year. (Refer Appendix for Resource Box list) This area is easily accessible to all children and allows them to become familiar with all resources.

Resources which are not used or required regularly are stored in the Art Room bunker in Math cupboards. (An up-to-date list of resources is attached in the Appendix)

HOMEWORK
It is our St Johns Junior School policy to provide parents and carers with opportunities to work with their children at home. These activities may only be brief, but are valuable in promoting children’s learning in mathematics.

Activities are sent home on a regular basis (see the separate school Homework Policy) and take the form of number games and tasks with some formal exercises for older children.

The policy will be reviewed every 3 years
Appendix 1:

St John’s Grammar School Maths Scope and Sequence

Ref: http://www.australiancurriculum.edu.au/Mathematics/Curriculum/F-10

Reception

Number and Algebra

Number and place value
  o Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point (ACMNA001)
  o Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond (ACMNA002)
  o Subitise small collections of objects (ACMNA003)
  o Compare, order and make correspondences between collections, initially to 20, and explain reasoning (ACMNA289)
  o Represent practical situations to model addition and sharing (ACMNA004)

Patterns and algebra
  o Sort and classify familiar objects and explain the basis for these classifications. Copy, continue and create patterns with objects and drawings (ACMNA005)

Measurement and Geometry

Using units of measurement
  o Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language (ACMMG006)
  o Compare and order the duration of events using the everyday language of time (ACMMG007)
  o Connect days of the week to familiar events and actions (ACMMG008)

Shape
  o Sort, describe and name familiar two-dimensional shapes and three-dimensional objects in the environment (ACMMG009)

Location and transformation
  o Describe position and movement (ACMMG010)

Statistics and Probability

Data representation and interpretation
  o Answer yes/no questions to collect information (ACMSP011)

Mathematics Achievement Standard
By the end of the Foundation Year, students make the connections between number names, numerals and quantities up to 10. Students are able to
compare and sort shapes and objects. They make connections between events and the days of the week.
Year 1

Number and Algebra

Number and place value
- Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero (ACMNA012)
- Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line (ACMNA013)
- Count collections to 100 by partitioning numbers using place value (ACMNA014)
- Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts (ACMNA015)

Fractions and decimals
- Recognise and describe one-half as one of two equal parts of a whole. (ACMNA016)

Money and financial mathematics
- Recognise, describe and order Australian coins according to their value (ACMNA017)

Patterns and algebra
- Investigate and describe number patterns formed by skip counting and patterns with objects (ACMNA018)

Measurement and Geometry

Using units of measurement
- Measure and compare the lengths and capacities of pairs of objects using uniform informal units (ACMMG019)
- Tell time to the half-hour (ACMMG020)
- Describe duration using months, weeks, days and hours (ACMMG021)

Shape
- Recognise and classify familiar two-dimensional shapes and three-dimensional objects using obvious features (ACMMG022)

Location and transformation
- Give and follow directions to familiar locations (ACMMG023)
Statistics and Probability

**Chance**

- Identify outcomes of familiar events involving chance and describe them using everyday language such as ‘will happen’, ‘won’t happen’ or ‘might happen’ (ACMSP024)

**Data representation and interpretation**

- Choose simple questions and gather responses (ACMSP262)
- Represent data with objects and drawings where one object or drawing represents one data value. Describe the displays (ACMSP263)

Mathematics Achievement Standard

By the end of Year 1, students recognise and communicate number sequences. They solve simple addition and subtraction problems, and are familiar with Australian coins. They describe a representation of a half. Students collect data from questions to draw and describe simple data displays. Students compare lengths and describe two-dimensional shapes and three-dimensional objects. They communicate time duration and can follow simple directions.
Year 2

Number and Algebra

Number and place value
- Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and ten from any starting point, then moving to other sequences. (ACMNA026)
- Recognise, model, represent and order numbers to at least 1000 (ACMNA027)
- Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to facilitate more efficient counting (ACMNA028)
- Explore the connection between addition and subtraction (ACMNA029)
- Solve simple addition and subtraction problems using a range of efficient mental and written strategies (ACMNA030)
- Recognise and represent multiplication as repeated addition, groups and arrays (ACMNA031)
- Recognise and represent division as grouping into equal sets and solve simple problems using these representations (ACMNA032)

Fractions and decimals
- Recognise and interpret common uses of halves, quarters and eighths of shapes and collections (ACMNA033)

Money and financial mathematics
- Count and order small collections of Australian coins and notes according to their value (ACMNA034)

Patterns and algebra
- Describe patterns with numbers and identify missing elements (ACMNA035)
- Solve problems by using number sentences for addition or subtraction (ACMNA036)

Measurement and Geometry

Using units of measurement
- Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units (ACMMG037)
- Compare masses of objects using balance scales (ACMMG038)
- Tell time to the quarter-hour, using the language of ‘past’ and ‘to’ (ACMMG039)
- Name and order months and seasons (ACMMG040)
- Use a calendar to identify the date and determine the number of days in each month (ACMMG041)

Shape
- Describe and draw two-dimensional shapes, with and without digital technologies (ACMMG042)
- Describe the features of three-dimensional objects (ACMMG043)
**Location and transformation**
- Interpret simple maps of familiar locations and identify the relative positions of key features (ACMMG044)
- Investigate the effect of one-step slides and flips with and without digital technologies (ACMMG045)
- Identify and describe half and quarter turns (ACMMG046)

**Statistics and Probability**

**Chance**
- Identify practical activities and everyday events that involve chance. Describe outcomes as ‘likely’ or ‘unlikely’ and identify some events as ‘certain’ or ‘impossible’ (ACMSP047)

**Data representation and interpretation**
- Identify a question of interest based on one categorical variable. Gather data relevant to the question (ACMSP048)
- Collect, check and classify data (ACMSP049)
- Create displays of data using lists, table and picture graphs and interpret them (ACMSP050)

**Mathematics Achievement Standard**
By the end of Year 2, students recognise and communicate number sequences involving twos, threes and fives. They are familiar with collections up to 1000 and recognise the connection between addition and subtraction. Students describe patterns with numbers and represent problems involving addition and subtraction by number sentences. They understand the value of collections of Australian coins. Students collect information and create data displays and interpret the information. They describe outcomes for everyday events. Students compare and order different shapes and objects using informal units. They use calendars to identify dates and seasons. They draw two-dimensional shapes and describe one-step transformations.
Year 3

Number and Algebra

Number and place value
- Investigate the conditions required for a number to be odd or even and identify odd and even numbers (ACMNA051)
- Recognise, model, represent and order numbers to at least 10 000 (ACMNA052)
- Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems (ACMNA053)
- Recognise and explain the connection between addition and subtraction (ACMNA054)
- Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation (ACMNA055)
- Recall multiplication facts of two, three, five and ten and related division facts (ACMNA056)
- Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies (ACMNA057)

Fractions and decimals
- Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole (ACMNA058)

Money and financial mathematics
- Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents (ACMNA059)

Patterns and algebra
- Describe, continue, and create number patterns resulting from performing addition or subtraction (ACMNA060)

Measurement and Geometry

Using units of measurement
- Measure, order and compare objects using familiar metric units of length, mass and capacity (ACMMG061)
- Tell time to the minute and investigate the relationship between units of time (ACMMG062)

Shape
- Make models of three-dimensional objects and describe key features (ACMMG063)

Location and transformation
- Create and interpret simple grid maps to show position and pathways (ACMMG065)
- Identify symmetry in the environment (ACMMG066)
**Geometric reasoning**
- Identify angles as measures of turn and compare angle sizes in everyday situations (ACMMG064)

**Statistics and Probability**

**Chance**
- Conduct chance experiments, identify and describe possible outcomes and recognise variation in results (ACMSP067)

**Data representation and interpretation**
- Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording (ACMSP068)
- Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies (ACMSP069)
- Interpret and compare data displays (ACMSP070)

**Mathematics Achievement Standard**
By the end of Year 3 students recall number facts for single digit numbers and are familiar with collections up to 10 000. They describe number patterns involving addition and subtraction and recognise the connection between multiplication and division. They model and represent unit fractions. They count the change required and represent money values in various ways. Students conduct chance experiments and describe the possible outcomes. They create, interpret and compare data displays. Students compare objects using familiar units. They compare angle sizes and identify symmetry. They tell the time and interpret positions and pathways on maps.
Year 4

Number and Algebra

Number and place value
- Investigate and use the properties of odd and even numbers (ACMNA071)
- Recognise, represent and order numbers to at least tens of thousands (ACMNA072)
- Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (ACMNA073)
- Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9 (ACMNA074)
- Recall multiplication facts up to $10 \times 10$ and related division facts (ACMNA075)
- Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder (ACMNA076)

Fractions and decimals
- Investigate equivalent fractions used in contexts (ACMNA077)
- Count by quarters halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line (ACMNA078)
- Recognise that the place value system can be extended to tenths and hundredths. Make connections between fractions and decimal notation (ACMNA079)

Money and financial mathematics
- Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies (ACMNA080)

Patterns and algebra
- Explore and describe number patterns resulting from performing multiplication (ACMNA081)
- Solve word problems by using number sentences involving multiplication or division where there is no remainder (ACMNA082)
- Use equivalent number sentences involving addition and subtraction to find unknown quantities (ACMNA083)

Measurement and Geometry

Using units of measurement
- Use scaled instruments to measure and compare lengths, masses, capacities and temperatures (ACMMG084)
- Compare objects using familiar metric units of area and volume (ACMMG290)
- Convert between units of time (ACMMG085)
- Use am and pm notation and solve simple time problems (ACMMG086)
Shape
- Compare the areas of regular and irregular shapes by informal means (ACMMG087)
- Compare and describe two-dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies (ACMMG088)
- Location and transformation
- Use simple scales, legends and directions to interpret information contained in basic maps (ACMMG090)
- Create symmetrical patterns, pictures and shapes with and without digital technologies (ACMMG091)

Geometric reasoning
- Compare angles and classify them as equal to, greater than or less than a right angle (ACMMG089)

Statistics and Probability

Chance
- Describe possible everyday events and order their chances of occurring (ACMSP092)
- Identify everyday events where one cannot happen if the other happens (ACMSP093)
- Identify events where the chance of one will not be affected by the occurrence of the other (ACMSP094)

Data representation and interpretation
- Select and trial methods for data collection, including survey questions and recording sheets (ACMSP095)
- Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values (ACMSP096)
- Evaluate the effectiveness of different displays in illustrating data features including variability (ACMSP097)

Mathematics Achievement Standard

By the end of Year 4 students recall multiplication facts up to 10 x 10 and the related division facts. They are familiar with collections up to 100 000. Students recognise and locate familiar fractions on a number line and make connections between fraction and decimal notations. They solve problems by using relevant number sentences involving the four operations. Students describe the probabilities of everyday events. They investigate different methods for data collection, construct data displays and evaluate their effectiveness. Students convert between units of time and solve problems involving time duration. They compare areas of regular and irregular shapes and classify angles. They create symmetrical patterns and interpret the information contained in maps.
Year 5

Number and Algebra

Number and place value

- Identify and describe factors and multiples of whole numbers and use them to solve problems (ACMNA098)
- Use estimation and rounding to check the reasonableness of answers to calculations (ACMNA099)
- Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)
- Solve problems involving division by a one digit number, including those that result in a remainder (ACMNA101)
- Use efficient mental and written strategies and apply appropriate digital technologies to solve problems (ACMNA291)

Fractions and decimals

- Compare and order common unit fractions and locate and represent them on a number line (ACMNA102)
- Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (ACMNA103)
- Recognise that the number system can be extended beyond hundredths (ACMNA104)
- Compare, order and represent decimals (ACMNA105)

Money and financial mathematics

- Create simple financial plans (ACMNA106)

Patterns and algebra

- Describe, continue and create patterns with fractions, decimals and whole numbers resulting from addition and subtraction (ACMNA107)
- Use equivalent number sentences involving multiplication and division to find unknown quantities (ACMNA121)

Measurement and Geometry

Using units of measurement

- Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108)
- Calculate the perimeter and area of rectangles using familiar metric units (ACMMG109)
- Compare 12- and 24-hour time systems and convert between them (ACMMG110)

Shape
- Connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111)

**Location and transformation**

- Use a grid reference system to describe locations. Describe routes using landmarks and directional language (ACMMG113)
- Describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries (ACMMG114)
- Apply the enlargement transformation to familiar two-dimensional shapes and explore the properties of the resulting image compared with the original (ACMMG115)

**Geometric reasoning**

- Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMMG112)

**Statistics and Probability**

**Chance**

- List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (ACMSP116)
- Recognise that probabilities range from 0 to 1 (ACMSP117)

**Data representation and interpretation**

- Pose questions and collect categorical or numerical data by observation or survey (ACMSP118)
- Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119)
- Describe and interpret different data sets in context (ACMSP120)

**Mathematics Achievement Standard**

By the end of Year 5 students identify and describe factors and multiples and use estimation and rounding to check the reasonableness of answers. They solve multiplication and division problems and compare, order and represent decimals. Students perform addition and subtraction of fractions with the same denominator and continue patterns with fractions and decimals. They plan simple budgets. Students list the outcomes of chance experiments as fractions. They pose questions to gather data and construct, describe and interpret different data sets. Students calculate perimeter and area of rectangles using appropriate units. They connect three dimensional objects with two dimensional representations. They measure and construct different angles and describe transformations of two-dimensional shapes, including the enlargement transformation. They identify line and rotational symmetry.

**Year 6**
Number and Algebra

**Number and place value**
- Identify and describe properties of prime, composite, square and triangular numbers (ACMNA122)
- Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
- Investigate everyday situations that use positive and negative whole numbers and zero. Locate and represent these numbers on a number line (ACMNA124)

**Fractions and decimals**
- Compare fractions with related denominators and locate and represent them on a number line (ACMNA125)
- Solve problems involving addition and subtraction of fractions with the same or related denominators (ACMNA126)
- Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies (ACMNA127)
- Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128)
- Multiply decimals by whole numbers and perform divisions that result in terminating decimals, with and without digital technologies (ACMNA129)
- Multiply and divide decimals by powers of 10 (ACMNA130)
- Make connections between equivalent fractions, decimals and percentages (ACMNA131)

**Money and financial mathematics**
- Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies (ACMNA132)

**Patterns and algebra**
- Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (ACMNA133)
- Explore the use of brackets and order of operations to write number sentences (ACMNA134)

**Measurement and Geometry**

**Using units of measurement**
- Connect decimal representations to the metric system (ACMMG135)
- Convert between common metric units of length, mass and capacity (ACMMG136)
- Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)
- Connect volume and capacity and their units of measurement (ACMMG138)
- Interpret and use timetables (ACMMG139)

**Shape**
- Construct simple prisms and pyramids (ACMMG140)
**Location and transformation**
- Investigate combinations of translations, reflections and rotations, with and without the use of digital technologies (ACMMG142)
- Introduce the Cartesian coordinate system using all four quadrants (ACMMG143)

**Geometric reasoning**
- Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles (ACMMG141)

**Statistics and Probability**

**Chance**
- Describe probabilities using fractions, decimals and percentages (ACMSP144)
- Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies (ACMSP145)
- Compare observed frequencies across experiments with expected frequencies (ACMSP146)

**Data representation and interpretation**
- Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
- Interpret secondary data presented in digital media and elsewhere (ACMSP148)

**Mathematics Achievement Standard**
By the end of Year 6, students recognise the properties of special numbers. They connect fractions, decimals and percentages as different representations of the same number and solve associated problems. They write correct number sentences. Students predict and communicate probabilities using simple fractions, decimals and percentages and construct and interpret a range of data displays. Students connect decimal representations to the metric system and choose appropriate units of measurement to solve problems. They interpret and use timetables. Students investigate angles. They investigate combinations of transformations and apply the enlargement transformation.
### Appendix 2: Booker Matrix

Ref: *Teaching Primary Mathematics* (Fourth Edition) Booker, Bond, Sparrow and Swan.

Book found in School Teacher Resource Area, JS library.

<table>
<thead>
<tr>
<th>LEVEL OF UNDERSTANDING</th>
<th>NUMERATION</th>
<th>ADDITIVE THINKING</th>
<th>MULTIPLICATIVE THINKING</th>
<th>GEOMETRY</th>
<th>MEASUREMENT</th>
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<tr>
<td>1. establish place value</td>
<td>one-digit numbers</td>
<td>+ concept part whole</td>
<td>two-dimensional shapes • sorting • pattern blocks • position • symmetry</td>
<td>initial concepts • length • area • volume • mass &amp; weight • temperature • informal units • time</td>
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<td>two-digit numbers</td>
<td>+ basic facts</td>
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<td>2. introduce renaming</td>
<td>three-digit numbers • internal zeros • renaming</td>
<td>+ algorithm</td>
<td>two-dimensional shapes • tangrams • classification • triangles • quadrilaterals • maps</td>
<td>concepts • length • perimeter • metric units • time—clocks • money</td>
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<td>fraction concept</td>
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<td>− basic facts</td>
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<tr>
<td>3. extend renaming</td>
<td>four-digit numbers • rounding</td>
<td>three-digit algorithms</td>
<td>× concept</td>
<td>two-dimensional shapes • properties • polygons • triangles • quadrilaterals • polyhedrons</td>
<td>concepts • area • mass • temperature • metric units • time—calendar • money</td>
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<td></td>
<td>fraction concept</td>
<td>+ algorithm</td>
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<td>× 2 digit 2 digit</td>
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<td>+ several 2 digit</td>
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<td>× 3 digit 2 digit</td>
<td>• volume</td>
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<td>rename mixed numbers &amp; improper</td>
<td>+/− like common fractions</td>
<td></td>
<td>• metric units</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fractions</td>
<td></td>
<td></td>
<td>• angle</td>
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<td>• timetables</td>
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<td></td>
<td>• chance</td>
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<td></td>
<td></td>
<td>• data</td>
</tr>
<tr>
<td>6.</td>
<td>extend place value</td>
<td>billions</td>
<td>fraction algorithms</td>
<td>× algorithm</td>
<td>applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rename as equivalent fractions</td>
<td>+/− hundredths</td>
<td>× 3 digit 3 digit</td>
<td>• volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+/− unlike common fractions</td>
<td></td>
<td>• capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• metric units</td>
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<td></td>
<td></td>
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<td>• angle</td>
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<td>• probability</td>
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<td></td>
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<td></td>
<td>• data</td>
</tr>
<tr>
<td>7.</td>
<td>third place value</td>
<td>scientific notation</td>
<td></td>
<td>location &amp; arrangements</td>
<td>applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rename among all fraction forms</td>
<td></td>
<td>• tessellations</td>
<td>• complex measurements</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• grids</td>
<td>• probability</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>• statistics</td>
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This Booker matrix goes into more depth with Numeration and Additive Thinking. Refer Booker text for more details.

<table>
<thead>
<tr>
<th>LEVEL OF UNDERSTANDING</th>
<th>NUMERATION</th>
<th>ADDITIVE THINKING</th>
<th>SUBTRACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>one-digit numbers</td>
<td>addition</td>
<td>subtraction</td>
</tr>
<tr>
<td>establish place value</td>
<td>• basis for all numbers</td>
<td>+ concept part whole</td>
<td>part whole</td>
</tr>
<tr>
<td>two-digit numbers</td>
<td>• thinking in tens</td>
<td>+ basic facts use doubles</td>
<td>count ons</td>
</tr>
<tr>
<td></td>
<td>• tens names</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 20–99</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• teens</td>
<td></td>
<td></td>
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</tbody>
</table>

| 2. introduce renaming   | three-digit numbers | addition | subtraction |
|                         | • place value      | 2 digit whole | part |
|                         | • teens            | + algorithm | part |
|                         | • internal zeros   | 2 digit | part |
|                         | • renaming         | basic facts | think of |
|                         | fraction concept   |               | addition |
|                         | language model     |               |            |

| 3. extend renaming      | four-digit numbers | addition | subtraction |
|                         | • place value      | 3 digit whole | 2 digit |
|                         | • teens            | + algorithm | 3 digit |
|                         | • internal zeros   | 2 digit | 3 digit |
|                         | • renaming         | basic facts | algorithm internal zeros |
|                         | fraction concept   |               |            |
|                         | language model     |               |            |
|                         | • decimal fractions—tenths | |

| 4. extend place value   | thousands 6 digit & 5 digit | addition | subtraction |
|                         | • new place value | 4 digit | 4 digit |
|                         | • internal zeros | + algorithm | 4 digit |
|                         | • renaming       | 4 digit | 4 digit |
|                         | common fraction  |               |            |
|                         | • symbols        |               |            |
|                         | decimal fractions |               |            |
|                         | • hundredths     |               |            |
This development forms the basis of the number strand in the early years of primary school so that the basis for all of numeration and additive processes is laid by midway through the primary years. The remaining levels, developed throughout the last years of primary school and into middle school, can be summarised as follows:

<table>
<thead>
<tr>
<th>LEVEL OF UNDERSTANDING</th>
<th>NUMERATION</th>
<th>ADDITIVE THINKING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>millions</td>
<td>ADDITION</td>
</tr>
<tr>
<td></td>
<td>• pattern grouped by hundreds tens ones</td>
<td>+ algorithm for decimal fractions—tenths</td>
</tr>
<tr>
<td></td>
<td>• internal zeros</td>
<td>+ algorithm for like common fractions</td>
</tr>
<tr>
<td></td>
<td>• renaming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• rounding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>per cents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>common fractions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• rename mixed numbers &amp; improper fractions</td>
<td></td>
</tr>
<tr>
<td>5. extend second place value</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>billions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• pattern grouped by hundreds tens ones</td>
<td>+ algorithm for decimal fractions—hundredths</td>
</tr>
<tr>
<td></td>
<td>• internal zeros</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• renaming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• rounding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>common fractions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• rename as equivalent fractions</td>
<td></td>
</tr>
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<td>6. consolidate second place value</td>
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<td></td>
<td>• exponents</td>
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</tr>
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<td>• large number names</td>
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</tr>
<tr>
<td></td>
<td>rename among all fraction forms</td>
<td></td>
</tr>
<tr>
<td>7. introduce third place value in terms of exponents</td>
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</table>
Appendix 3: 2 Year Cyclic Professional Learning Overview

<table>
<thead>
<tr>
<th></th>
<th>Year A</th>
<th>Year B</th>
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</thead>
<tbody>
<tr>
<td>T1</td>
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<td>Multiplication</td>
</tr>
<tr>
<td>T2</td>
<td>Mental Strategies</td>
<td>Division</td>
</tr>
<tr>
<td>T3</td>
<td>Addition</td>
<td>Geometry</td>
</tr>
<tr>
<td>T4</td>
<td>Subtraction</td>
<td>Measurement</td>
</tr>
</tbody>
</table>

Expectation is that during one staff meeting each term – all Year Level Staff will share an example of current teaching in the nominated area.

Appendix 4: Common Numeracy Terminology

Find in Common Area/Staff Secure/Numeracy/Vocabulary Book
File name: Primary Maths Vocabulary