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Content Clusters - Stage 2

Scope and sequencing by conceptual understanding

This is the scope… you create the sequence.

In this resource I provide possible ways of how groups of outcomes and their key ideas can be sequenced together based on the concepts they address. These are just examples and is not an exhaustive list of the clusters you can use to make connections across mathematics. I have used the syllabus outcomes, sub strands and the mathematics key ideas document. When teaching for conceptual understanding (not just the knowledge of each sub strand) we need to make clear how the pieces of the mathematical puzzle fit together. To do this, our planning needs to reflect this belief - that mathematics is a complex web of interrelated ideas. For ideas on what these links are, see my Linkages across the syllabus document on the resources section of our website.

The scope of what we teach is described in the syllabus (this is the constant), the sequence of what and how we teach mathematics is a decision for individual teachers (this is the variable). These clusters can be used to create meaningful sequences of learning that focus on concepts and programs that still address common sub strands (across grades or classes) but allow for individual teachers to add additional key ideas or focus on specific aspects of the cluster that students either have misconceptions around or are developing conceptual understanding in. The clusters are numbered but are not written in teaching order. These clusters may be added to or updated in the future and newer versions will be released.

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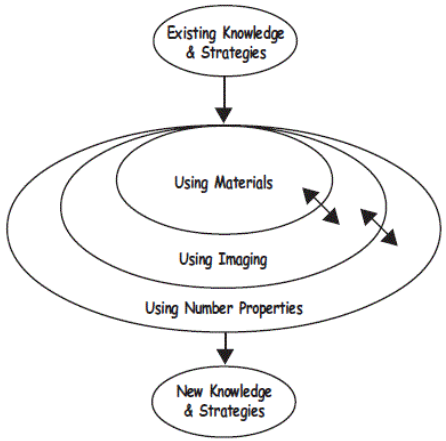
These clusters highlight the concept or main idea that ties each group of outcomes together, assisting teachers in making sense and meaning of the mathematics to students. When we think about the concepts or understandings first, we can think about what misconceptions students may have or what aspects of that concept they need next to connect their prior knowledge (the known) to create new knowledge (the unknown). The image to the right sourced from NZMaths, is based on Pirie and Kieren's growth in understanding model of the 'back and forth' nature of how students develop understanding from the known to the unknown.

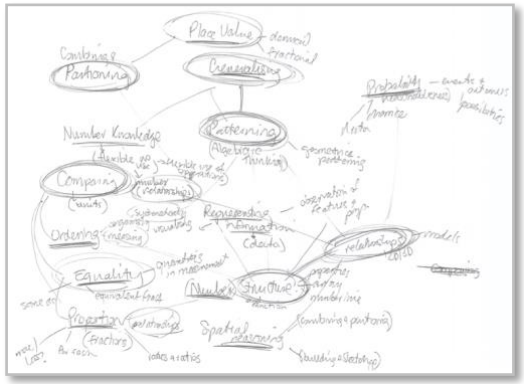


A (scope and) sequence should:

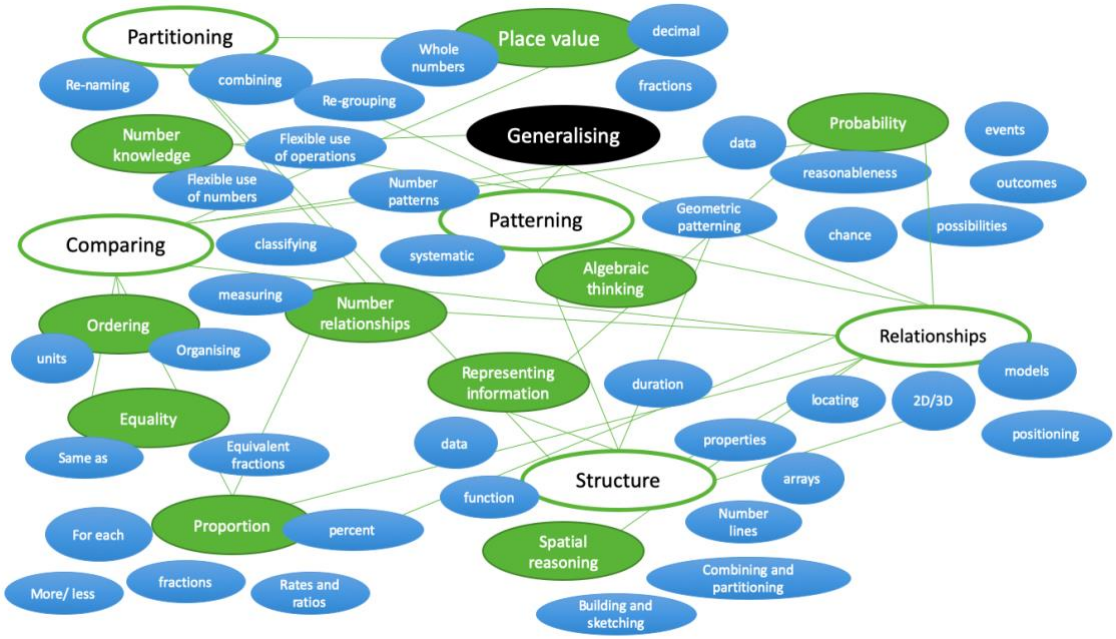
- reflect the conceptual needs of your students at this point in time (they need to be evaluated and changed constantly)
- show evidence of connections across sub strands
- address connected content strands that deal with similar concepts within a lesson or within a sequence of lessons (e.g. over a few weeks)
- give teachers an overarching structure to guide immediate planning
- where possible, be written to address the upcoming half- term or term teaching and learning cycle

NESA states that for their registration process as evidence of compliance schools need to provide "scope and sequence of learning/units of work in relation to outcomes of NESA syllabus for each KLA for each Year" (page 10). **Note:** Most schools have a set, wider grade or school-based scope and sequence, you can use the content clusters within those parameters to guide what conceptual understandings you focus on for your students. They show where you can make connections between the sub strands that are listed in the school's scope and sequence.

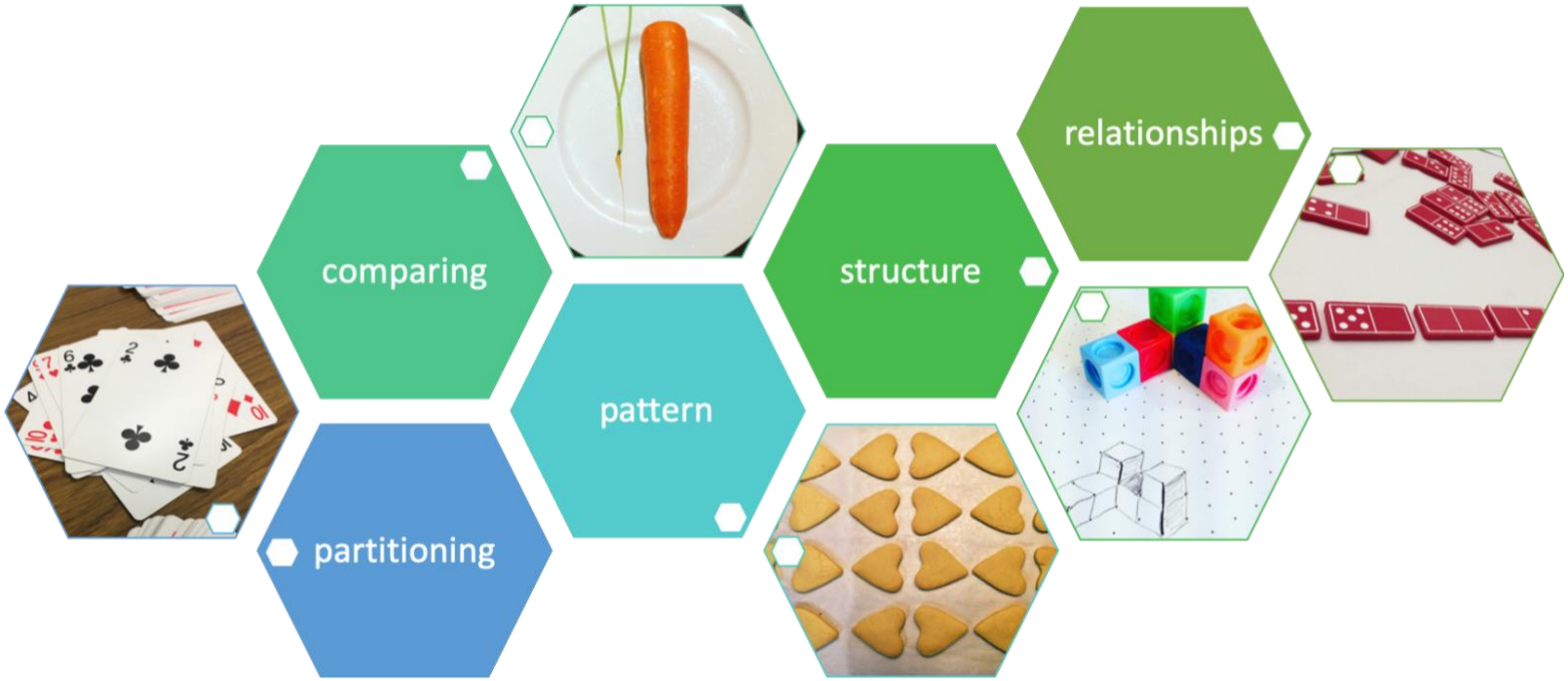
Mind map of big ideas and smaller concept connections



To assist with how these clusters fit into the larger picture of mathematics, what many researchers refer to as ‘Big ideas’ or important concepts (Askew, 2013; Boaler, 2017; Charles, 2005; Clarke, Clarke & Sullivan, 2012; Hurst & Hurrell, 2014; Siemon, Bleckly & Neal, 2012; Tout & Spithill, 2015), I had a go at thinking holistically about *“What are the main concepts or ‘knowledge actions’ students need?”* Here is my ‘messy’ thinking, then a more organised way of linking these ideas together are illustrated on the following pages.



Big ideas simplified



I then thought about these important concepts ‘big ideas’, the smaller ‘knowledge actions’ within them, and how the Content Clusters fit under each of these concepts, noting that some clusters align with more than one big idea.

Big ideas and smaller ‘knowledge actions’

Partitioning	Pattern	Comparing	Structure	Relationships
• Combining • Part-whole • Place value • Modelling • Whole numbers • Decimals • Fractions	• Geometric • Number • Algebraic • Generalising • Predicting	• Equality (with numbers and measurement) • Ordering • Proportion (fractions, percent, rates, ratios) • Magnitude • Estimating	• Number • Arrays • Shape • Measuring • Spatial • Building and sketching • Representing features (shape, data)	• Number • Additive and multiplicative • 2D and 3D • Probability • Possibilities (chance) • Data • Locating, positioning • Part-whole

These are just my ideas, Charles (2005) in his paper recognises that in developing deeper understanding of big ideas it might be helpful for teachers to “decide to modify or build your own” (p. 11). He also stated that:

> *“In working with colleagues on the development of this paper I am rather certain that it is not possible to get one set of Big Ideas and Understandings that all mathematicians and mathematics educators can agree on. Fortunately, I do not think it’s necessary to reach a consensus in this regard. Use the Big Mathematical Ideas and Understandings presented here as a starting point for the conversations they are intended to initiate” (p. 9)*

Organisation of Stage 2 clusters (updated)

In this update I have reduced the repetition of clusters and now simply have all the clusters included once (they are no longer repeated under substrand headings). Two additional clusters have been added related to time concepts (new – Clusters 19 and 20) which has resulted in the original Clusters 19 - 30 having their numbers changed to accommodate. A few clusters have been revised (Cluster 7 – previously 5, Cluster 25 – previously 23, and 29 – previously 27) to add in other connections that have arisen. Where appropriate, clusters have been given the same or similar names as concepts from other Stages to help make connections, show concepts that develop, and to assist with multi-stage planning. This version also includes a visual overview of the clusters mapped to the NSW outcomes they address to assist with planning and programming. A list of cluster titles is also included so teachers can see 'at a glance' the types of concepts the clusters explore. There is no set time for how long each cluster may take to explore with students, it could be 2 weeks per cluster or 3-4 weeks. Clusters may be repeated, merged or omitted (please see these are examples). Decisions about how the clusters are arranged and implemented should be made by teachers at a school/grade/classroom level based on students' needs, abilities, and interests.

References

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Mathematics K-10 Syllabus outcomes © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012.

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Tout, D. & Spithill, J. (2015). Big Ideas in Mathematics Teaching. *The Research Digest, QCT, 2015 (11*)

What is mathematical beauty Jo Boaler (Youcubed)

Clusters mapped to big ideas

Stage 2 Clusters

Partitioning	Pattern	Comparing	Structure	Relationships
•Content Cluster 2: Place value •Content Cluster 7: Flexible strategies for operating with numbers •Content Cluster 8: Partitioning •Content Cluster 9: Money uses a many-to-one scale •Content Cluster 11: Number relationships	•Content Cluster 1: Flexible counting (any number can be a countable unit) •Content Cluster 3: Representing numbers •Content Cluster 4: Number representations •Content Cluster 12: Numbers can be represented using pairs •Content Cluster 13: Patterns repeat or grow •Content Cluster 28: Patterns can be created using shapes	•Content Cluster 5: Comparing quantities – linear •Content Cluster 6: Comparing quantities – area/volume •Content Cluster 10: The 'equals sign' means "the same as" •Content Cluster 11: Number relationships •Content Cluster 18: Time can be measured •Content Cluster 19: Duration can be calculated using units of time •Content Cluster 22: Benchmark numbers can be used to estimate quantities •Content Cluster 23: Numbers and quantities can be compared using scale •Content Cluster 24: Objects can be measured and compared •Content Cluster 25: Shapes can be measured and compared •Content Cluster 27: Shapes and objects are classified •Content Cluster 30: Information can be collected, represented … •Content Cluster 32: Events can be predicted, measured	•Content Cluster 2: Place value •Content Cluster 3: Representing numbers •Content Cluster 4: Number representations •Content Cluster 6: Comparing quantities – area/volume •Content Cluster 8: Partitioning •Content Cluster 13: Patterns repeat or grow •Content Cluster 14: Multiples can be visually represented as an array •Content Cluster 15: The 'for each' concept •Content Cluster 21: Measurements are approximations •Content Cluster 20: Time can be represented in multiple ways •Content Cluster 26: Shape properties remain constant •Content Cluster 31: Information can be presented visually	•Content Cluster 2: Place value •Content Cluster 7: Flexible strategies for operating with numbers •Content Cluster 9: Money uses a many-to-one scale •Content Cluster 10: The 'equals sign' means "the same as" •Content Cluster 11: Number relationships •Content Cluster 12: Numbers can be represented using pairs •Content Cluster 15: The 'for each' concept •Content Cluster 16: A fraction is a number that represents a relationship •Content Cluster 17: Fractions represent division •Content Cluster 19: Duration can be calculated using units of time •Content Cluster 23: Numbers and quantities can be compared using scale •Content Cluster 29: Locating and positioning is based on references

Stage 2 Overview of Content Clusters

Content Cluster 1: Flexible counting (any number can be a countable unit)

Content Cluster 2: Place value (numbers can be regrouped and renamed – partitioning)

Content Cluster 3: Representing numbers (numbers can be represented and ordered based on their place value)

Content Cluster 4: Number representations (numbers can be represented by words/language, images/drawings, numbers/symbols)

Content Cluster 5: Comparing quantities – linear focus (numbers can be compared based on size and place value)

Content Cluster 6: Comparing quantities – area/volume focus (numbers can be compared based on size and place value)

Content Cluster 7: Flexible strategies for operating with numbers (numbers can be partitioned to assist with computation)

Content Cluster 8: Partitioning: Part-whole number knowledge (numbers can be partitioned in multiple ways)

Content Cluster 9: Money uses a many-to-one scale

Content Cluster 10: The ‘equals sign’ means “the same as” (equality and inequality)

Content Cluster 11: Number relationships – converting (one thousand can be regrouped as 10 hundreds, 100 tens, or 1000 ones)

Content Cluster 12: Numbers can be represented using pairs to explore odd and even properties

Content Cluster 13: Patterns repeat or grow and future terms can be predicted (number structure)

Content Cluster 14: Multiples can be visually represented as an array (number structure)

Content Cluster 15: The ‘for each’ concept – for each of these (how many rows), there are some of those (how much in each row)

Content Cluster 16: A fraction is a number that represents a relationship between parts and the whole

Content Cluster 17: Fractions represent division (number relationships)

Content Cluster 18: Time can be measured in hours, minutes and seconds (links to fractional language)

Content Cluster 19: Duration can be calculated using units of time

Content Cluster 20: Time can be represented in multiple ways (e.g. calendars, timelines, timetables)

Content Cluster 21: Measurements are approximations and can be represented using formal units

Content Cluster 22: Benchmark numbers can be used to estimate quantities (how much/how many)

Stage 2 Overview of Content Clusters cont.

Content Cluster 23: Numbers and quantities can be compared using scale (links to proportionality)

Content Cluster 24: Objects can be measured and compared through different representations

Content Cluster 25: Shapes can be measured and compared through different representations

Content Cluster 26: Shape properties remain constant even when they are moved or reorientated (transforming shapes)

Content Cluster 27: Shapes and objects are classified based on properties (comparing features)

Content Cluster 28: Patterns can be created using shapes (copying, rotating, translating and reflecting)

Content Cluster 29: Locating and positioning is based on references (to points or one's self)

Content Cluster 30: Information can be collected, represented and analysed using numbers (collecting data)

Content Cluster 31: Information can be presented visually to convey meaning (data representations)

Content Cluster 32: Events can be predicted, measured, and discussed based on chance

Stage 2 Content Cluster outcome mapping

	1 Flexible counting	2 Place value	3 Representing numbers	4 Number representations	5 Comparing quantities – linear focus	6 Comparing quantities – area/volume	7 Flexible strategies for operating	8 Partitioning: Part-whole number know	9 Money uses a many-to-one scale	10 The equals sign means 'the same as'	11 Number relationships – converting	12 Numbers can be represented using pairs	13 Patterns repeat or grow	14 Multiples can be visually represented array	15 The 'for each' concept	16 A fraction is a number that rep a relationship	17 Fractions represent division	18 Time can be measured in hours, minutes	19 Duration can be calculated using units	20 Time can be represented in multiple ways	21 Measurements are approximations	22 Benchmark numbers can be used to est	23 Numbers a can be compared: scale	24 Objects can be measured and compared	25 Shapes can be measured and compared	26 Shape properties remain constant	27 A Shapes and objects are classified	28 Patterns can be created using shapes	29 Locating and positioning: references	30 Information can be collected, represent	31 Information can be presented visually	32 Events can be predicted... based on chance
Whole Number MA2-4NA	■	■	■	■				■	■		■		■			■				■												
Addition & Sub MA2-5NA	■	■		■			■		■	■									■					■							■		■
Multi & Div MA2-6NA	■			■			■	■	■	■		■	■	■	■		■		■						■							
Fractions & Dec MA2-7NA			■	■	■	■		■	■	■			■			■	■	■		■												
Pat & Algebra MA2-8NA	■									■		■	■	■	■														■			
Length MA2-9MG			■		■						■											■	■	■		■					■	
Area MA2-10MG						■					■			■								■	■			■						
Vol & Capacity MA2-11MG					■	■					■			■								■	■		■							
Mass MA2-12MG						■					■											■	■									
Time MA2-13MG					■													■	■	■				■								
3D Space MA2-14MG																									■		■					
2D Space MA2-15MG													■												■	■	■	■	■	■		
Angles MA2-16MG																■		■								■		■	■	■		■	
Position MA2-17MG																									■					■		
Data MA2-18SP																							■								■	■
Chance MA2-19SP																															■	■

Stage 2 Content Clusters

Content Cluster 1: Flexible counting (any number can be a countable unit)			
Whole Numbers 1 MA2-4NA Count forwards and backwards by tens and hundreds from any starting point	**Addition and Subtraction 1 MA2-5NA** Perform calculations with money, including calculating equivalent amounts using different denominations	**Multiplication and Division 1 MA2-6NA** Recall multiplication facts for twos, threes, fives and tens	**Patterns and Algebra 1 MA2-8NA** Identify, continue, create, describe and record increasing and decreasing number patterns

Content Cluster 2: Place value (numbers can be regrouped and renamed – partitioning)			
Whole Numbers 1 MA2-4NA State the place value of digits in numbers of up to four digits	**Whole Numbers 2 MA2-4NA** State the place value of digits in numbers of up to five digits Record numbers of up to five digits using expanded notation	**Addition and Subtraction 1 MA2-5NA** Use and record a range of mental strategies for addition and subtraction of two-, three- and four-digit numbers Use the formal written algorithm for addition and subtraction	**Addition and Subtraction 2 MA2-5NA** Use and record a range of mental strategies for addition and subtraction of two-, three-, four-and five-digit numbers

Content Cluster 3: Representing numbers (numbers can be represented and ordered based on their place value)			
Whole Numbers 1 MA2-4NA Read, write and order numbers of up to four digits **Whole Numbers 2 MA2-4NA** Read, write and order numbers of up to five digits	**Fractions and Decimals 1 MA2-7NA** Model and represent fractions with denominators 2, 3, 4, 5 and 8 Count by halves, quarters and thirds, including with mixed numerals Represent fractions on number lines, including number lines that extend beyond 1	**Fractions and Decimals 2 MA2-7NA** Model and find equivalence between fractions with denominators 2, 4 and 8; 3 and 6; and 5, 10 and 100 Apply the place value system to represent tenths and hundredths as decimals	**Length 1 MA2-9MG** Use metres, centimetres and millimetres to measure, compare, order and estimate lengths

Stage 2 Content Clusters

Content Cluster 4: Number representations (numbers can be represented by words/language, images/drawings, numbers/symbols)			
Whole Numbers 1 MA2-4NA Read, write and order numbers of up to four digits **Whole Numbers 2 MA2-4NA** Read, write and order numbers of up to five digits	**Addition and Subtraction 1 MA2-5NA** Model and apply the associative property for addition	**Multiplication and Division 1 MA2-6NA** Recognise and use the symbols × and ÷ Link multiplication and division using arrays Model and apply to commutative property for multiplication	**Fractions and Decimals 1 MA2-7NA** Model and represent fractions with denominators 2, 3, 4, 5 and 8 **Fractions and Decimals 2 MA2-7NA** Model, compare and represent decimals with one and two decimal places

Content Cluster 5: Comparing quantities – linear focus (numbers can be compared based on size and place value)				
Fractions and Decimals 2 MA2-7NA Make connections between fraction and decimal notation Model, compare and represent decimals with one and two decimal places Represent decimals on number lines	**Length 1 MA2-9MG** Use metres, centimetres and millimetres to measure, compare, order and estimate lengths	**Length 2 MA2-9MG** Select and use appropriate scaled instruments and units to measure and compare lengths Convert between metres, centimetres and millimetres Record lengths and distances using decimal notation to two decimal places Use a scaled instrument to measure and compare temperatures	**Time 2 MA2-13MG** Convert between seconds, minutes, hours and days	**Volume and Capacity 1 MA2-11MG** Use litres to measure, compare and estimate capacities and volumes **Volume and Capacity 2 MA2-11MG** Use litres and millilitres to measure, compare and estimate capacities and volumes

Stage 2 Content Clusters

Content Cluster 6: Comparing quantities – area/volume focus (numbers can be compared based on size and place value)			
Fractions and Decimals 2 MA2-7NA Make connections between fraction and decimal notation Model, compare and represent decimals with one and two decimal places	**Area 1 MA2-10MG** Use square centimetres and square metres to measure and estimate rectangular (and square) areas Area 2 MA2-10MG Measure and compare the areas of regular and irregular shapes using a square-centimetre grid Compare areas measured in square centimetres and square metres	**Volume and Capacity 1 MA2-11MG** Use cubic centimetres to measure and compare volumes Volume and Capacity 2 MA2-11MG Compare volumes of objects by submerging each in water	**Mass 1 MA2-12MG** Use kilograms to measure, compare, order and estimate masses **Mass 2 MA2-12MG** Use kilograms and grams to measure and compare masses using a scaled instrument

Content Cluster 7: Flexible strategies for operating with numbers (numbers can be partitioned to assist with computation)	
Addition and Subtraction 1 MA2-5NA Use and record a range of mental strategies for addition and subtraction of two-, three- and four-digit numbers Perform calculations with money, including calculating equivalent amounts using different denominations **Addition and Subtraction 2 MA2-5NA** Use and record a range of mental strategies for addition and subtraction of two-, three-, four-and five-digit numbers	**Multiplication and Division 1 MA2-6NA** Use mental strategies to multiply one-digit numbers by multiples of 10 Use and record a range of mental strategies for multiplication of two single-digit numbers **Multiplication and Division 2 MA2-6NA** Recall and use multiplication facts up to 10 × 10 with automaticity Relate multiplication facts to their inverse division facts Use and record a range of mental and informal written strategies for multiplication and division of two-digit numbers by a one-digit operator Use mental strategies and informal recording methods for division with remainders

Stage 2 Content Clusters

Content Cluster 8: Partitioning: Part-whole number knowledge (numbers can be partitioned in multiple ways)			
Fractions and Decimals 1 MA2-7NA Model and represent fractions with denominators 2, 3, 4, 5 and 8 Count by halves, quarters and thirds, including with mixed numerals	**Fractions and Decimals 2 MA2-7NA** Model and find equivalence between fractions with denominators 2, 4 and 8; 3 and 6; and 5, 10 and 100 Model, compare and represent decimals with one and two decimal places	**Multiplication and Division 2 MA2-6NA** Use mental strategies and informal recording methods for division with remainders	**Whole Numbers 2 MA2-4NA** Record numbers of up to five digits using expanded notation

Content Cluster 9: Money uses a many-to-one scale			
Addition and Subtraction 1 MA2-5NA Perform calculations with money, including calculating equivalent amounts using different denominations **Addition and Subtraction 2 MA2-5NA** Solve word problems, including those involving money	**Fractions and Decimals 2 MA2-7NA** Apply the place value system to represent tenths and hundredths as decimals	**Multiplication and Division 1 MA2-6NA** Use mental strategies to multiply one-digit numbers by multiples of 10	**Whole Numbers 1 MA2-4NA** Count forwards and backwards by tens and hundreds from any starting point

Content Cluster 10: The 'equals sign' means "the same as" (equality and inequality)			
Addition and Subtraction 1 MA2-5NA Model and apply the associative property for addition Use the equals sign to record equivalent number sentences **Addition and Subtraction 2 MA2-5NA** Use the inverse operation to check addition and subtraction calculations	**Multiplication and Division 1 MA2-6NA** Recognise and use the symbols × and ÷ Model and apply to commutative property for multiplication **Multiplication and Division 2 MA2-6NA** Relate multiplication facts to their inverse division facts Use the equals sign to record equivalent number relationships involving multiplication	**Patterns and Algebra 2 MA2-8NA** Find missing numbers in number sentences involving addition or subtraction on one or both sides of the equals sign **Patterns and Algebra 2 MA2-8NA** Find missing numbers in number sentences involving one operation of multiplication or division	**Fractions and Decimals 2 MA2-7NA** Model and find equivalence between fractions with denominators 2, 4 and 8; 3 and 6; and 5, 10 and 100

Stage 2 Content Clusters

Content Cluster 11: Number relationships – converting (one thousand can be regrouped as 10 hundreds, 100 tens, or 1000 ones)				
Whole Numbers 2 MA2-4NA Record numbers of up to five digits using expanded notation	**Length 1 MA2-9MG** Use metres, centimetres and millimetres to measure, compare, order and estimate lengths Record lengths using the abbreviations m, cm and mm **Length 2 MA2-9MG** Convert between metres, centimetres and millimetres	**Area 1 MA2-10MG** Use square centimetres and square metres to measure and estimate rectangular (and square) areas Record lengths using the abbreviations cm^2 and m^2	**Volume and Capacity 2 MA2-11MG** Use litres and millilitres to measure, compare and estimate capacities and volumes Record capacities and volumes using the abbreviations L and mL Convert between litres and millilitres	**Mass 2 MA2-12MG** Use kilograms and grams to measure and compare masses using a scaled instrument Record masses using the abbreviations kg and g

Content Cluster 12: Numbers can be represented using pairs to explore odd and even properties	
Patterns and Algebra 1 MA2-8NA Identify odd and even numbers of up to four digits **Patterns and Algebra 2 MA2-8NA** Investigate and use the properties of odd and even numbers Recognise, continue and describe number patterns resulting from performing multiplication	**Multiplication and Division 1 MA2-6NA** Link multiplication and division using arrays **Multiplication and Division 2 MA2-6NA** Recall and use multiplication facts up to 10 × 10 with automaticity Relate multiplication facts to their inverse division facts Determine multiples and factors of whole numbers

Stage 2 Content Clusters

Content Cluster 13: Patterns repeat or grow and future terms can be predicted (number structure)				
Patterns and Algebra 1 MA2-8NA Identify, continue, create, describe and record increasing and decreasing number patterns **Patterns and Algebra 2 MA2-8NA** Recognise, continue and describe number patterns resulting from performing multiplication	**Multiplication and Division 1 M2-6NA** Recall multiplication facts for twos, threes, fives and tens Link multiplication and division using arrays	**Fractions and Decimals 1 MA2-7NA** Count by halves, quarters and thirds, including with mixed numerals	**Whole Numbers 1 MA2-4NA** Count forwards and backwards by tens and hundreds from any starting point Read, write and order numbers of up to four digits **Whole Numbers 2 MA2-4NA** Read, write and order numbers of up to five digits	**Two-Dimensional Space 2 MA2-15MG** Use transformations to create and describe symmetrical designs Create and record tessellating designs

Content Cluster 14: Multiples can be visually represented as an array (number structure)				
Multiplication and Division 1 MA2-6NA Link multiplication and division using arrays Model and apply to commutative property for multiplication Use mental strategies to multiply one-digit numbers by multiples of 10	**Multiplication and Division 2 MA2-6NA** Relate multiplication facts to their inverse division facts Determine multiples and factors of whole numbers Use and record a range of mental and informal written strategies for multiplication and division of two-digit numbers by a one-digit operator Use mental strategies and informal recording methods for division with remainders	**Area 1 MA2-10MG** Use square centimetres and square metres to measure and estimate rectangular (and square) areas **Area 2 MA2-10MG** Measure and compare the areas of regular and irregular shapes using a square-centimetre grid	**Volume and Capacity 1 MA2-11MG** Use cubic centimetres to measure and compare volumes	**Patterns and Algebra 2 MA2-8NA** Recognise, continue and describe number patterns resulting from performing multiplication

Stage 2 Content Clusters

Content Cluster 15: The 'for each' concept – for each of these (how many rows), there are some of those (how much in each row)		
Multiplication and Division 1 MA2-6NA Link multiplication and division using arrays Model and apply to commutative property for multiplication	**Multiplication and Division 2 MA2-6NA** Determine multiples and factors of whole numbers	**Patterns and Algebra 2 MA2-8NA** Recognise, continue and describe number patterns resulting from performing multiplication

Content Cluster 16: A fraction is a number that represents a relationship between parts and the whole			
Fractions and Decimals 1 MA2-7NA Count by halves, quarters and thirds, including with mixed numerals Represent fractions on number lines, including number lines that extend beyond 1	**Fractions and Decimals 2 MA2-7NA** Apply the place value system to represent tenths and hundredths as decimals Make connections between fraction and decimal notation Represent decimals on number lines	**Angles 1 MA2-16MG** Identify and describe angles as measures of turn	**Whole Numbers 2 MA2-4NA** Record numbers of up to five digits using expanded notation

Content Cluster 17: Fractions represent division (number relationships)			
Fractions and Decimals 1 MA2-7NA Model and represent fractions with denominators 2, 3, 4, 5 and 8	**Fractions and Decimals 2 MA2-7NA** Model and find equivalence between fractions with denominators 2, 4 and 8; 3 and 6; and 5, 10 and 100	**Multiplication and Division 1 MA2-6NA** Recall multiplication facts for twos, threes, fives and tens Link multiplication and division using arrays	**Multiplication and Division 2 MA2-6NA** Relate multiplication facts to their inverse division facts Use mental strategies and informal recording methods for division with remainders

Stage 2 Content Clusters

Content Cluster 18: Time can be measured in hours, minutes and seconds (links to fractional language)			
Time 1MA2-13MG Recognise the coordinated movements of the hands on a clock Read and record time to the minute, using digital notation and the terms 'past' and 'to'	**Time 2 MA2-13MG** Convert between seconds, minutes, hours and days Use and interpret am and pm notation	**Fractions and Decimals 1 MA2-7NA** Model and represent fractions with denominators 2, 3, 4, 5 and 8 Count by halves, quarters and thirds, including with mixed numerals	**Angles 1 MA2-16MG** Identify and describe angles as measures of turn Compare angle sizes in everyday situations

Content Cluster 19: Duration can be calculated using units of time			
Time 1MA2-13MG Read and record time to the minute, using digital notation and the terms 'past' and 'to'	**Time 2 MA2-13MG** Convert between seconds, minutes, hours and days Use and interpret am and pm notation	**Addition and Subtraction 1 MA2-5NA** Use and record a range of mental strategies for addition and subtraction of two-, three- and four-digit numbers	**Multiplication and Division 2 MA2-6NA** Use and record a range of mental and informal written strategies for multiplication and division of two-digit numbers by a one-digit operator

Content Cluster 20: Time can be represented in multiple ways (e.g. calendars, timelines, timetables)			
Time 1MA2-13MG Recognise the coordinated movements of the hands on a clock Read and record time to the minute, using digital notation and the terms 'past' and 'to'	**Time 2 MA2-13MG** Convert between seconds, minutes, hours and days Use and interpret am and pm notation	**Fractions and Decimals 1 MA2-7NA** Model and represent fractions with denominators 2, 3, 4, 5 and 8 Count by halves, quarters and thirds, including with mixed numerals	**Whole Numbers 1 MA2-4NA** State the place value of digits in numbers of up to four digits Read, write and order numbers of up to four digits

Stage 2 Content Clusters

Content Cluster 21: Measurements are approximations and can be represented using formal units			
Length 1 MA2-9MG Record lengths using the abbreviations m, cm and mm **Length 2 MA2-9MG** Select and use appropriate scaled instruments and units to measure and compare lengths Record temperatures using the symbol for degrees (°)	**Area 1 MA2-10MG** Recognise the need for formal units to measure area Record lengths using the abbreviations cm^2 and m^2	**Volume and Capacity 1 MA2-11MG** Recognise the need for formal units to measure capacity and volume Record capacities and volumes using the abbreviations L and cm^3 **Volume and Capacity 2 MA2-11MG** Record capacities and volumes using the abbreviations L and mL	**Mass 1 MA2-12MG** Recognise the need for formal units to measure mass Record masses using the abbreviation kg

Content Cluster 22: Benchmark numbers can be used to estimate quantities (how much/how many)			
Length 1 MA2-9MG Use metres, centimetres and millimetres to measure, compare, order and estimate lengths **Length 2 MA2-9MG** Estimate and measure perimeters of two-dimensional shapes	**Area 1 MA2-10MG** Use square centimetres and square metres to measure and estimate rectangular (and square) areas	**Volume and Capacity 1 MA2-11MG** Use litres to measure, compare and estimate capacities and volumes **Volume and Capacity 2 MA2-11MG** Use litres and millilitres to measure, compare and estimate capacities and volumes	**Mass 1 MA2-12MG** Use kilograms to measure, compare, order and estimate masses

Stage 2 Content Clusters

Content Cluster 23: Numbers and quantities can be compared using scale (links to proportionality)				
Addition and Subtraction 1 MA2-5NA Use and record a range of mental strategies for addition and subtraction of two-, three- and four-digit numbers	**Length 1 MA2-9MG** Use metres, centimetres and millimetres to measure, compare, order and estimate lengths **Length 2 MA2-9MG** Convert between metres, centimetres and millimetres	**Position 1 MA2-17MG** Draw simple maps, with and without a grid **Position 2 MA2-17MG** Interpret legends and directions on maps Use the scale to calculate the distance between two points on maps	**Data 1 MA2-18SP** Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs (one-to-one correspondence) **Data 2 MA2-18SP** Construct data displays, including tables, and column graphs and picture graphs of many-to-one correspondence	**Time 2 MA2-13MG** Read and interpret simple timetables, timelines and calendars

Content Cluster 24: Objects can be measured and compared through different representations			
Three-dimensional Space 1 MA2-14MG Make models of three-dimensional objects Create nets from everyday packages	**Three-Dimensional Space 2 MA2-14MG** Represent three-dimensional objects in drawings showing depth Sketch three-dimensional objects from different views Interpret and make drawings of objects on isometric grid paper	**Volume and Capacity 1 MA2-11MG** Use cubic centimetres to measure and compare volumes	**Multiplication and Division 2 MA2-6NA** Use and record a range of mental and informal written strategies for multiplication and division of two-digit numbers by a one-digit operator

Stage 2 Content Clusters

Content Cluster 25: Shapes can be measured and compared through different representations				
Two-Dimensional Space 1 MA2-15MG Combine common shapes to form other shapes and record the arrangement Split common shapes into other shapes and record the result	**Position 1 MA2-17MG** Use grid-referenced maps to locate and describe positions and pathways Draw simple maps, with and without a grid	**Area 2 MA2-10MG** Measure and compare the areas of regular and irregular shapes using a square-centimetre grid Compare areas measured in square centimetres and square metres	**Length 2 MA2-9MG** Estimate and measure perimeters of two-dimensional shapes	**Angles 1 MA2-16MG** Compare angle sizes in everyday situations

Content Cluster 26: Shape properties remain constant even when they are moved or reorientated (transforming shapes)			
Three-Dimensional Space 1 MA2-14MG Identify, describe and7compare features of prisms, pyramids, cylinders, cones and spheres	**Three-Dimensional Space 2 MA2-14MG** Sketch three-dimensional objects from different views Interpret and make drawings of objects on isometric grid paper	**Two-Dimensional Space 1 MA2-15MG** Identify and name the special quadrilaterals presented in different orientations Identify and describe shapes as ‘regular’ or ‘irregular’ Describe and compare features of shapes, including the special quadrilaterals	**Two-Dimensional Space 2 MA2-15MG** Use transformations to create and describe symmetrical designs Create and record tessellating designs

Stage 2 Content Clusters

Content Cluster 27: Shapes and objects are classified based on properties (comparing features)		
Three-Dimensional Space 1 MA2-14MG Identify, describe and compare features of prisms, pyramids, cylinders, cones and spheres	**Two-Dimensional Space 1 MA2-15MG** Identify and name the special quadrilaterals presented in different orientations Identify and describe shapes as 'regular' or 'irregular' Describe and compare features of shapes, including the special quadrilaterals Identify and draw lines of symmetry on shapes	**Angles 1 MA2-16MG** Identify 'perpendicular' lines and 'right angles' **Angles 2 MA2-16MG** Draw and classify angles as acute, obtuse, straight, reflex or a revolution

Content Cluster 28: Patterns can be created using shapes (copying, rotating, translating and reflecting)			
Patterns and Algebra 1 MA2-8NA Identify, continue, create, describe and record increasing and decreasing number patterns **Patterns and Algebra 2 MA2-8NA** Recognise, continue and describe number patterns resulting from performing multiplication	**Two-Dimensional Space 1 MA2-15MG** Identify and draw lines of symmetry on shapes	**Two-Dimensional Space 2 MA2-15MG** Combine common shapes to form other shapes and record the arrangement Split common shapes into other shapes and record the result Use transformations to create and describe symmetrical designs Create and record tessellating designs	**Angles 1 MA2-16MG** Identify 'perpendicular' lines and 'right angles' **Angles 2 MA2-16MG** Draw and classify angles as acute, obtuse, straight, reflex or a revolution

Stage 2 Content Clusters

Content Cluster 29: Locating and positioning is based on references (to points or one's self)			
Position 1 MA2-17MG Use grid-referenced maps to locate and describe positions and pathways Draw simple maps, with and without a grid	**Position 2 MA2-17MG** Determine directions N, E, S, W and NE, SE, SW, NW, given one of the directions Interpret legends and directions on maps	**Two-Dimensional Space 1 MA2-15MG** Identify and name the special quadrilaterals presented in different orientations	**Three-Dimensional Space 2 MA2-14MG** Sketch three-dimensional objects from different views

Content Cluster 30: Information can be collected, represented and analysed using numbers (collecting data)			
Data 1 MA2-18SP Plan methods for data collection Interpret and compare data displays	**Data 2 MA2-18SP** Select, trial and refine methods for data collection, including survey questions and recording sheets Evaluate the effectiveness of different displays	**Chance 1 MA2-19SP** Identify and describe possible 'outcomes' of chance experiments Predict and record all possible combinations in a chance situation Conduct chance experiments and compare predicted with actual results	**Addition and Subtraction 2 MA2-5NA** Use and record a range of mental strategies for addition and subtraction of two-, three-, four-and five-digit numbers

Content Cluster 31: Information can be presented visually to convey meaning (data representations)				
Data 1 MA2-18SP Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs (one-to-one correspondence)	**Data 2 MA2-18SP** Construct data displays, including tables, and column graphs and picture graphs of many-to-one correspondence	**Chance 1 MA2-19SP** Conduct chance experiments and compare predicted with actual results	**Angles 1 MA2-16MG** Identify 'perpendicular' lines and 'right angles'	**Length 2 MA2-9MG** Select and use appropriate scaled instruments and units to measure and compare lengths

Stage 2 Content Clusters

Content Cluster 32: Events can be predicted, measured, and discussed based on chance			
Chance 1 MA2-19SP Conduct chance experiments and compare predicted with actual results	**Chance 2 MA2-19SP** Describe possible everyday events and order their chances of occurring Identify everyday events where one occurring cannot happen if the other happens Identify events where the chance of one occurring will not be affected by the occurrence of the other	**Data 2 MA2-18SP** Select, trial and refine methods for data collection, including survey questions and recording sheets	**Addition and Subtraction 1 MA2-5NA** Use and record a range of mental strategies for addition and subtraction of two-, three- and four-digit numbers