Eastbrook Primary School Mathematics Curriculum

Intent: A Character and Academics approach

At Eastbrook Primary School we aim to teach children how to make sense of the world around them by developing their ability to calculate, reason and solve problems. Our mathematics curriculum assumes that all pupils will use their mathematical knowledge throughout their lives, and in a wide range of contexts: in life-long learning, in training, or in employment; whilst managing a weekly or annual budget, when arranging loans, and in buying and selling. As a result, the curriculum has been designed to be fit for that purpose.

Our aims in the teaching of mathematics are:

- to promote enjoyment of learning through practical activity, exploration and discussion;
- to develop confidence and competence with numbers and the number system;
- to develop the ability to solve problems through decision-making and reasoning in a range of contexts;
- to develop a practical understanding of the ways in which information is gathered and presented; to explore features of shape and space, and developing measuring skills in a range of contexts;
- to help children understand the importance of mathematics in everyday life.
- to become fluent in the fundamentals of mathematics, including through varied and frequent mathematical problems.
- to reason mathematically by following a line of enquiry, conjecturing relationships and making generalisations, and by developing an argument, justification or proof using precise mathematical language.

End Point (Key Stage 4)

Mathematics at Eastbrook School develops knowledge and skills sequenced in a clearly delineated structure within the wider school 'Character and Academics' approach to curriculum. Throughout their developmental journey, children gain specific knowledge, practice skills with ever increasing complexity and demonstrate virtues that enable them to be ready for further study or work. Our curriculum supports this journey through its' spiral design, where clearly sequenced units of knowledge, skill and virtue are regularly revisited, building on previous learning; this is amongst a few initiatives in the wider 'retention strategy' for the subject. Describe-explain-convince-justify-prove', 'SSDD' and 'variation-theory' are amongst some new initiatives used in mathematics lessons to ensure differentiation, inclusion and challenge are always present. In this way, children develop fluency in mathematics and improve their reasoning skills as well as being able to solve problems.

Way Points

The waypoints for the end of the reception year are laid out in Development Matters. The waypoints for the end of KS1 and the end of KS2 are laid out in the national Curriculum programmes of study.

By the end of Early Years

By the end of the Early Years Foundation Stage children will have been taught the six key areas of early mathematics learning which collectively provide a platform for everything children will encounter as they progress through their maths learning at primary school, and beyond:

- Cardinality and Counting
- Comparison
- Composition
- Pattern
- Shape and Space
- Measures

By the end of Key Stage 1

Children can add and subtract with two-digit and one-digit numbers. They know the multiplication and division facts for the 2, 5 and 10 times-tables. When working with fractions they can find 1/3, 1/4 1/2 and 3/4 of a shape or a quantity of objects. They are familiar with measures, including weight, capacity and length, and can tell the time to five minutes. They know the properties of 2D and 3D shapes, as well as a range of data-handling methods such as bar charts and pictograms. They know the number bonds to 20 and are precise in using and understanding place value. Children will demonstrate a breadth of knowledge and will use their understanding of key maths concepts to solve a range of challenging maths problems.

By the end of Key Stage 2

Pupils demonstrate broad and deep conceptual knowledge by making links between concepts, discussing their work using precise mathematical vocabulary, and by solving challenging mathematical problems. They use their understanding of place value, including large numbers and decimals, to solve a range of number problems. They calculate mentally, using efficient strategies such as manipulating expressions using commutative and distributive properties to simplify the calculation. Pupils use formal methods to solve multistep problems.

They can recognise the relationship between fractions, decimals and percentages and can express them as equivalent quantities. Pupils perform a range of calculations using fractions, decimals or percentages. They substitute values into a simple formula to solve problems.

The pupil can calculate with measures. They use mathematical reasoning to find missing angles. Pupils can use simple algebra, can calculate missing angles in a range of shapes, and can interpret pie charts using percentages.

Sequencing

Mathematics is planned and sequenced so that new mathematical knowledge, skills and virtues build on what has been taught before and lead naturally towards our defined **waypoints** and **endpoints**. We recognise the importance of creating a joined-up, progressive mathematical curriculum which builds on what has gone before and prepares pupils for what comes next. As an all-through school, we are particularly well placed to ensure a well-sequenced learning journey – the Year Seven curriculum builds upon the primary curriculum. To this end we ensure that there is consistency in the language of learning and the language for learning.

Early Years Foundation Stage – Reception Year: Our Early Years Foundation Stage curriculum introduces children to a wide range of engaging and exciting concepts which enable them to develop their personalities, talents and abilities. It frames a range of structured and unstructured experiences planned with knowledge of the strengths and needs of each child. Curriculum adaptation during this stage is individualised and happens moment-to-moment. This curriculum ensures children build the character and academic, skills and knowledge essential for successful learning in Key Stages 1 and 2.

Mathematics has is one of seven specific areas of learning in the revised Early Years Foundation Stage statutory framework. We ensure that children hear maths talk and have lots of opportunities to explore in a mathematical way from the moment they enter our Reception class. Our mathematics practice is informed by 'Development Matters', the non-statutory guidance material that supports practitioners in implementing the statutory requirements of the EYFS (2012).

We plan for children to:

- play with and explore key mathematical concepts.
- actively learn to apply key mathematical concepts.
- create and think critically. We encourage children to have and to develop their own mathematical ideas, and to make links between mathematical ideas, and to develop their own mathematical strategies for doing things.

We plan for children to develop mathematical concepts through playing and exploring. We also ensure that as children learn, we provide experiences to help them develop their own ideas. Children earn mathematical concepts in the Foundation stage through games, routines, classroom and lunchtime talk, and chanting. Our Nursery children actively explore and experience shape, space and position as part of everyday play. We ensure that children hear rich mathematical talk as they play.

Key Stage 1 and Key Stage 2 – Year 1 to Year 6: Our KS1 and KS2 curriculum ensures children have the essential learning skills of literacy and numeracy; are creative, resourceful and able to identify and solve problems; have enquiring minds and think for themselves to process information, reason, question and evaluate; communicate well in a range of ways; understand how they learn and learn from their mistakes; are able to learn independently and with others; know about big ideas and events that shape our world; enjoy learning and are motivated to achieve the best they can, now and in the future. It is a curriculum that ensures pupils leave primary school having mastered demanding standards of reading writing and maths – meaning they are ready to deal with the challenges of secondary school and equipped to thrive.

We use the 'Inspire Maths' scheme, which has a proven track-record of success in Singapore and England. Inspire Maths develops firm mathematical foundations and builds on concepts and skills within a spiral curriculum. We plan for a systematic development of skills and concepts within each unit.

Appendix 1 is the Inspire Maths overview of units. Appendix 2 is the document: Progression of Maths Concepts from Year One to Year Six. This shows how key maths concepts are developed as pupil's progress through the school. Appendices 3, 4, 5 and 6 are the Inspire Maths Calculation Progression Charts. These documents show how the progression of calculation in addition and subtraction and multiplication and division, from Year One to Year Six.

Adaptation

Our curriculum reflects the school's local context by addressing typical gaps in pupils' knowledge and skills. The most significant factors impacting on pupils' knowledge and skills with regard to our local context are:

- The number of pupils in school with English as an Additional Language (EAL).
- The number of pupils in school with Speech, Language and Communication needs (SLC).
- The number of pupils in school with Social Emotional and Mental Health needs (SEMH).
- The high level of economic deprivation amongst pupils.
- The variation in cultural experience amongst pupils.
- Inconsistent teaching of maths in the past – leading to gaps in pupils' knowledge.

Adapting our curriculum to address these typical gaps involves considered selection of materials to interpret the National Curriculum - for example our adoption of the International Primary Curriculum in Key Stages 1 and 2 to highlight the natural international mindedness of our community and to value and promote it – and considered selection of experiences to supplement of the National Curriculum – for example our creation o f a list of 100 things to do before 18 ¾ and the weaving of these through our curriculum to address the lack of cultural capital afforded our economically deprived pupils.

When the Inspire Maths curriculum was introduced in September 2019 Years 2 to 6 revised the previous year's Inspire maths curriculum, for the first half term. This ensured that knowledge gaps were addressed. Teachers adapt the Inspire Maths curriculum to address whole-class gaps in knowledge.

Curriculum and pedagogic adaptation

Curriculum adaptation at pupil level is indistinguishable from pedagogic adaptation and is a matter of implementation rather than intent. It is an ongoing dynamic process that modifies and adapts the prescribed programmes of study to meet the learning requirements of each pupil. It enables the teachers to teach learners of all abilities and ensures that every pupil is challenged. Maths books are monitored regularly to ensure that the school's marking and feedback policy is being followed. Book monitoring ensures that marking is regular and has an impact on pupils' progress.

Weaving character virtues throughout mathematics teaching

The core **character virtues -** creativity, curiosity, perseverance, and teamwork – are weaved throughout the mathematics curriculum. Examples of this are shown in the table below.

Character virtue	**Example of its application**
Curiosity	How is the Base 10 number system linked to our fingers? How can a number represent an object? How is the Base 2 number system linked to electricity? How can our number system record an infinite number of numbers using just ten digits? How did people record numbers before the invention of the zero? Why is the zero so important in our Base 10 number system? What is the relationship between fractions, decimals and percentages? What is a concept? How can I show my understanding of a maths concept? What is infinity? Can a number be infinitely big? Can a number be infinitely small? What are negative numbers? How are negative numbers related t positive numbers? What mathematical patterns can I spot? What is the relationship between 2d and 3d shapes? How and why is data presented in different ways? What makes a calculation efficient? What makes a solution to a problem elegant? Why do we have standard metric units of length, mass and volume? How is time related to the movement of the Earth?
Teamwork	Pupils work in a tem to solve mathematical problems. They listen to each other explain methods. Pupils work in a team to analyse a question and suggest what mathematical concepts are involved. Pupils ask their peers questions.

Perseverance	Pupils stick with a problem. When they find a mathematical concept hard they say. “I don’t get it yet.” They appreciate the importance of perseverance in learning a concept.
Kindness	Pupils support their peers and help them by sharing their methods. They show kindness when a pupil finds a concept hard to understand. They ask questions to support their peers and see maths as a joint learning process of discovery.
Gratitude	Pupils show gratitude when their peers help them with a problem. They are grateful and polite when the teacher offers support.

Transferable knowledge

Mathematics knowledge is used across the curriculum. Some examples are summarised in the table below.

Maths knowledge	**Application of knowledge**
Number and place value	Science: measurement - converting units of measurement. Geography:
Data handling	Science: Recording data using tables, graphs and charts. Science: Analysing data. Geography: Recording data using tables, graphs and charts. Geography: Fieldwork experience. Geography: Climate analysis.
Reasoning	Science: Reasoning about scientific results and drawing. appropriate conclusions. Geography:
Geometry	Geography: Coordinates and grid reference.
Measuring	Science: Science experiments. Geography: Geography fieldwork.

Appendices

Appendix 1

INSPIREMATHS

Inspire Maths Overview of Units

Unit	Inspire Maths 1	Inspire Maths 2	Inspire Maths 3	Inspire Maths 4	Inspire Maths 5	Inspire Maths 6
1	Numbers to 10	Numbers to 1000	Numbers to 10 000	Whole Numbers (1)	Whole Numbers (1)	Algebra
2	Number Bonds	Addition and Subtraction within 1000	Addition of Numbers within 10 000	Whole Numbers (2)	Whole Numbers (2)	Angles in Shapes and Diagrams
3	Addition within 10	Using Models: Addition and Subtraction	Subtraction of numbers within 10 000	Whole Numbers (3)	Fractions (1)	Nets
4	Subtraction within 10	Multiplication and Division	Solving Word Problems 1: Addition and Subtraction	Tables and Line Graphs	Fractions (2)	Fractions
5	Shapes and Patterns	Multiplying by 2 and 3	Multiplying by 6, 7, 8 and 9	Fractions	Area of a Triangle	Ratio
6	Ordinal numbers	Multiplying by 4, 5 and 10	Multiplication	Angles	Ratio	Percentage
7	Numbers to 20	Using Models: Multiplication and Division	Division	Perpendicular and Parallel Lines	Decimals	Speed
8	Addition and Subtraction within 20	Length	Solving Word Problems 2: Multiplication and Division	Squares and Rectangles	Measurements	Circles
9	Length	Mass	Mental Calculations	Decimals (1)	Mean (average)	Pie Charts
10	Mass	Mental Calculations	Money	Decimals (2)	Percentage	Area and Perimeter
11	Picture Graphs	Money	Length, Mass and Volume	Time	Angles	Volume of Solids and Liquids
12	Numbers to 40	Fractions	Solving Word Problems: Length, Mass and Volume	Area and Perimeter	Properties of Triangles and 4-sided Shapes	
13	Mental Calculations	Time	Bar Graphs	Symmetry	Geometrical Construction	
14	Multiplication	Volume	Fractions	Tessellations	Volume of Cubes and Cuboids	
15	Division	Graphs	Time			
16	Time	Lines and Surfaces	Angles			
17	Numbers to 100	Shapes and Patterns	Perpendicular and Parallel Lines			
18	Money (1)		Area and Perimeter			
19	Money (2)					

Appendix 2

Progression of Maths Concepts from Year One to Year Six

Eastbrook Primary School

2019-2020

Contents

Unit title	Key concepts

NUMBERS

YEAR ONE

Numbers to 10	
Counting to 10	• Understand numbers from 0 to 10
Compare	• Two sets of objects can be compared using the method of one-to-one correspondence • The number of objects can be the same as, smaller than or greater than another set of objects
Order and pattern	• A sequence of objects and numbers can form a pattern
Numbers to 20	
Counting to 20	• Use one-to-one correspondence in counting
Place value	• Numbers to 20 can be represented as tens and ones in a place value chart
Compare	• Numbers to 20 can be compared using the terms 'greater than' and 'smaller than' as well as by arranging in ascending or descending order
Order and pattern	• Numbers can be arranged in order and made into a pattern
Numbers to 40	
Counting to 40	• Using one-to-one correspondence in counting • 1 ten equals ten ones
Place value	• Numbers to 40 can be represented as tens and ones in a place value chart
Comparing, order and pattern	• Numbers to 40 can be compared using the terms 'greater than' / 'smaller than' and 'greatest' / 'smallest' as well as arranged in ascending or descending order
Simple addition	• 'Add on' and 'part-whole' concepts are used in adding numbers
More addition	• 'Add on' and 'part-whole' concepts are used in adding numbers • Regrouping concept can be applied in addition
Simple subtraction	• The 'taking away' concept is used in subtraction
More subtraction	
Adding three numbers	• 'Add on' and 'making ten' concepts are used in adding three numbers • The regrouping concept is also applied
Solving word problems	• The 'part-whole', 'taking away', 'adding on' and 'comparing' concepts are used to solve word problems involving addition and subtraction
Numbers to 100	
Counting	• Using one-to-one correspondence in counting • 1 ten is the same as 10 ones • 10 tens is 100
Place value	• Numbers to 100 can be represented as tens and ones in a place value chart

Comparing, order and pattern	• Numbers to 100 can be compared using the terms 'greater than' and 'smaller than' • Numbers to 100 can be arranged in ascending or descending order
Simple addition	• The 'adding on' and 'part-whole' concepts are used in adding numbers
More addition	• The 'adding on' and 'part-whole' concepts are used in adding numbers • The regrouping concept is applied in addition
Simple subtraction	• The 'taking away' concept is used in subtraction
More subtraction	
Mental calculations	
Mental addition	• A 2-digit number can be conceptualised as tens and ones • Adding is conceptualised as adding or putting parts together

Ordinal numbers	
Knowing ordinal numbers	• Ordinal numbers are for describing the position of something
Naming left and right positions	• Positions from the left and right can be named using ordinal numbers

YEAR TWO

Numbers to 1000	
Counting	• Counting numbers up to 1000 by using concrete representations • Strategies for counting in ones, tens and hundreds
Place value	• Each digit of a number has its own value
Comparing numbers within 1000	• Identify the place and value of the digits of corresponding numbers and then compare
Order and pattern	• Numbers are said to form a pattern when they are arranged in a systematic order. To find the next number in a pattern, we add or subtract a certain fixed number
Mental Calculations	
Mental addition	• Using number bonds in mental addition

YEAR THREE

Numbers to 10 000	
Counting	• Counting numbers up to 10 000 by using concrete representations and strategies of ones, tens, hundreds and thousands
Place value	• The digits of a number have their own values in terms of ones, tens, hundreds and thousands
Comparing, order and pattern	• Numbers up to 10 000 can be compared and arranged in ascending or descending order
9 Mental Calculations	

Mental addition	• Applying number bonds to assist mental calculations
More mental addition	• Relating a number that is close to 100 to a number bond and applying the number bond to do mental addition

YEAR FOUR

Whole Numbers (1)	
Numbers to 100 000	• Place value of ten thousands, thousands, hundreds, tens and ones and counting numbers up to 100 000
Comparing numbers with 100 000	• Numbers up to 100 000 are compared and arranged in ascending or descending order
Whole Numbers (2)	
Rounding numbers to the nearest ten	• The number line is used as a visual aid to help pupils round numbers
Rounding numbers to the nearest hundred	
Estimation	• Estimation is based on rounding numbers and it provides a tool for checking answers
Factors	• Factors are whole numbers. When a given number is divided by its factor, it does not leave any remainder • The smallest factor of a number is 1 and the greatest factor is the number itself
Multiples	• Multiples of a 1-digit whole number are found by multiplying the whole number by any other whole number • The concept of factors and multiples are related: 2 is a factor of 8 and 8 is a multiple of 2
Decimals (2)	
Addition	Addition of decimals can be interpreted as: • combining two or more quantities into one • the enlargement of a quantity, i.e. increasing the amount in the quantity • comparison of a quantity with another, i.e. one quantity has a certain amount more than the other

YEAR FIVE

Whole Numbers (1)	
Numbers to 10 million	• The next place after the ten thousands place is the hundred thousands place • 10 ten thousands = 1 hundred thousand
Place and value	• The actual value of a digit in a number is equal to the digit multiplied by the place value. E.g. the value of the digit 5 in the number 4 657 809 is 5 ten thousands, i.e. 5 × 10 000 = 50 000 • The value of a number is the sum of the values of each digit in the number
Comparing numbers within 10 million	• In a number, e.g. 1999, the value of the first digit (1000) is always greater than the sum of the values of the remaining digits (999)
Rounding to the nearest thousand and estimating	• There are 10 hundreds between two consecutive thousands

Whole Numbers (2)	
Using a calculator	• Understanding the concepts of place value and the four operations
Multiplying by tens, hundreds or thousands	In the base ten number system: • Ones × 10 = tens, Tens × 10 = hundreds, Hundreds × 10 = thousands • Ones × 100 = hundreds, Tens × 100 = thousands, Hundreds × 100 = ten thousands • Ones × 1000 = thousands, Tens × 1000 = ten thousands, Hundreds × 1000 = hundred thousands
Dividing by tens, hundreds or thousands	In the base ten number system: • Thousands ÷ 10 = hundreds, Hundreds ÷ 10 = tens, Tens ÷ 10 = ones, Ones ÷ 10 = tenths • Ten thousands ÷ 100 = hundreds, Thousands ÷ 100 = tens, Hundreds ÷ 100 = ones, Tens ÷ 100 = tenths, Ones ÷ 100 = hundredths • Hundred thousands ÷ 1000 = hundreds, Ten thousands ÷ 1000 = tens, Thousands ÷ 1000 = ones, Hundreds ÷ 1000 = tenths Tens ÷ 1000 = hundredths, Ones ÷ 1000 = thousandths
Order of operations	• In number sentences with only addition and subtraction or only multiplication and division, the order of operations is from left to right • In number sentences with multiplication and/or division together with addition and/or subtraction, the order of operations is from left to right with multiplication and/or division carried out first • In number sentences with brackets, the order of operations is from left to right with the operations in the brackets carried out first
Word problems (1)	• Application of concepts and skills of the four operations to solving word problems
Word problems (2)	• Application of concepts and skills of the four operations and various strategies to solving word problems

Fractions (1)	
Adding unlike fractions	• Fractions are equivalent when they show the same parts of the whole • Fractions can be added when they are expressed as like fractions
Adding mixed numbers	• A mixed number comprises a whole number and a proper fraction • Mixed numbers can be added like adding proper and improper fractions

YEAR SIX

Algebra	
Using letters as numbers	• Letters in algebraic expressions represent numbers • A letter can represent a specific unknown number or any number in general
Simplifying algebraic expressions	• The sum $a + a + a + \ldots + a$ (n terms) = $n \times a = na$ • The sum $ma + na = (m + n) \times a = (m + n)a$ • The difference $ma - na = (m - n) \times a = (m - n)a$
Word problems	• The process of problem solving in mathematics involves the application of concepts and strategies

Unit title	Key concepts

DECIMALS

YEAR FOUR

Decimals (1)	
Understanding tenths	• The first decimal place represents tenths • 10 tenths = 1 one
Understanding hundredths	• The second decimal place represents hundredths • 10 hundredths = 1 tenth
Understanding thousandths	• The third decimal place represents thousandths • 10 thousandths = 1 hundredth
Comparing decimals	• Decimals form part of the base-ten system of numeration
Rounding decimals	• Between two consecutive whole numbers, there are 10 tenths • Between two consecutive tenths, there are 10 hundredths • Between two consecutive hundredths, there are 10 thousandths
Fractions and decimals	• Decimals up to 3 places are fractions with denominators 10, 100, 1000

Decimals (2)	
Addition	Addition of decimals can be interpreted as: • combining two or more quantities into one • the enlargement of a quantity, i.e. increasing the amount in the quantity • comparison of a quantity with another, i.e. one quantity has a certain amount more than the other
Subtraction	Subtraction of decimals can be interpreted as: • taking away part of a quantity • finding the missing part of a quantity given the whole and the other part • comparison, i.e. the difference between two quantities • complementary addition, i.e. how much must be added to a quantity to give another
Word problems	• Application of the concepts of addition and subtraction of decimals to solving word problems
Multiplication	Multiplication of a decimal by a whole number can be interpreted as: • repeated addition of the decimal • comparison of one quantity with another, i.e. one quantity is *n* times as much as the other
Division	Division of a decimal by a whole number can be interpreted as: • sharing equally, i.e. dividing the decimal into a number of equal groups. The number of groups is determined by the divisor • grouping equally, i.e. dividing the set into groups of equal size. The size of each group is determined by the divisor
Estimation of decimals	• Application of rounding concepts and mental calculation strategies
Word problems	• Application of the concepts of multiplication and division of a decimal by a whole number to solving word problems

YEAR FIVE

Decimals	
Converting decimals to fractions	• Decimals are an extension of fractions • Decimals can be converted to fractions, and vice versa
Multiplying by tens, hundreds and thousands	• When a number is multiplied by 10, 100 or 1000, each digit in the number moves 1, 2 or 3 places respectively to the left in the place value chart • When a number is multiplied by 10, 100 or 1000, the decimal place shifts 1, 2 or 3 places respectively to the right
Dividing by tens, hundreds and thousands	• When a number is divided by 10, 100 or 1000, each digit in the number moves 1, 2 or 3 places respectively to the right in the place value chart • When a number is divided by 10, 100 or 1000, the decimal place shifts 1, 2 or 3 places respectively to the left • Dividing by 10 is the same as multiplying by $^{1}/_{10}$
Using a calculator	• Understanding the concepts of place value and the four arithmetical operations
Word problems	• Application of concepts and skills of the four operations to solving word problems

Unit title	Key concepts

ADDITION

YEAR ONE

Addition within 10	
Ways to add	• Adding is associated with the 'part-whole' and 'adding-on' concepts
Making up addition stories	
Solving word problems	• Applying the 'part-whole' and 'adding on' concepts in addition
Addition within 20	
Ways to add	• Two 1-digit numbers can be added by using the 'make 10' strategy and the 'regrouping into tens and ones' strategy • 2-digit numbers can be regrouped into tens and ones
Solving word problems	• Applying the 'part-whole', 'adding on' concept in addition
Adding Money (2)	
Adding in pence	• Addition concept in numbers is used in addition of money
Adding in pounds	
Solving word problems	• The 'part-whole', 'adding on', and 'comparing' concepts in addition and subtraction are used in solving word problems

YEAR TWO

2 Addition within 1000	
Simple addition within 1000	• The 'adding on' concept is related to calculation in addition • The digit at each place has its own value
Addition with regrouping the ones	• The regrouping concept in addition
Addition with regrouping the tens	
Addition with regrouping the tens and ones	
3 Using Models: Addition	
Simple word problems (1)	• Using models to find the whole from two or more parts • Using models to find a part of a whole
Simple word problems (3)	• The 'comparing' concept can be represented by models

YEAR THREE

2 Addition of Numbers within 10 000	
The meaning of sum	• The meaning of 'sum' is to add

Simple addition within 10 000	• Addition within 10 000 without regrouping
Addition with regrouping in hundreds	• Addition with regrouping in hundreds
Addition with regrouping in ones, tens and hundreds	• Addition with regrouping in ones, tens and hundreds

YEAR FOUR

Decimals (2)	
Addition	Addition of decimals can be interpreted as: • combining two or more quantities into one • the enlargement of a quantity, i.e. increasing the amount in the quantity • comparison of a quantity with another, i.e. one quantity has a certain amount more than the other

YEAR FIVE

Fractions (1)	
Adding unlike fractions	• Fractions are equivalent when they show the same parts of the whole • Fractions can be added when they are expressed as like fractions
Adding mixed numbers	• A mixed number comprises a whole number and a proper fraction • Mixed numbers can be added like adding proper and improper fractions

YEAR SIX

4 Fractions	
Adding fractions	•Addition of fractions or mixed numbers can be interpreted in the same way as addition of whole numbers

Unit title	Key concepts

SUBTRACTION

YEAR ONE

4 Subtraction within 10	
Ways to subtract	• Subtracting is associated with the 'part-whole' and 'taking away' concepts
Making up subtraction stories	
Solving word problems	• Applying the 'part-whole' and 'taking away' concepts in subtraction
Making a family of number sentences	• A family of number sentences can be written from a set of three related numbers
Subtraction within 20	
Ways to subtract	• 2-digit numbers can be regrouped into tens and ones
Solving word problems	• Applying the 'part-whole', 'taking away' concepts in subtraction
Mental calculations	
Mental subtraction	• A 2-digit number can be conceptualised as tens and ones • Subtracting is conceptualised as taking away from a whole
19 Money (2)	
Subtracting in pence	• Subtraction concept in numbers IS used in subtraction of money
Subtracting in pounds	
Solving word problems	• The 'part-whole', 'taking away' and 'comparing' concepts in subtraction are used in solving word problems

YEAR TWO

Subtraction within 1000	
Simple subtraction within 1000	• The 'taking away' concept is related to calculation in subtraction • The digit at each place has its own value
Subtraction with regrouping the tens and ones	• The regrouping concept in subtraction
Subtraction with regrouping the hundreds and tens	• Regrouping in hundreds and tens in subtraction
Subtraction with regrouping the hundreds, tens and ones	• Regrouping in hundreds, tens and ones in subtraction
Subtraction with numbers that have zeros	• Regrouping involving zeros in hundreds to tens and tens to ones
Using Models: Subtraction	

Simple word problems (1)	• Using models to find the whole from two or more parts • Using models to find a part of a whole
Simple word problems (2)	• Using models to make a whole by joining one or more parts to another • Using models to show when one or more sets are taken away
Simple word problems (3)	• The 'comparing' concept can be represented by models

YEAR THREE

Subtraction of Numbers within 10 000	
The meaning of difference	• The regrouping concept in subtraction
Simple subtraction within 10 000	• Subtraction without regrouping
Subtraction with regrouping in hundreds and thousands	• Regrouping from thousands to hundreds
Subtraction with regrouping in ones, tens, hundreds and thousands	• Subtraction with regrouping in ones, tens, hundreds and thousands
Subtraction with numbers that have zeros	• Regrouping from thousands to hundreds, tens and ones in subtraction
Solving Word Problems Subtraction	
Word problems	• Translating subtraction concepts into models for solving two-step word problems
Mental Calculations	
Mental subtraction	• Applying number bonds in subtraction
Money	
Subtraction	• Subtracting money is similar to subtracting whole numbers
Word problems	• Concepts in subtracting whole numbers are applied in problems involving money
Solving Word Problems: Length, Mass and Volume	
One-step word problems	• Concepts subtraction in whole numbers are applied to solve word problems on length, mass and volume
Two-step word problems	• Concepts in the four operations are applied to solve two-step word problems
Fractions	
Subtracting fractions	• Two fractions are related when the denominator of one fraction is a multiple of the denominator of the other fraction • When subtracting related fractions, the related fractions are changed to like fractions first
15 Time	
Subtraction	• Hours and minutes can be subtracted like whole numbers • Regrouping concepts (60 mins = 1 h) are applied to whole numbers

YEAR FOUR

10 Decimals (2)	
Subtraction	Subtraction of decimals can be interpreted as: • taking away part of a quantity • finding the missing part of a quantity given the whole and the other part • comparison, i.e. the difference between two quantities • complementary addition, i.e. how much must be added to a quantity to give another
Word problems	• Application of the concepts of addition and subtraction of decimals to solving word problems

YEAR FIVE

Order of operations	• In number sentences with only addition and subtraction or only multiplication and division, the order of operations is from left to right • In number sentences with multiplication and/or division together with addition and/or subtraction, the order of operations is from left to right with multiplication and/or division carried out first • In number sentences with brackets, the order of operations is from left to right with the operations in the brackets carried out first
Word problems	• Application of concepts and skills of the four operations to solving word problems
Word problems	• Application of concepts and skills of the four operations and various strategies to solving word problems
Fractions (1)	
Subtracting unlike fractions	• Two fractions can be subtracted if they come from the same whole or from identical wholes
Subtracting mixed numbers	• A mixed number comprises a whole number and a proper fraction • Mixed numbers can be subtracted like subtracting proper and improper fractions
7Decimals	
Using a calculator	• Understanding the concepts of place value and the four arithmetical operations
Word problems	• Application of concepts and skills of the four operations to solving word problems

YEAR SIX

Fractions	
Four operations with fractions	• A fraction is a part of a whole or set, a ratio or a quotient • Addition and subtraction of fractions or mixed numbers can be interpreted in the same way as addition and subtraction of whole numbers • Multiplication of fractions, for example, $^{2}/_{3} \times {}^{3}/_{4}$ is interpreted as $^{2}/_{3}$ of $^{3}/_{4}$ or $^{3}/_{4}$ of $^{2}/_{3}$ • Division of a fraction by a whole number is interpreted as partition (sharing)

Unit title	Key concepts

MULTIPLICATION

YEAR ONE

Multiplication	
Adding the same number	• Multiplication is conceptualised as repeated addition
Making multiplication stories	• Tell stories based on the multiplication concept and repeated addition
Solving word problems	• Applying the multiplication concept to solve word problems

YEAR TWO

Multiplication	
How to multiply	• Multiplication is conceptualised as multiplying a fixed number of objects by a certain number of times. The fixed number of objects refers to the number of objects in a group. The number of groups refers to the number of times it is multiplied
Multiplying by 2 and 3	
Multiplying by 2: skip-counting	• Multiplication is interpreted as repeated addition and as groups of items
Multiplying by 2: using dot paper	• The 'relating facts' concept can be used to find a more difficult multiplication fact using dot paper
Multiplying by 3: skip-counting	• Multiplication is interpreted as repeated addition and as groups of items
Multiplying by 3: using dot paper	• The 'relating facts' concept can be used to find a more difficult multiplication fact using dot paper
Multiplying by 4, 5 and 10	
Multiplying by 4: skip-counting	• Multiplication is conceptualised as repeated addition, groups of items, or multiplying
Multiplying by 4: using dot paper	• The 'group and number of items in each group' concept is applied
Multiplying by 5: skip-counting	• Multiplication is conceptualised as groups of items and as sequential numbers in the 'skip-counting' strategy
Multiplying by 5: using dot paper	• The 'group and number of items in each group' concept is applied
Multiplying by 10: skip-counting and using dot paper	• Multiplication is interpreted as groups of items and as sequential numbers in the 'skip-counting' strategy

Using Models: Multiplication	
Multiplication	• Multiplication is conceptualised as the total number of items, given groups of items

Mass	
Multiplication of mass	• Pupils can use concepts in multiplication and division to solve multiplication and division problems
Length	
Multiplication of length	• The 'multiplication' and 'division' concepts in numbers are applied in this section

YEAR THREE

5 Multiplying by 6, 7, 8 and 9	
Multiplying by 6: skip-counting	• The 'group and item' concept is used for the multiplication facts of 6 • Repeated addition is used for multiplication
Multiplying by 7: skip-counting	• The 'group and item' concept is used for the multiplication facts of 7 • Repeated addition is used for multiplication
Multiplying by 8: skip-counting	• The 'group and item' concept is used for the multiplication facts of 8 • Repeated addition is used for multiplication
Multiplying by 9	• The 'group and item' concept is used for the multiplication facts of 9 • Repeated addition is used for multiplication
Short cut method for multiplying by 6, 7, 8 and 9	• The relating facts concept is used to find a more difficult multiplication fact
6 Multiplication	
Multiplication without regrouping	• A number up to 1000 can be conceptualised as the sum of its values in the ones, tens and hundreds places • Multiplication of a 2-digit number or a 3-digit number by a 1-digit number is the sum of multiplying values from different places
Multiplication with regrouping in ones, tens and hundreds	
Multiplication with regrouping in ones, tens, hundreds and thousands	• A number up to 1000 can be conceptualised as the sum of its values in the ones, tens and hundreds places • Multiplication of a 2-digit number or a 3-digit number by a 1-digit number is the sum of multiplying values from different places • Regrouping in ones, tens, hundreds and thousands is used in multiplication

Solving Word Problems 2: Multiplication	
Multiplication: one-step word problems	• The multiple concept in multiplication is used to compare two sets of items • Bar diagrams can be based on problem situations in multiplication
Multiplication: two-step word problems	• Multiplication concepts including 'multiple' and 'group and item' are used for solving two-step word problems • Addition concepts such as 'adding on' and 'part-whole' are used for solving two-step word problems • Subtraction concepts such as 'taking away' and 'part-whole' are used for solving two-step word problems

Mental Calculations	
Mental multiplication	• Reversing the order of groups and items in a multiplication concept produces the same product
Solving Word Problems: Length, Mass and Volume	
One-step word problems	• Concepts of addition, subtraction, multiplication and division in whole numbers are applied to solve word problems on length, mass and volume
Two-step word problems	• Concepts in the four operations are applied to solve two-step word problems

YEAR FOUR

Whole Numbers	
Multiplication by a 1-digit number	• Using a formal algorithm to multiply numbers up to 4 digits by a 1-digit whole number • Using regrouping in multiplication
Multiplication by a 2-digit number	• Using a formal algorithm to multiply numbers up to 3 digits by a 2-digit whole number • Using regrouping in multiplication
Word problems	• Applying concepts in the 4 operations to solve word problems up to 3 steps involving whole numbers and the 4 operations (some word problems are solved with the help of models)
Decimals (2)	
Multiplication	Multiplication of a decimal by a whole number can be interpreted as: • repeated addition of the decimal • comparison of one quantity with another, i.e. one quantity is *n* times as much as the other
Word problems	• Application of the concepts of multiplication and division of a decimal by a whole number to solving word problems

YEAR FIVE

Fractions (2)	
Product of proper fractions	• Multiplying two fractions is the same as finding the fractional part of another fraction
Word problems (1)	• The product of two proper fractions is the fractional part of another fraction
Product of an improper fraction and a proper or improper fraction	• Multiplying a fraction and another fraction is the same as finding the fractional part of another fraction
Product of a mixed number and a whole number	• The product of a whole and a mixed number refers to the group and item multiplication concept
Word problems (2)	• Use the group and item multiplication concept to find the product of a whole number and a mixed number
Area of a triangle	
Finding the area of a triangle	• The area of a triangle is half that of its related rectangle • Area of a triangle = $^1/_2$ x Base x Height
Decimals	

Multiplying by tens, hundreds and thousands	• When a number is multiplied by 10, 100 or 1000, each digit in the number moves 1, 2 or 3 places respectively to the left in the place value chart • When a number is multiplied by 10, 100 or 1000, the decimal place shifts 1, 2 or 3 places respectively to the right
Word problems	• Application of concepts and skills of the four operations to solving word problems

Volume of Cubes and Cuboids	
Understanding and measuring volume	• Volume is the amount of space an object occupies • Volume is measured in cubic units • Volume can be measured in different units, including cm^3 and m^3
Volume of a cuboid and of liquid	• Volume of a cube = Edge x Edge x Edge • Volume of a cuboid = Length x Width x Height • Volume of liquid in a container that is completely filled is equal to the capacity of the container

YEAR SIX

Fractions	
Four operations with fractions	• A fraction is a part of a whole or set, a ratio or a quotient • Addition and subtraction of fractions or mixed numbers can be interpreted in the same way as addition and subtraction of whole numbers • Multiplication of fractions, for example, $^2/_3 \times {}^3/_4$ is interpreted as $^2/_3$ of $^3/_4$ or $^3/_4$ of $^2/_3$ • Division of a fraction by a whole number is interpreted as partition (sharing)
Ratio	
Word problems (1)	• Fractions and ratios can be used to show the relative amounts of two quantities • The multiple concept in multiplication is another comparative tool to show the relative amount of two quantities

Circles	
Area of a circle	• The area of a circle is equal to $\pi \times$ Radius × Radius
11 Volume of Solids and Liquids	
Volume of solids	• The volume of a cuboid is the product of its length, width and height • The square root of a number *n* is the number *m* so that *m* x *m* = *n* • The cube root of a number *n* is the number *m* so that *m* x *m* x *m* = *n*

Unit title	Key concepts

DIVISION

YEAR ONE

Division	
Sharing equally	• Division is conceptualised as dividing a set of objects equally
Finding the numbers of groups	• Division is conceptualised as sharing a set of items equally into groups

YEAR TWO

Division	
How to divide	• Division is conceptualised as sharing or dividing a set of items into equal groups so that each group has the same number of items

Division	• Division is the inverse of multiplication
Division	• Division is conceptualised as the inverse of multiplication and as the equal sharing of items

8 Length	
Multiplication and division of length	• The 'multiplication' and 'division' concepts in numbers are applied in this section
Mass	
Multiplication and division of mass	• Pupils can use concepts in multiplication and division to solve multiplication and division problems
11 Money	
Word problems	• Solving one-step or two-step word problems involving money using addition and subtraction • Solving one-step or two-step word problems involving money using multiplication and division

YEAR THREE

Division	
Quotient and remainder	• Division of a 2-digit number by a 1-digit number with remainder
Odd and even numbers	• Recognising patterns to identify odd and even numbers
Division without remainder and regrouping	• Expressing a number as a sum of values of different places • Dividing equally with no remainder
Division with regrouping in tens and ones	• Expressing a number as a sum of values of different places • Dividing equally with or without remainder • Regrouping from values of a higher place (tens) to a lower place (ones) in division
Division with regrouping in	• Expressing a number as a sum of values of different places

hundreds, tens and ones	• Dividing equally with or without remainder • Regrouping from values of a higher place (e.g., hundreds) to a lower place (e.g., tens) in division

Solving Word Problems 2: Multiplication and Division	
Division: one-step word problems	• The division concepts: finding the number of groups and the number of items in each group are applied • Division is the inverse of multiplication
Division: two-step word problems	• Division concepts using 'group and item' are used for solving two-step word problems • Addition concepts such as 'adding on' and 'part-whole' are used for solving two-step word problems • Subtraction concepts such as 'taking away' and 'part-whole' are used for solving two-step word problems

Mental Calculations	
Mental division	• Division is the inverse of multiplication

12 Solving Word Problems: Length, Mass and Volume	
One-step word problems	• Concepts of addition, subtraction, multiplication and division in whole numbers are applied to solve word problems on length, mass and volume
Two-step word problems	• Concepts in the four operations are applied to solve two-step word problems

YEAR FIVE

4 Fractions (2)	
Dividing a fraction by a whole number	• Division in fractions is dividing each fractional part into smaller equal parts/units
Word problems (3)	• The concepts of the four operations and division of a fraction are applied

Decimals	
Dividing by tens, hundreds and thousands	• When a number is divided by 10, 100 or 1000, each digit in the number moves 1, 2 or 3 places respectively to the right in the place value chart • When a number is divided by 10, 100 or 1000, the decimal place shifts 1, 2 or 3 places respectively to the left • Dividing by 10 is the same as multiplying by $^{1}/_{10}$
Word problems	• Application of concepts and skills of the four operations to solving word problems

YEAR SIX

Fractions	
Four operations with fractions	• A fraction is a part of a whole or set, a ratio or a quotient • Addition and subtraction of fractions or mixed numbers can be interpreted in the same way as addition and subtraction of whole numbers • Multiplication of fractions, for example, $^{2}/_{3} \times {}^{3}/_{4}$ is interpreted as $^{2}/_{3}$ of $^{3}/_{4}$ or $^{3}/_{4}$ of $^{2}/_{3}$ • Division of a fraction by a whole number is interpreted as partition (sharing)

Dividing by a proper fraction	• Division by a proper fraction is interpreted as measurement division; e.g., $3 \div {}^{2}/_{3}$ or ${}^{3}/_{4} \div {}^{2}/_{3}$ is interpreted as the number of two-thirds in 3 or ${}^{3}/_{4}$

Unit title	Key concepts

SHAPES PATTERNS AND GEOMETRY

YEAR ONE

Shapes and Patterns	
Getting to know shapes	• A circle has no corners and no sides • A square has 4 equal sides and 4 corners • A triangle has 3 sides and 3 corners • A rectangle has 4 sides (opposite sides are equal) and 4 corners
Making pictures from shapes	• Shapes such as circles, triangles, squares and rectangles can be used to make pictures
Seeing shapes in things around us	• When an object is viewed from different angles/sides, we can see different shapes. For example, the top view of a tin of soup is a circle
Getting to know patterns	• Patterns are formed by repeating a particular arrangement of shape, size and/or colour placed next to each other
Making more patterns	• Patterns can be formed by repeating a particular arrangement of objects placed next to each other

YEAR TWO

17 Shapes and Patterns	
2D shapes	• Identifying semicircles and quarter circles
3D shapes	• Shapes can be visualised as 3D shapes
Making patterns	• Patterns are made by repeating sequences

Unit title	Key concepts

TABLES AND GRAPHS

YEAR ONE

Picture graphs	
Simple picture graphs	• Data can be collected and organised into a horizontal or vertical picture graph for interpretation
More picture graphs	• Data can be collected and organised into a horizontal or vertical picture graph using symbols

YEAR TWO

Graphs	
Reading picture graphs	• Picture graphs represented by symbols can be compared and interpreted
Making picture graphs	• Picture graphs can be made using different symbols and scales
More graphs	• Interpreting picture graphs to solve problems

YEAR THREE

Bar Graphs	
Making bar graphs with scales	• A bar graph represents synthesised data for presentation
Reading and interpreting bar graphs	• Whole number concepts are applied to bar graphs in reading and interpretation of concepts

YEAR FOUR

Tables and Line Graphs	
Presenting and interpreting data in a table	• Data involving two variables is presented in a table
More tables	• A variable may be sub-classified into two or more sub-variables (E.g. 'Number of children' can be further classified into 'Number of boys' and 'Number of girls')

YEAR SIX

Pie Charts	
Understanding pie charts	• The circle in a pie chart represents one whole or 100%

Unit title	Key concepts

FRACTIONS

YEAR TWO

12 Fractions	
Understanding fractions	• Fractions make up equal parts of a whole. Conversely, unequal parts are not fractions of a whole • The symbol $\frac{1}{2}$ represents 1 out of 2 parts • $\frac{2}{2}$ is a whole
More fractions	• Using modelling as a concept to represent fraction contexts
Comparing and ordering fractions	• Quantifying and comparing fractions
Adding and subtracting like fractions	• Quantifying, adding and subtracting fractions
Solving word problems	• Applying the 'adding on', 'taking away', 'part-whole' and comparing concepts in solving word problems involving fractions

YEAR THREE

Fractions	
Numerator and denominator	• A whole is divided into parts and the fraction symbol is used to determine the parts of the whole • The terms 'numerator' and 'denominator' give precise definition of parts of a whole
Understanding equivalent fractions	• A length model with bars showing parts of whole is used to represent fractions • Two equal parts of different divisions taken from the same whole number, with the same size, are equivalent
More equivalent fractions: short cut	• The multiplying factor technique is applied to find equivalent fractions • The dividing factor technique is applied to find equivalent fractions
Comparing fractions	• Two fractions are equal when they are expressed as equivalent fractions • Two fractions can be compared by referring to the values of the numerators when the denominators of the two fractions are the same • Two fractions can be compared by referring to the values of the denominator when the numerators of the two fractions are the same
Adding fractions	• Two fractions are related when the denominator of one fraction is a multiple of the denominator of the other fraction • When adding related fractions, the related fractions are changed to like fractions first
Subtracting fractions	• Two fractions are related when the denominator of one fraction is a multiple of the denominator of the other fraction • When subtracting related fractions, the related fractions are changed to like fractions first

YEAR FOUR

Fractions	
Mixed numbers	• A mixed number is made up of a whole number and a proper fraction • A proper fraction is a part of a whole • A proper fraction is a number between 0 and 1
Improper fractions	• In an improper fraction, the numerator is equal to or greater than the denominator • An improper fraction is a number equal to or greater than 1 • Improper fractions are extensions of proper fractions
Conversion of fractions	• A mixed number and an improper fraction can represent the same number
Adding and subtracting fractions	• Two fractions are related when the denominator of one fraction is a multiple of the denominator of the other fraction • Two or more related fractions can be converted to equivalent fractions with denominators equal to that of the fraction with the greatest denominator
Fractions of a set	• A fraction is part of a set
Word problems	• Application of the concepts of a fraction as part of a whole and part of a set

YEAR FIVE

Fractions (1)	
Like and unlike fractions	• A fraction refers to a part of a whole • Like fractions are fractions with the same denominator • Unlike fractions are fractions with different denominators
Adding unlike fractions	• Fractions are equivalent when they show the same parts of the whole • Fractions can be added when they are expressed as like fractions
Subtracting unlike fractions	• Two fractions can be subtracted if they come from the same whole or from identical wholes
Fractions and division	• A whole number when divided by another whole number can result in: (a) a whole number with or without remainder (b) a proper fraction (c) a mixed number
Converting fractions to decimals	• Fractions and decimals are interchangeable • Decimals are a special type of fractions with denominators in tens, hundreds and thousands
Adding mixed numbers	• A mixed number comprises a whole number and a proper fraction • Mixed numbers can be added like adding proper and improper fractions
Subtracting mixed numbers	• A mixed number comprises a whole number and a proper fraction • Mixed numbers can be subtracted like subtracting proper and improper fractions
Word problems	• The following concepts are applied to fractions: part-whole concepts in addition and subtraction, comparison concept, adding-on in addition, taking-away in subtraction and division concept
Fractions (2)	
Product of proper fractions	• Multiplying two fractions is the same as finding the fractional part of another fraction
Word problems (1)	• The product of two proper fractions is the fractional part of another fraction
Product of an improper fraction and a proper or	• Multiplying a fraction and another fraction is the same as finding the fractional part of another fraction

improper fraction	
Product of a mixed number and a whole number	• The product of a whole and a mixed number refers to the group and item multiplication concept
Word problems (2)	• Use the group and item multiplication concept to find the product of a whole number and a mixed number
Dividing a fraction by a whole number	• Division in fractions is dividing each fractional part into smaller equal parts/units
Word problems (3)	• The concepts of the four operations and division of a fraction are applied

YEAR SIX

Fractions	
Four operations with fractions	• A fraction is a part of a whole or set, a ratio or a quotient • Addition and subtraction of fractions or mixed numbers can be interpreted in the same way as addition and subtraction of whole numbers • Multiplication of fractions, for example, $^2/_3 \times {}^3/_4$ is interpreted as $^2/_3$ of $^3/_4$ or $^3/_4$ of $^2/_3$ • Division of a fraction by a whole number is interpreted as partition (sharing)
Dividing by a proper fraction	• Division by a proper fraction is interpreted as measurement division; e.g., $3 \div {}^2/_3$ or $^3/_4 \div {}^2/_3$ is interpreted as the number of two-thirds in 3 or $^3/_4$
Word problems	• The process of problem solving in mathematics involves the application of concepts and strategies

Unit title	Key concepts

MEASUREMENT

YEAR ONE

Length	
Comparing two things	• The lengths of two objects can be compared using the terms 'tall/taller', 'long/longer', 'short/shorter' and 'high/higher'
Comparing more things	• The lengths of more than two objects can be compared using the terms 'tallest', 'longest', 'shortest' and 'highest'
Using a start line	• A common starting point makes comparison of lengths easier
Measuring things	• Length can be measured using objects as non-standard units
Finding lengths in units	• Length can be described using the term 'unit' instead of paper clips or lolly sticks
Mass	
Comparing things	• Compare masses using a pan balance
Finding the masses of things	• Mass can be measured using objects as non-standard units
Finding mass in units	• Mass can be described using the term 'units'

Time	
Telling the time to the hour	• Time can be used to measure the duration of an event
Telling the time to the half hour	• Measuring half an hour using the term 'half past'

Money (1)	
Getting to know our money	• Coins and notes in pounds and pence can be used to pay for goods and services
Exchanging money	• A coin or note of one denomination can be used as the equivalent of another set of coins or notes of a smaller denomination
Work out the amount of money	• The amount of money can be counted in pence (up to £1) and pounds (up to £100)
Money (2)	
Adding and subtracting in pence	• Addition and subtraction concepts in numbers are used in addition and subtraction of money
Adding and subtracting in pounds	
Solving word problems	• The 'part-whole', 'adding on', 'taking away' and 'comparing' concepts in addition and

	subtraction are used in solving word problems

YEAR TWO

8 Length	
Measuring in metres	• Length is a concept of measurement to determine how long or short an object is • The metre (m) is a unit of measurement for length
Comparing lengths in metres	• The metre is a medium for measuring and comparing
Measuring in centimetres	• Length is a concept of measurement to determine how long or short an object is • The centimetre (cm) is a unit of measurement for length
Comparing lengths in centimetres	• The centimetre is used to measure and compare the lengths of two or more objects
Addition and subtraction of length	• The 'addition' and 'subtraction of numbers' concepts and techniques are applied in this section
Multiplication and division of length	• The 'multiplication' and 'division' concepts in numbers are applied in this section
9 Mass	
Measuring in kilograms	• The kilogram (kg) is a unit of measurement for mass
Comparing masses in kilograms	• The kilogram (kg) is used as a medium to find the masses of objects and compare masses
Measuring in grams	• The gram (g) is a unit of measurement for mass
Comparing masses in grams	• An object can be heavier or lighter than another based on the masses of the two objects
Addition and subtraction of mass	• The process of addition and subtraction of mass is similar to addition and subtraction of whole numbers
Multiplication and division of mass	• Pupils can use concepts in multiplication and division to solve multiplication and division problems

Time	
The minute hand	• The minute is a measure of time • The minute hand of the clock is used to indicate the time in minutes
Reading and writing the time	• Hours and minutes are measures of time
Learning a.m. and p.m.	• Time is told in a.m. and p.m. • 'a.m.' is used for time after 12 midnight to just before 12 noon • 'p.m.' is used for time after 12 noon to just before 12 midnight
Time taken in hours and minutes	• 'Hour' is written as h and 'minutes' is written as mins • Time taken between two given times is measured in h and mins

Money	
Counting pounds and pence	• The dot separates the pounds from the pence
Changing pounds and pence	• £1 = 100p • When changing pence to pounds, use the dot to separate the pounds from the pence • When changing pounds to pence, remove the dot from the pounds
Comparing amounts of money	• Comparing amounts of money by comparing the pounds followed by the pence
Word problems	• Solving one-step or two-step word problems involving money using addition and subtraction • Solving one-step or two-step word problems involving money using multiplication and division

Volume	
Getting to know volume	• The capacity of a container is the amount of space it can hold • The volume of a container is the amount of space it contains
Measuring in litres	• The litre (ℓ) is a unit of measurement for volume
Addition and subtraction of volumes	• Volume in litres can be added and subtracted like whole numbers
Multiplication and division of volumes	• Volume in litres can be multiplied and divided like whole numbers

YEAR THREE

Length, Mass and Volume	
Metres and centimetres	• Visualising and measuring in compound units, metres (m) and centimetres (cm)
Kilometres and metres	• Visualising and measuring in compound units, kilometres (km) and metres (m)
Kilograms and grams	• Visualisation and measurement of a kilogram (kg) and a gram (g)
Litres and millilitres	• Visualisation and measurement of volume and capacity in litres (l) and millilitres (ml)
Solving Word Problems: Length, Mass and Volume	
One-step word problems	• Concepts of addition, subtraction, multiplication and division in whole numbers are applied to solve word problems on length, mass and volume
Two-step word problems	• Concepts in the four operations are applied to solve two-step word problems
Length, Mass and Volume	
Metres and centimetres	• Visualising and measuring in compound units, metres (m) and centimetres (cm)
Kilometres and metres	• Visualising and measuring in compound units, kilometres (km) and metres (m)
Kilograms and grams	• Visualisation and measurement of a kilogram (kg) and a gram (g)
Litres and millilitres	• Visualisation and measurement of volume and capacity in litres (l) and millilitres (ml)

Time	
Telling the time	• Using ‘past’ and ‘to’ in telling the time
Conversion of hours and minutes	• Pupils use 1 h = 60 mins to convert the time
Addition	• Hours and minutes can be added like whole numbers • Regrouping concepts (60 mins = 1 h) are applied to whole numbers
Subtraction	• Hours and minutes can be subtracted like whole numbers • Regrouping concepts (60 mins = 1 h) are applied to whole numbers
Duration in hours and minutes	• Say the duration of time in hours, minutes and hours and minutes
Word problems	• Use of the unitary method is required to solve problems

Money	
Addition	• Adding money is similar to adding whole numbers
Subtraction	• Subtracting money is similar to subtracting whole numbers
Word problems	• Concepts in adding and subtracting whole numbers are applied in problems involving money

YEAR FOUR

Time	
Seconds	• A second is a unit of measurement of time • 60 seconds = 1 minute
24-hour clock	• Time can be expressed using the 12-hour or the 24-hour clock notation • Duration can be measured in hours and minutes

YEAR FIVE

Measurements	
Converting a measurement from a larger unit to a smaller unit	• Understanding direct proportion
Converting a measurement from a smaller unit to a larger unit	• Understanding direct proportion

Unit title	Key concepts

GEOMETRY

YEAR TWO

Lines and Surfaces	
Straight lines and curves	• Represent lengths with straight lines • Interpret straight lines with given lengths
Flat surfaces	• Identifying flat surfaces and curved surfaces

YEAR THREE

Angles	
Understanding angles	• An angle is a measure of the amount of turning
Identifying angles	• Angles are measurements of turning which can also be made using 2D shapes
Right angles	• A right angle is a special type of angle, which is formed by two straight lines meeting at a point
Perpendicular and Parallel Lines	
Perpendicular lines	• When two straight lines intersect each other at right angles, they are perpendicular to each other
Drawing perpendicular lines	• Perpendicular lines are made when two lines meet at a right angle
Parallel lines	• Parallel lines are two straight lines drawn in such a way that they will never meet and the distance between them will always be the same
Drawing parallel lines	
Area and Perimeter	
Area	• Area is the amount of space that covers the surface of a shape • The amount of space is measured by the number of standard units
Square centimetres (cm^2)	• A square centimetre is a standard unit for measuring area
Square metres (m^2)	• A square metre is a standard unit for measuring bigger areas
Perimeter and area	• Perimeter is the distance around a shape • Area is the amount of space that covers the surface of the shape
More perimeter	• Perimeter is the distance around a shape
Area of a rectangle	• The area of a rectangle is the amount of space that covers the surface • The area of a rectangle is the same as length × width of the rectangle

YEAR FOUR

Angles	
Understanding angles (Naming angles)	• An angle is an amount of turning and not the amount of space

Understanding angles (Measuring angles)	• Angles are named as ∠ABC or ∠a
Drawing angles to 180°	• Drawing angles up to 180°
Turns and right angles	• A right angle (a quarter turn) is 90°, 2 right angles (a half turn) is 180°, 3 right angles (a three-quarter turn) is 270° and 4 right angles (a complete turn) is 360°
8-point compass	• Know the directions: north (N), south (S), east (E), west (W), north-east (NE), north-west (NW), south-east (SE), south-west (SW)

Perpendicular and Parallel Lines	
Drawing perpendicular lines	• Perpendicular lines meet or intersect at right angles
Drawing parallel lines	• Parallel lines never meet • The perpendicular distance between a pair of parallel lines is equal at every point on the lines
Horizontal and vertical lines	• A horizontal line is a line on level ground or parallel to the level ground • A vertical line is a line perpendicular to the level ground
Squares and Rectangles	
Squares and rectangles	• A square is a four-sided shape in which all the sides are equal and all the angles are right angles • A rectangle is a four-sided shape in which the opposite sides are equal and all the angles are right angles
More on squares and rectangles	• Properties of squares (all the sides are equal and each angle = 90°) and rectangles (opposite sides are equal and each angle = 90°)

Area and Perimeter	
Rectangles and squares	• The perimeter of a plane closed figure is the distance around the figure. For a rectangle, the perimeter is 2 × (Length + Width) and for a square, it is 4 × length of side • The area of a plane closed figure is the amount of surface inside the figure. For a rectangle, the area is Length × Width and for a square, it is Side × Side
Composite shapes	• The perimeter of a composite shape is the total distance around it • The area of a composite shape is the sum of the areas of all the individual rectangles and squares that make up the composite shape • Area of a rectangle = Length × Width and Area of a square = Side × Side • Opposite sides of a rectangle are equal • The four sides of a square are equal
Solving word problems	• Application of the concepts of area and perimeter of squares and rectangles to solving word problems
Symmetry	
Identifying symmetrical shapes	• A symmetrical shape has a line of symmetry which divides the shape into two equal parts • When folded along the line of symmetry, the two parts fit exactly

Identifying lines of symmetry	• A line of symmetry divides the shape into two equal parts so that the two parts fit exactly when the shape is folded along this line
Making symmetrical shapes and patterns	• A shape is symmetrical along a line if the line divides the shape into two equal parts and the parts fit exactly when the shape is folded along this line
Tessellations	
Identifying tessellations	• A shape can be tessellated if any number of them can be fitted together to cover a surface without any gaps or overlapping. If necessary, the shape can be rotated, but not flipped over
More tessellations	• A tessellating shape can cover a surface without any gaps • Some tessellating shapes can cover a surface in more than one way • A tessellating shape can be created from another

YEAR FIVE

Area of a triangle	
Base and height of a triangle	• Any side of a triangle can be the base and for each base, there is a corresponding height
Finding the area of a triangle	• The area of a triangle is half that of its related rectangle • Area of a triangle = $^1/_2$ x Base x Height

Angles	
Angles on a straight line	• An angle (≤ 180°) is made when two straight lines meet at a point • A unit of measurement of angles is the degree • The sum of angles on a straight line is 180°
Angles at a point	• The sum of angles at a point is 360°
Vertically opposite angles	• Vertically opposite angles are made by two intersecting straight lines • Vertically opposite angles are equal
Properties of Triangles and 4-sided Shapes	
Angles of a triangle	• Sum of angles in a triangle = 180°
Right-angled, isosceles and equilateral triangles (Right-angled triangles)	• A right-angled triangle has one angle equal to 90°
Right-angled, isosceles and equilateral triangles (Isosceles triangles)	• An isosceles triangle has two equal sides
Right-angled, isosceles and equilateral triangles (Equilateral triangles)	• An equilateral triangle has three equal sides
Parallelograms, rhombuses and trapeziums (Parallelograms)	A parallelogram is a 4-sided shape in which: • the opposite sides are parallel • the opposite angles are equal • each pair of angles between parallel sides adds up to 180°
Parallelograms, rhombuses and trapeziums (Rhombuses)	• A rhombus is a parallelogram with four equal sides where the opposite angles are equal and each pair of angles between parallel sides adds up to 180°
Parallelograms, rhombuses	• A trapezium is a 4-sided shape in which only one pair of opposite sides is parallel and each

and trapeziums (Trapeziums)	pair of angles between parallel sides adds up to 180°

YEAR SIX

Angles in Shapes and Diagrams	
Finding unknown angles	• Understanding and applying the properties of angles, triangles, squares, rectangles, parallelograms, rhombuses and trapeziums

Nets	
Solids	• Cubes and cuboids have rectangular faces (including squares) • Prisms have rectangular faces (including squares) and two identical polygonal faces (which could also be rectangles) • Pyramids have triangular faces that meet at a point and a polygonal base • Cylinders have a curved surface and two identical circular bases (at the ends) • Cones have a curved surface and a circular base
Nets of solids	• A net of a solid is a diagram that can be folded to make the solid • A solid can have different nets

Circles	
Radius, diameter and circumference	• A radius of a circle is any straight line from the centre to a point on the circumference • A diameter of a circle is any straight line that joins two points on the circumference and passes through the centre • The circumference of a circle is its perimeter • The ratio of the circumference of a circle to its diameter is the constant π

Area and Perimeter	
Area and perimeter of composite shapes	• The properties of squares, rectangles, triangles and circles • Formulae can be used to find the perimeters and areas of squares, rectangles and triangles, as well as the circumference and area of circles
Volume of Solids and Liquids	
Volume of solids	• The volume of a cuboid is the product of its length, width and height • The square root of a number n is the number m so that $m \times m = n$ • The cube root of a number n is the number m so that $m \times m \times m = n$
Volume of liquids	• The volume of liquid in a full container is given by the capacity of the container • Liquid in a container takes the shape of the container • Rate is an example of direct proportion, and problems involving rate can be solved using the unitary method

Unit title	Key concepts

STATISTICS

YEAR FIVE

9 Mean (average)	
Understanding mean (average)	• The total amount or sum of the data is found by multiplication: Total = Mean x Number of data or items
Word problems	• Applying the mean concept and part-whole concept to solve problems involving more than one set of items
Percentage	
Per cent	• 5% means 5 out of 100 • Percentage is a specific fraction where the denominator is 100
Converting more fractions to percentages	• Fractions and percentages are two representations for comparison of numbers • Percentage is a specific fraction where the denominator is 100
Percentage of a quantity	• Percentage of a quantity refers to part of a whole where the whole is equivalent to 100 units
Word problems	• 100 parts = the whole = 100%
Ratio	
Finding ratio	• Ratio is a way of comparing the relative sizes of two quantities or sets of items
Equivalent ratios	• Finding the common factor of the terms of the ratio of two quantities • Dividing the terms of a ratio of two quantities by the common factor to express a ratio in its simplest form
Word problems (1)	• Applying equivalent ratio concept, part-whole concept, taking away concept and comparison concept to solve up to 2-step word problems involving ratio of two quantities
Comparing three quantities	• Ratio is a way of comparing the relative sizes of three quantities or sets of items
Word problems (2)	• Applying equivalent ratio concept, part-whole concept and comparison concept to solve up to 2-step word problems involving ratio of three quantities

YEAR SIX

Ratio	
Ratio and fraction	• The ratio of one quantity to another quantity may not represent the actual number of items in each group • A simplified ratio of two quantities shows the relative amount of each quantity with respect to the other
Word problems (1)	• Fractions and ratios can be used to show the relative amounts of two quantities • The multiple concept in multiplication is another comparative tool to show the relative amount of two quantities
Comparing ratios	• The quantities in fixed ratios increase or decrease by the same multiple
Word problems (2)	• When quantities are increased or decreased in relation to each other, the ratios of the quantities are also changed

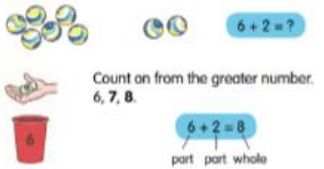
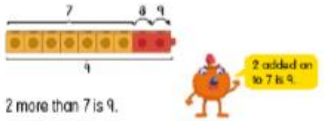
Percentage	
Finding percentages	• Percentages are similar to decimal fractions • A percentage is a special type of decimal fraction, giving the number of parts out of 100 equal parts rather than out of 1
Word problems (1)	• Applying the concepts learnt on percentage to solve word problems using a variety of strategies
Word problems (2)	• Applying the concepts learnt on percentage and a variety of strategies to solve higher-order word problems
Speed	
Distance and speed	• Speed is defined as the distance travelled per unit of time • The greater the distance travelled per unit of time, the faster the speed
Average speed	• Average speed is not the mean of two or more speeds • Average speed is the mean distance travelled per unit of time • Average speed is calculated by dividing the total distance travelled by the total time taken
Word problems	• Applying combinations of concepts such as mean (average), speed and rate to solve higher-order word problems

Appendix 3

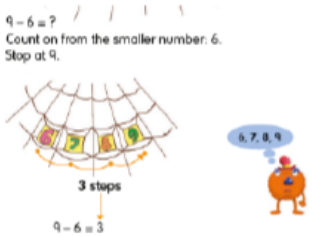
INSPIRE MATHS

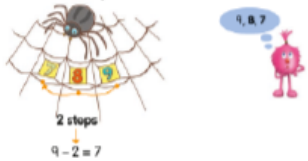
Progression of Key Concepts in Inspire Maths

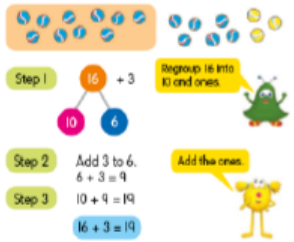
Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide

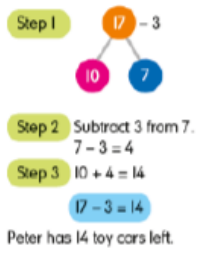
Inspire Maths 1	Inspire Maths 2	Inspire Maths 3	Inspire Maths 4	Inspire Maths 5	Inspire Maths 6
***Number bonds:* TG1A Unit 2 p32** **Key concepts:** using concrete representations – cubes, balances. 'part-whole'. ***Addition within 10*: TG1A Unit 3 p48** **Key concepts:** using concrete representations to support 'counting on' and 'part-whole' relating addition to number bonds. The + (plus) and = (equals) symbols are introduced here as one of the C-P-A representations within this unit. *- Adding by counting on:*  What is 2 more than 7?  2 more than 7 is 9.	***Addition and subtraction within 1000:* TG2A Unit 2 p43** **Key concepts:** using place value charts with concrete representations. Using horizontal and column addition/subtraction. *- HTU ± U – no regrouping* *- HTU ± TU – no regrouping* *- HTU ± HTU – no regrouping* *- HTU ± HTU – regrouping ones* *- HTU ± HTU – regrouping tens* *- HTU ± HTU – regrouping TU* *- HTU - HTU – regrouping HT* *- HTU - HTU – regrouping HTU* *- Subtraction with numbers that have zero – HTU - TU moving to HTU - HTU* ***Using models: Addition and subtraction:* TG2A Unit 3 p100** **Key concepts:** part-whole using models either with paper strips or by drawing bars. *Length:* TG2A Unit 8 p250 Key concepts: 'part-whole', 'adding on', 'taking away' and 'comparing' using models. *- Addition and subtraction of length*	***Addition of numbers within 10 000*: TG3A Unit 2 p38** **Key concepts:** addition with, then without, place value charts and concrete representations. Using column addition. *- ThHTU + ThHTU – no regrouping* *- ThHTU + ThHTU – regrouping H* *- ThHTU + ThHTU – regrouping HTU* ***Subtraction of numbers within 10 000:* TG3A Unit 3 p63** **Key concepts:** using place value charts with concrete representations. Using column subtraction. *- Meaning of difference* *- ThHTU + ThHTU – no regrouping* *- ThHTU + ThHTU – regrouping ThH* *- ThHTU + ThHTU – regrouping ThHTU* *- Subtraction with numbers that have zeros – ThHTU - HTU* ***Solving word problems 1: addition and subtraction:* TG3A Unit 4 p94** **Key concepts:** 'part-whole', 'adding on', 'comparing', 'taking away' and using models.	***Whole Numbers (3): Word problems (involving the four operations using a formal algorithm):* TG4A Unit 3 p85** *- Solve up to 3 step whole number word problems involving the four operations* *- Use model drawing and the unitary method to solve word problems* *- Use part-whole, comparison, adding on or taking away model drawings to solve word problems* *Decimals (2):* TG4B Unit 10 p64 *- ± involving tenths without regrouping* *- ± involving tenths and ones with regrouping tenths and ones* *- ± involving hundredths without regrouping* *- ± involving hundredths, tenths and ones with regrouping hundredths first, moving to regrouping hundredths, tenths and ones* *- Word problems up to 2 decimal places*	***Whole Numbers (2):* TG5A Unit 2 p49** *- Using a calculator, order of operations and Word problems* *- Application of concepts and skills of four operations*	***Algebra*: TG6A Unit 1 p4** *- Solve simple word problems involving algebraic expressions.*

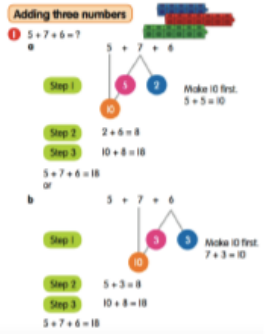
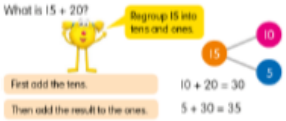
Progression of Key Concepts in Inspire Maths Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
- Adding with number bonds:  How many penguins are there altogether? 3 + 5 = ?  ***Subtraction within 10*: TG1A Unit 4 p73** **Key concepts:** using concrete representations to support 'taking away', 'counting on', 'counting back' and 'part-whole' relating to subtraction number bonds. The – (minus) and = (equals) symbols are introduced here as one of the C-P-A representations within this unit. *- Subtracting by taking away:* There are 9 spiders. Cross out 6 spiders. There are 3 spiders left. 	*Mass*: TG2A Unit 9 p287 Key concepts: 'part-whole', 'adding on', 'taking away' and 'comparing' using models. *- Addition and subtraction of mass* ***Mental calculations*: TG2B Unit 10 p4** **Key concepts:** Number bonds involving tens and 'part-whole'. *Money*: TG2B Unit 11 p34 Key concepts: 'part-whole', 'adding on', 'taking away' and 'comparing' using models. *- Word problems: Addition and subtraction of money* *Volume*: TG2B Unit 14 p147 Key concepts: 'part-whole', 'adding on', 'taking away' and 'comparing' using models. *- Addition and subtraction of volumes*	***Mental calculations*: TG3A Unit 9 p232** **Key concepts:** applying number bonds. *Money*: TG3B Unit 10 p4 Key concepts: Adding/subtracting money is similar to adding/subtracting whole numbers Addition: *- Add two amounts of money without regrouping by first adding the pounds then the pence* *- Add two amounts of money where pence add up to £1* *- Add two amounts of money using the following strategies:* *(1) decomposition* *(2) compensation* *in which one amount is made into a whole number of pounds* *- Add two amounts of money using the standard method* Subtraction: *- Subtract two amounts of money without regrouping by first subtracting the pounds then the pence* *- Subtract two amounts money using the strategy of compensation, in which the amount subtracted is rounded up to the nearest pound* *- Subtract two amounts of money using the standard method*			

Progression of Key Concepts in Inspire Maths					
Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
- Subtracting by counting on: There are 9 flies. 6 flies are stuck in a web. How many flies are still flying? 9 – 6 = ? Count on from the smaller number: 6. Stop at 9.  *- Subtracting by counting back:* 9 – 2 = ? Start from the greater number, 9. Count back 2 steps.	<u>Key vocabulary</u> - grouping: TG2A p135 - volume: TG2B p137 - model: TG2A p100 - item: TG2A p108 - two-step word problem: TG2A p113	*<u>Solving word problems: Length, Mass and volume:</u>* <u>TG3B Unit 12 p67</u> Key concepts: addition and subtraction one- and two-step problems *<u>Time:</u>* <u>TG3B Unit 15 p167</u> Addition: *- Add time with no regrouping by adding the hours first then the minutes* *- Add time with regrouping by adding the minutes first then the hours* Subtraction: *-Subtract time without regrouping by subtracting the hours first then the minutes* *- Subtract time with regrouping by first regrouping the hours and minutes, next subtracting the minutes, then subtracting the hours* <u>Key vocabulary</u> - sum: TG3A p25 - difference: TG3A p37			

Progression of Key Concepts in Inspire Maths Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
9 – 2 = ? Start from the greater number, 9. Count back 2 steps.  *- Subtracting with number bonds:* There are 9 bean bags altogether. How many bean bags does Ruby have on her head?  ***A family of number sentences can be written from a set of three related numbers*: 1A Unit 4 p84**  How many balls of string are yellow? 7 – 2 = 5 How many balls of string are blue? 7 – 5 = 2 How many balls of string are there altogether? 2 + 5 = 7 or 5 + 2 = 7					

Progression of Key Concepts in Inspire Maths Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
Addition and subtraction within 20: **TG1A Unit 8 p194** **Key concepts:** using concrete representations to support 'make 10', 'taking away', 'adding on' and 'part-whole'. *- Adding by making 10: adding two 1-digit numbers using the make 10 strategy:*  *- Adding by regrouping into tens and ones:*  					

Progression of Key Concepts in Inspire Maths Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
- Subtracting by regrouping into tens and ones:  Peter has 14 toy cars left. *Numbers to 40*: TG1B Unit 12 p59 **Key concepts:** using concrete representations to support 'counting on', 'number bond' and 'part-whole'. The vertical addition and subtraction strategy is introduced here using a place value chart. *- Simple addition and subtraction:* *- TU ± U – no regrouping* *- TU ± tens – no regrouping* *- TU ± TU – no regrouping* *- TU ± U – regrouping* *- TU ± TU – regrouping ones* *- Adding three numbers:*					

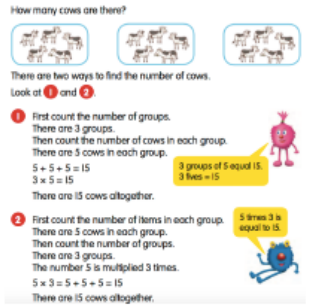
Progression of Key Concepts in Inspire Maths					
Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
 ***Mental addition and subtraction*: TG1B Unit 13 p109** **Key concepts:** adding is conceptualized as adding or putting parts together - *Mental addition*:  - *Mental subtraction*: 					

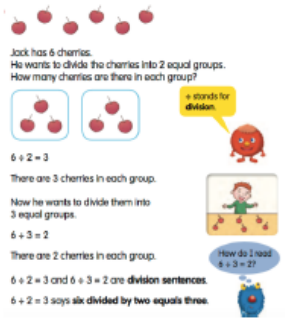
Progression of Key Concepts in Inspire Maths Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
Numbers to 100: TG1B Unit 17 p190 **Key concepts:** using concrete representations to support 'counting on', 'number bond', 'part-whole' and adding ones first followed by the tens. Using the vertical addition strategy with a place value chart. *- Simple addition and subtraction:* *- TU ± U – no regrouping* *- TU ± tens – no regrouping* *- TU ± TU – no regrouping* *- TU ± U – regrouping* *- TU ± TU – regrouping ones* *Money (2)*: TG1B Unit 19 p252 Key concepts: using concrete representations to support comparing, 'number bond' and 'part-whole' *- Adding and subtracting in pence* *- Adding and subtracting in pounds* Key vocabulary - count on: TG1A p10 - number bond: TG1A p32 - part: TG1A p32 - whole: TG1A p32 - add: TG1A p48 - plus: TG1A p48 - equals: TG1A p48 - addition sentence: TG1A p48 - group: TG1A p32 - total: TG1A p49 - most: TG1A p51					

Progression of Key Concepts in Inspire Maths Addition and subtraction (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
- rounds: TG1A p51 - addition story: TG1A p54 - word problem: TG1A p56 - regroup: TG1A p197 - subtract: TG1A p73 - minus: TG1A p73 - taking away: TG1A p73 - step: TG1A p75 - counting back: TG1A p77 - subtraction story: TG1A p80 - number sentence: TG1A p84					

Appendix 4

INSPIRE MATHS

Progression of Key Concepts in Inspire Maths Multiplication and division (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
***Multiplication*: TG1B Unit 14 p122** **Key concept:** Multiplication is conceptualized as repeated addition. The × (times) symbol is introduced as another way of representing multiplication. *- Adding the same number, relate repeated addition to the multiplication concept:* How many groups are there? How many are in each group? 2 + 2 + 2 = 6 3 twos = 6 3 groups of 2 = 6 *- Making up stories* *- Solving word problems* ***Division*: TG1B Unit 15 p143** **Key concept:** Division is conceptualised as dividing a set of objects equally. *- Sharing equally* *- Finding the number of groups* **Key vocabulary** - group: TG1A p32 - multiplication: TG1B p122 - multiplication stories: TG1B p125 - multiplication sentence: TG1B	***Multiplication and division*: TG2A Unit 4 p131** **Key concept:** Multiplying a fixed number of objects by a certain number of times. *- How to multiply: multiplication as the number of groups by the number of items; multiplying a set of items by number of times:*  **Key concept:** Sharing or dividing a set of items into equal groups so that each group has the same number of items. The ÷ (division) symbol is introduced as another way of representing multiplication. *- How to divide: sharing a number of items equally between a number of groups; dividing a set of items into groups given a fixed number of items in each group:*	***Multiplying by 6, 7, 8 and 9*: TG3A Unit 5 p118** **Key concepts:** The 'group and item' concept is used for multiplication and repeated addition. *- Multiplying by 6: skip counting,* *- Multiplying by 7: skip counting,* *- Multiplying by 8: skip counting,* *- Multiplying by 9: skip counting,* *- Short cut method for multiplying by 6, 7, 8 and 9* **Key concepts:** Division is the inverse of multiplication. Division involves the distribution of a set of items equally into some groups by relating multiplication facts. *- Division: finding the number of items in each group* *- Division: making equal groups* ***Multiplication*: TG3A Unit 6 p147** **Key concepts:** Vertical format introduced alongside the horizontal format. *- Multiply a 2-digit or 3-digit number by 2, 3, 4, or 5 without regrouping* *- Multiply a 2-digit or 3-digit number by 2, 3, 4, or 5 with regrouping in ones, tens and hundreds*	***Whole Numbers (2)*: TG4A Unit 2 p42** *- Factors* *- Multiples* ***Whole Numbers (3)*: TG4A Unit 3 p67** **Key concepts:** The formal algorithm long multiplication is introduced as another strategy *- Multiply whole numbers (up to 4-digits) by a 1-digit number with or without regrouping* *- Multiply a whole number (up to 3 digits) by 10 or tens using two different methods with or without regrouping* *- Multiply a whole number (2 or 3-digits) by another 2-digit number with or without regrouping* *- Divide a whole number (up to 4 digits) by a 1-digit number with or without regrouping and without remainder* *- Divide a whole number (up to 4 digits) by a 1-digit number with or without regrouping and with remainder* *- Solve up to 3-step whole number word problems involving the four operations*	***Whole Numbers (2)*: TG5A Unit 2 p53** *- Multiplying by 10* *- Multiplying by tens* *- Multiplying by 100 or 1000* *- Multiplying by hundreds or thousands* *- Dividing by 10* *- Dividing by tens* *- Dividing by 100 or 1000* *- Dividing by hundreds or thousands* *- Order of operations* **Key concepts:** Application of concepts and skills of the four operations to solving word problems. *- Word problems (1) and (2)* ***Decimals*: TG5B Unit 7 p6** *- Multiplying by 10* *- Multiplying by tens* *- Multiplying by 100 or 1000* *- Multiplying by hundreds or thousands* *- Dividing by 10* *- Dividing by tens* *- Dividing by 100 or 1000* *- Dividing by hundreds or thousands*	***Speed*: TG6B Unit 7 p4** ***Circles*: TG6B Unit 8 p45** *- Diameter* *- Circumference* *- Area of circle* ***Volume*: TG6B Unit 11 p140** *- Volume = length x width x height* **Key vocabulary** - diameter: TG6B p46 - circumference: TG6B p46

Progression of Key Concepts in Inspire Maths					
Multiplication and division (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
p125 - times (multiplication): TG1B p125	 ***Multiplying by 2 and 3*: TG2A Unit 5 p148** **Key concepts:** Multiplication is interpreted as repeated addition and as groups of items. The multiplication concept is 'groups of' or 'multiplying by'. The skip-count strategy helps to find the times table facts. *- Multiplying by 2: skip counting, using dot paper* *- Multiplying by 3: skip counting, using dot paper* **Key concepts:** Division is the inverse of multiplication. Division involves the distribution of a set of items equally into some groups by relating multiplication facts. *- Sharing: finding the number of items in each group:*	*- Multiply 2-digit or 3-digit number by 2, 3, 4, or 5 with regrouping in ones, tens, hundreds and thousands* ***Division*: TG3A Unit 7 p 175** **Key concepts:** The long division format is used to divide and find the quotient (number of items each group will contain) and remainder. The divisor is the number of groups. *- Divide a 1-digit or a 2-digit number by 1-digit number without remainder* 8 ÷ 2 = ?  8 ones ÷ 2 = 4 ones with no remainder Quotient = 4 ones Remainder = 0 ones $2\overline{)8}$ $\frac{4}{8}$ $\frac{8}{0}$ Each child gets 4 buckets. There are no buckets left. *- Divide a 1-digit or a 2-digit number by a 1-digit number with remainder* *- Divide a 2-digit number by a 1-digit number with no regrouping or remainder* *- Divide a 2-digit number by a 1-digit number with regrouping from tens to ones, with or without remainder* *- Divide a 3-digit number by a 1-digit number with regrouping from hundreds to tens then from tens to ones with or without remainder*	***Decimals (2)*: TG4B Unit 10 p77** *- Multiply tenths by a 1-digit whole number* *- Multiplication involving tenths and ones* *- Multiplication involving tenths and hundredths* *- Division of tenths by a 1-digit whole number* *- Division involving tenths in which regrouping is necessary* *- Division involving ones, tenths and hundredths when regrouping is necessary* **Key concepts:** Application of the concepts of multiplication and division of a decimal by a whole number to solving word problems. *- Word problems up to 2 decimal places* **Key vocabulary** - factor: TG4A p42 - multiple: TG4A p47 - decimal: TG4B p6 - decimal place: TG4B p34 - exactly (division): TG4A p42 - common factor: TG4A p44 - common multiple: TG4A p48 - calculate: TG4A p71 - ratio: TG5A p248 - equivalent ratio: TG5A p253	*7Mean*: TG5B Unit 9 p82 *Volume*: TG5B Unit 14 p278 *- Volume = length x width x height* **Key vocabulary** - numbers one ten thousand to nine ten thousands (counting on in ten thousands): TG5A p6 - hundred thousand *(place value)*: TG5A p6	

Progression of Key Concepts in Inspire Maths					
Multiplication and division (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
	Sharing: Finding the number of items in each group 1 Divide 12 pencil sharpeners into 2 equal groups. How many pencil sharpeners are there in each group?  There are 6 pencil sharpeners in each group. - *Grouping: making equal groups* Divide 15 jelly beans into equal groups. There are 3 jelly beans in each group. How many groups are there?  ***Multiplying by 4, 5 and 10*: TG2A Unit 6 p182** **Key concepts:** Multiplication is conceptualized as repeated addition, groups of items, or multiplying. The multiplication concept is 'groups of' or 'multiplying by'. The skip-count strategy helps to find the times table facts. - *Multiplying by 4: skip counting, using dot paper* - *Multiplying by 5: skip counting, using dot paper* - *Multiplying by 10: skip counting, using dot paper*	***Solving word problems 2: Multiplication and division*: TG3A Unit 8 p205** **Key concept:** solve one-step word problems on multiplication using model drawing. ***Mental calculations*: TG3A Unit 9 p240** **Key concept:** Commutative rule – reversing the order of groups and items in multiplication concept produces the same product. - *Mental multiplication* **Key concept:** Division is the inverse of multiplication. - *Mental division* ***Solving word problems: length, mass and volume*: TG3B Unit 12 p67** **Key vocabulary** - thousands (*place value*): TG3A p10 - remainder, quotient: TG3A p175 - horizontally: TG3A p191 - vertically: TG3A p191 - finger counting method: TG3A p125 - short cut method: TG3A p128 - product: TG3A p147			

Progression of Key Concepts in Inspire Maths					
Multiplication and division (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
	Key concepts: Division is the inverse of multiplication. Division involves the distribution of a set of items equally into some groups by relating multiplication facts. *- Sharing: finding the number of items in each group* *- Grouping: making equal groups* ***Using models: Multiplication and division*: TG2A Unit 7 p224** **Key concept:** Represent the 'group and item' using models either with paper strips or drawing bars to find the number of items or groups. ***Length:* TG2A Unit 8 p254** **Key concept:** draw models to help solve word problems. *- Multiplication and division of length* ***Mass:* TG2A Unit 9 p291** *- Multiplication and division of mass* ***Money:* TG2B Unit 11 p36** *- Word problems: multiplication and division.* ***Volume:* TG2B Unit 14 p150** *- Multiplication and division of volumes*	- one-step word problems: : TG3A p205 - double: TG3A p207 - to begin with: TG3A p208 - thrice: TG3A p213			

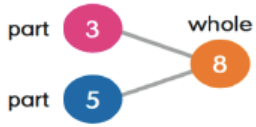
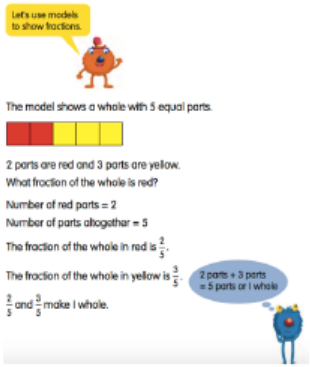
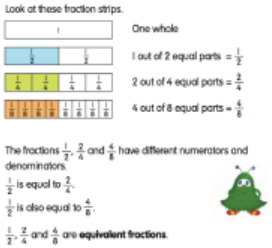
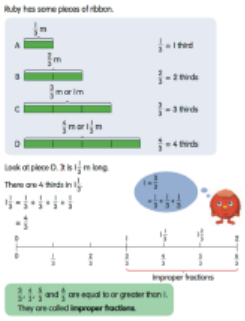
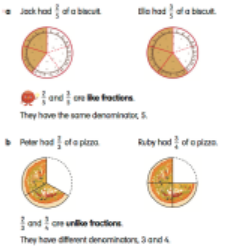
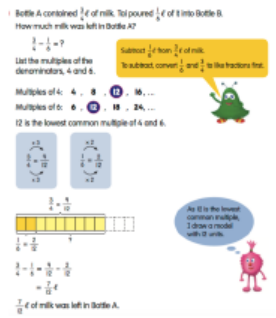
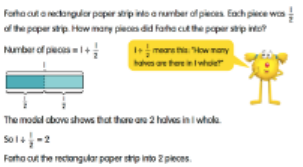
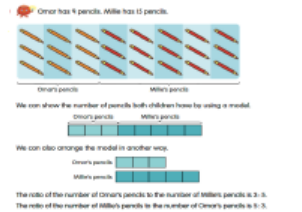
Progression of Key Concepts in Inspire Maths					
Multiplication and division (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
	Key vocabulary - grouping: TG2A p135 - skip-counting: TG2A p148 - division: TG1B p143 - equally: TG1B p143 - divide: TG1B p143 - sharing / share: TG2A p133 - division sentence: TG2A p133 - times table: TG2A p155				

Appendix 5

INSPIRE MATHS

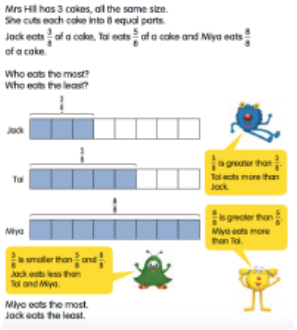
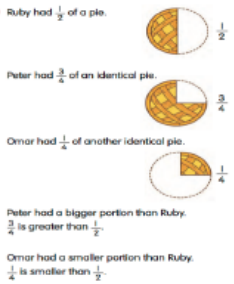
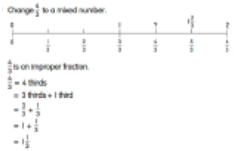
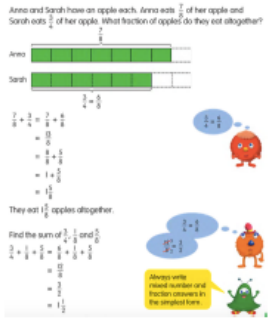
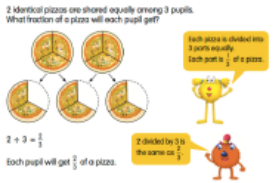
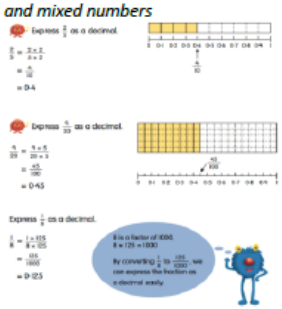
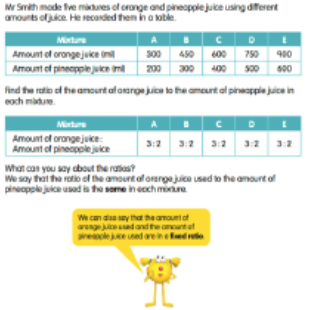
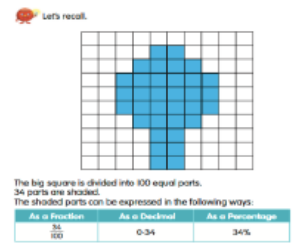
Progression of Key Concepts in Inspire Maths

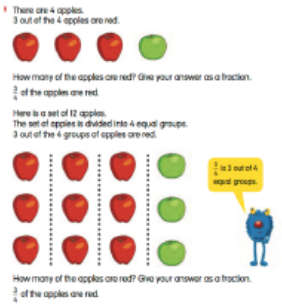
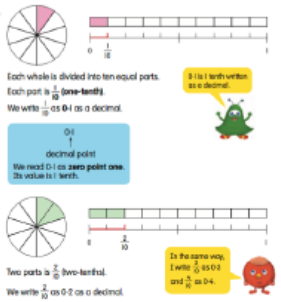
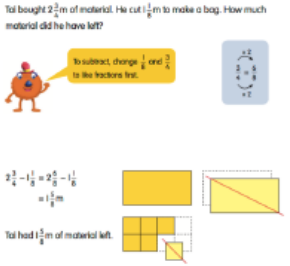
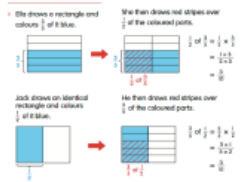
Fractions, percentages and decimals (making connections between the units) with reference to the pages in the Teacher's Guide

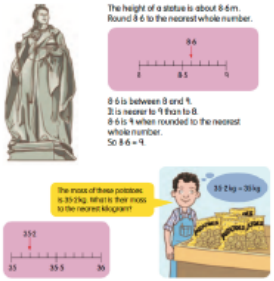
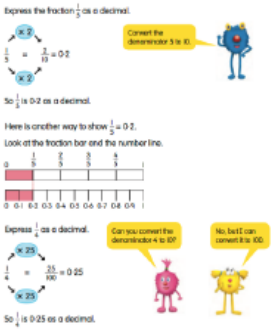
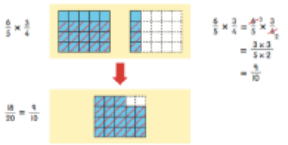
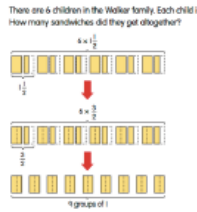
Inspire Maths 1	Inspire Maths 2	Inspire Maths 3	Inspire Maths 4	Inspire Maths 5	Inspire Maths 6
The foundations of fractions are laid in Inspire Maths 1 by analyzing parts and whole using the 'part-whole' strategy. This appears throughout IM1A and IM1B.  **Key vocabulary** - part: TG1A p32 - whole: TG1A p32	***Fractions*: TG2B Unit 12 p56** **Key concepts**: Understanding fractions by using shapes to represent one whole with denominators up to 12 and write fractions with denominators up to 12 from given shapes. *- Using model drawing as a concept to represent fraction contexts:*  *- Compare and order two or more fractions with the same denominator using rectangular strips or model drawings of the same size:*	***Fractions:* TG3B Unit 14 p116** *- Numerator and denominator:*  In the fraction 2/3, 2 is the **numerator**, and 3 is the **denominator**. *- Understanding equivalent fractions using a fraction strip (paper) to show equal parts and write equivalent parts of a given fraction with the help of a model drawing:*  *- Write equivalent fractions of a given fraction using the multiplying/dividing factor technique expressing in its simplest form.*	***Fractions:* TG4A Unit 5 p 137** *- Express, interpret, read, draw and mark mixed numbers on a number line and as region models (translating pictorial representations of mixed numbers to symbolic and vice versa).* *- Express, interpret, read, draw and mark improper fractions on a number line and as region models (translating pictorial representations of improper fractions to symbolic and vice versa):*  	***Fractions (1)*: TG5A Unit 3 p116** *- Identifying and differentiating like and unlike fractions:*  *- Adding unlike fractions by making a systematic list of the multiples of the denominator and by drawing a model:*  *- Subtracting unlike fractions by making a systematic list of the multiples of the denominator and by drawing a model*	***Fractions*: TG6A Unit 4 p106** *- Four operations with fractions* *- Dividing by a proper fraction: dividing a whole number by a proper fraction, dividing a proper fraction by a proper fraction*  *- Word problems* ***Ratio*: TG6A Unit 5 p145** *- Ratio and fraction: write and express ratio by comparing and analyzing parts and wholes (values):* 

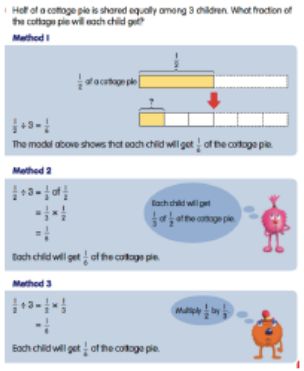
Progression of Key Concepts in Inspire Maths

Fractions, percentages and decimals (making connections between the units) with reference to the pages in the Teacher's Guide

Inspire Maths 1	Inspire Maths 2	Inspire Maths 3	Inspire Maths 4	Inspire Maths 5	Inspire Maths 6
	- Compare and order two or more fractions with different denominators using rectangular strips or model drawings of the same size.  *- Adding and subtracting like fractions.* *- Solving word problems by recalling and applying 'part-whole' and 'adding on' concepts in addition of two fractions using model drawing. Recalling and applying 'part-whole' and 'taking away' concepts in subtraction of fractions using model drawing.* **Key vocabulary** - fractions: TG2B p56 - equal part: TG2B p56 - unequal: TG2B p56 - whole: TG2B p57 - fractional parts: TG2B p61 - fractions (one-half to one-twelfth):	*- Comparing fractions using the equivalent fraction method:*  *- Adding related fractions (the related fractions are changed to like fractions first).* *- Subtracting related fractions (the related fractions are changed to like fractions first).* **Key vocabulary** - numerator: TG3B p116 - denominator: TG3B p116 - equivalent faction: TG3B p117 - simplest form: TG3B p122 - portion: TG3B p123 - common denominator: TG3B p126 - common numerator: TG3B p127 - express: TG3B p129	*- Conversion of fractions relating improper fractions to mixed numbers and converting between the two by separating an improper fraction into a whole and part of a whole, or by division, or by multiplication:*  *- Adding and subtracting fractions: add two or three related fractions, subtract two related fractions, subtract a fraction from a whole number:*  	*- Fractions and division: a whole number when divided by another whole number can result in a whole number with or without a remainder, a proper fraction or a mixed number:*  *- Converting fractions to decimals: converting tenths, hundredths and thousandths, converting using long division, converting improper fractions and mixed numbers*  *- Adding mixed numbers with or without regrouping*	*- Comparing ratios:*  *- Word problems (2)* **Percentage: TG6A Unit 6 p197** *- Finding percentages: express a fraction or a decimal as a percentage and vice versa, analyze the parts and whole to express the percentage giving the number of parts:*  *- Word problems (1)* *- Word problems (2)*

Progression of Key Concepts in Inspire Maths					
Fractions, percentages and decimals (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
	TG2B p61 - fraction story: TG2B p67 - like fractions: TG2B p74		*- Fractions of a set:*  *- Word problems* **<u>*Decimals (1)*: TG4B Unit 9 p6</u>** *- Understanding tenths:*  *- Understanding hundredths* *- Understanding thousandths* *- Comparing and ordering decimals*	*- Subtracting mixed numbers with or without regrouping*  *- Word problems* **<u>*Fractions (2)*: TG5A Unit 4 p168</u>** *- Product of proper fractions: multiplying two fractions is the same as finding the fractional part of another fraction; conceptualizing the meaning of multiplying two proper fractions with concrete representation; use of the cancellation (simplification) method to compute the product of two proper fractions; exploring and comparing the product of two whole numbers and the product of two proper fractions* 	**<u>Key vocabulary</u>** - unitary method: TG6A p175

Progression of Key Concepts in Inspire Maths					
Fractions, percentages and decimals (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
			- Rounding decimals to the: *nearest whole number* *nearest tenth* *nearest hundredth:*  *- Fractions and decimals: expressing a fraction (whose denominator is a factor of 10 or 100) as a decimal and express a decimal as a fraction in its simplest form:* 	*- Word problems (1)* *- Product of an improper fraction and a proper or improper fraction:*  *- Product of a mixed number and a whole number:*  *- Word problems (2)* *- Dividing a fraction by a whole number:*	

Progression of Key Concepts in Inspire Maths					
Fractions, percentages and decimals (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
			***Decimals (2):* TG4B Unit 10 p77** *- Refer to addition and subtraction progression document* *- Refer to multiplication and division progression document* **Key vocabulary** - mixed number: TG4A p137 - simplify: TG4A p141 - cancellation: TG4A p141 - improper fraction: TG4A p142 - conversion: TG4A p146	 *- Word problems (3)* ***Decimals:* TG5B Unit 7 p2 p28** *- Converting fractions to decimals: converting tenths and hundredths, converting thousandths* *- Using a calculator* *- Word problems* ***Decimals*: TG5B Unit 7 p6** Refer to multiplication and division progression document ***Measurement*: TG5B Unit 8 p53** *- Converting a measurement from a larger unit to a smaller unit* *- Converting a measurement from a smaller unit to a larger unit*	

Progression of Key Concepts in Inspire Maths					
Fractions, percentages and decimals (making connections between the units) with reference to the pages in the Teacher's Guide					
Inspire Maths 1	**Inspire Maths 2**	**Inspire Maths 3**	**Inspire Maths 4**	**Inspire Maths 5**	**Inspire Maths 6**
				Percentage: TG5B Unit 10 p108 *- Per cent* *- Converting more fractions to percentages* *- Percentage of a quantity* *- Word problems* Key vocabulary - unlike fractions: TG5A p116 - proper fractions: TG5A p116 - per cent: TG5B p108	

Maths thinking skills and Problem-solving heuristics in Inspire Maths

September 2020

Maths thinking skills in Inspire Maths							
	Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Adding on							
Analysing							
Applying							
Associating							
Classifying							
Comparing							
Deducing							
Estimating							
Evaluating							
Identifying							
Inducing							
Inferring							
Interpreting							
Linking							
Matching							
Mental calculation							
Observing							
Ordering							
Predicting							
Reasoning							
Recalling							
Reflecting							
Regrouping							
Relating							
Sequencing							
Sorting							
Spatial visualising							
Translating							
Visualising							

N.B. Green highlight indicates that a particular thinking skill is taught in that year group

Maths thinking skills in Inspire Maths							
Year group	**Reception**	**Year One**	**Year Two**	**Year Three**	**Year Four**	**Year Five**	**Year Six**
Thinking skills	Classifying at a practical level _____ Ordering at a practical level _____ Reflection on a practical action _____ Sequencing at a practical level _____ Sorting at a practical level _____	Adding on (3) _____ Analysing (5) Analysing and interpreting (5, 16) Analyse events and relate to a.m. or p.m. (13) Analysing parts and whole (2, 3, 4, 7, 8, 10, 16, 12, 13, 15, 16, 17, 18, 19) _____ Applying addition and subtraction concepts (19) Applying number bonds (19) Applying the multiplication concept (14) _____ Classifying	Analysing and visualising parts and whole (12) Analysing positions of hour and minute hand (13) Analysing the 'adding on' and taking away' concepts in addition and subtraction (3) Analysing the 'comparing' concept in addition and subtraction (3) Analysing the 'group and item' Concept in multiplication (4, 7) Analysing the 'part-whole' concept in	Analysing (2, 14) Analysing and interpreting (4) Analysing parts and whole (2) Analysing relationships (1, 5, 7) Analysing the part-whole model (14) _____ Applying addition and subtraction concepts (4, 8) Applying division concepts (8) Applying division concept to divide a whole into equal parts (14) Applying division concepts with multiplication (8)	Analysing parts and wholes (9) _____ Applying addition and subtraction concepts to problem solving (8) Applying concepts of addition and subtraction (10) Applying concepts of multiplication and division (10) Applying concept of equivalent fractions 99) Applying concepts of perimeter and area (12) Applying concepts of perimeter and	Analysing (1, 7) Analysing parts and wholes (3, 4, 9, 10) _____ Applying concepts and processes (1, 2) Applying the concepts of the four operations (4) Applying the multiplication concept to fractions (4) Applying problem solving strategies (7) _____ Classifying (2) _____ Comparing (1, 2, 3, 4, 6, 11, 12, 14) _____ Deducing	Analysing parts and wholes (5, 6) _____ Comparing (1, 2, 3, 4, 5, 7, 8) _____ Deducing (1, 2, 4, 7, 8, 9, 11) _____ Identifying patterns and relationships (1, 2, 3, 4, 5, 7, 8, 9, 10, 11) _____ Inducing (1, 9) _____ Sequencing (5,7, 8) _____ Spatial Visualising (2,3, 8, 10,11) _____ Translating (1, 4) _____ Visualising (8, 10, 11) _____

		(1, 5, 11, 18) _____ Comparing (1, 2, 7, 9, 10, 11, 12, 15, 17, 18, 19) _____ Deducing (2, 3, 7, 9, 10, 17) _____ Identifying patterns and relationships (4, 5, 6, 17) _____ Inducing (4, 9, 10, 17, 18) _____ Linking one concept to another (14) _____ Relating time and clock shown (16) Relating time and event (16) _____ Sequencing (1, 5, 6, 7, 9, 10, 12, 16) _____	addition and subtraction (3) Analysing the 'sharing equally' concept in division (7) Analysing time and event (13) _____ Applying the concepts of addition and subtraction (11, 14) Applying concepts of multiplication and division (14) Applying parts and wholes in addition and subtraction (12) Applying 'part-whole' , 'adding on' and 'taking away' concepts in fractions (12) _____ Associating and relating (5, 6) _____	Applying model drawing to equivalent fractions (14) Applying model drawing and equivalent fractions (14) Applying multiplication facts (5, 8) Applying number bonds (9) Applying place value relationships (2) Applying the concepts of area (18) Applying the multiplying factor technique and the dividing factor technique to find equivalent fractions. (14)	area to composite shapes (12) Applying division facts, place value concepts and rounding skills (3) Applying division and subtraction concepts to problem solving (8) Applying multiplication and division facts (2) Applying multiplication facts, place value concepts and rounding skills (3) Applying number bonds (9, 14) Applying ordering skills and place value concepts (2, 9)	(5, 7, 9, 11, 12, 13) _____ Evaluating (1) _____ Identifying patterns and relationships (1, 2, 3, 4, 5, 7, 8, 9, 10. 12, 14) Identifying relationships (7, 8, 10, 12, 14) _____ Inducing (4, 7) _____ Relating concepts in addition and subtraction (3) Relating part-whole, adding on and comparing concepts to fractions (3) Relating part-whole, taking away and comparing concepts to fractions (3)	

			Classifying (1, 10, 15, 16, 17) _____ Comparing (1, 2, 8, 9, 11, 14, 15, 16, 17) Comparing fractions (12) Comparing volumes (14) _____ Deducing (1, 2, 5, 6, 8, 9, 14, 15, 17) _____ Estimating (8, 9) _____ Identifying patterns and relationships (1, 4, 6, 10, 11, 15, 16, 17) Identifying attributes and components (11) Identifying patterns and shapes (17) _____ Inferring (9, 15) _____	Applying the pattern strategy and seeing connections between numbers (6) Applying the properties of a rectangle to help work out perimeter (18) _____ Associating (5, 7, 11) _____ Classifying. (1, 6, 7, 11, 13) _____ Comparing (1, 2, 3, 9, 10, 11, 13, 14, 15, 16, 17, 18) Comparing and determine patterns (18) Comparing lengths of shapes with more than two sides (18) Comparing numbers (9, 18)	Applying place value concepts (9, 10) Applying place value relationships (10) Applying rounding skills (2, 9, 10) Applying place value concepts (9, 10) Applying place value relationships (10) _____ Comparing (1, 2, 4, 5, 6, 9, 12, 13) _____ Identifying relationships (1, 2, 3, 4, 6, 7, 8, 10, 11, 12) _____ Inducing (6, 9) _____ Interpreting (4) _____	Relating part-whole concept to fractions (3) _____ Sequencing (1, 2, 7, 13, 14) _____ Spatial Visualising (4, 5, 6, 11, 12, 13, 14) _____	

			Interpreting and analysing complex addition and subtraction concepts (3) _____ Linking addition and subtraction (11) Linking multiplication and division (11) _____ Recalling and relating (13) Recalling number bonds (11) Recall the 5 times table and relate it to the minute hand (13) _____ Regrouping (2) _____ Relating and connecting related facts (5, 6)	_____ Deducing (6, 11, 13) _____ Identifying attributes and components (15) Identifying numerators and denominators of fractions (14) Identifying place value relationships (3) Identifying relationships (1, 2, 3, 5, 6, 7, 10, 11, 13, 15) _____ Inferring (4, 13) _____ Matching shapes (18) _____ Observing and analysing (18) _____ Predicting (18) _____ Reasoning. (1) _____ Recalling. (14, 18)	Mental calculation (2, 10) _____ Reasoning (10) _____ Recalling addition facts (10) Recalling multiplication facts (10) Recalling division facts (10) Recalling subtraction facts (10) Recalling and applying division concepts (8) _____ Relating addition to subtraction and multiplication to division (12) Relating improper fractions to mixed numbers (5)		

			Relating division with multiplication (5) Relating and connecting related facts (5, 6) Relating two different concepts (6) _____ Sequencing (1, 5, 6, 8, 9, 15) _____ Spatial visualising (14, 16, 17) Spatial visualising (conceptualising volume of liquid (12) _____ Visualising (16) Visualising equal parts of a whole (12) Visualising shapes (17)	Recalling and applying concepts of the four operations (12) Recalling and applying division concepts with multiplication (8) Recalling and applying division facts (8) Recalling and applying multiplication facts (8) Recalling and relating multiplication and division facts (7) _____ Reflecting (15) Reflecting and comparing (14, 15) _____ Relating (5, 6) Relating different units of	Relating number line representation to decimals (9) _____ Sequencing (1, 11) _____ Spatial visualisation (1, 6, 7, 8, 12, 13, 14) _____ Translating (5) Translating fractions statements and verbal statements to decimals (9) Translating fractions to decimals and vice versa (9) Translating a graph into a table (4) Translating decimal representation		

			Visualising volumes (14) _____	measurement of mass (11) Relating model representations to fraction statements (14) Relating multiplication and division facts (7) Relating number facts (7) _____ Sequencing (1, 6) _____ Spatial visualisation (14, 17) _____ Translating fraction symbols to models in various ways (14) Translating a model to words (15) Translating pictorial representations	to models and vice versa (9) Translating pictorial representations of fractions of a set to symbolic representations (5) Translating pictorial representations of improper fractions to symbolic representations and vice versa (5) Translating pictorial representations of mixed numbers to symbolic representations of improper fractions to symbols (5) Translating verbal statements to diagrammatic		

				to verbal questions (10) Translating statements and models to number sentences (10, 15) Translating statements to models and number sentences (15) Translating verbal and fraction statements to models (14) Translating words and models to symbols (2, 3(_____ Using models to represent problem situations (12) _____ Visualising and comparing (16)	representations (12) Translating verbal statements to models and/or number sentences (3, 10) Translating verbal statements to models and fraction operations (5) _____ Visualising (6, 12, 14) Visualising a subset or equal subset of a set as part of the whole set (5) Visualising part-whole relationships (12) Visualising part-whole relationships in fraction notation (5)		

				Visualising and identifying angles (16) Visualising and identifying relationships (16, 18) Visualising angles on a plane (16) Visualising various types of triangles and rectangles (16) Visualising and comparing (16) Visualising angles on a plane (16) Visualising shapes on grids (18) Visualising shapes with the same area (18) _____	_____		

Problem-solving heuristics in Inspire Maths							
	Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Acting it out							
Drawing a diagram							
Drawing a model							
Drawing a table							
Eliminating options							
Guessing and checking							
Looking for a pattern or relationship							
Making a list							
Using models to represent problems							
Restating the problem							
Simplifying the problem							
Solving in parts							
Solving part of the problem							
Using before-after concept							
Using a diagram							
Using a model							
Working back							

N.B. Green highlight indicates that a particular problem solving heuristic is taught in that year group

Problem-solving heuristics in Inspire Maths. (unit numbers are in brackets)

	Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Problem solving heuristics	Act it out Guess and check Solving part of the problem	Act it out (14, 10, 16) Draw a model (14) Guess and check (2, 3, 7, 10, 17) Looking for patterns and relationships (1) Making a list (11, 18,19 Simplifying the problem (17, 10, 17, 19) Solving part of the problem (4) Using a diagram (3,9) Work backwards (6)	Draw a diagram (14) Guess and check (5, 8, 11, 15) Making a systematic list (11) Work back (2, 5)	Draw a diagram (4, 15) Drawing a model to represent a problem situation (8, 12, 14) Guess and check (1, 3, 6, 8, 14) Looking for patterns (7) Making a list (14, 15) Using models to represent problem situations (12, 14) Work backwards (15)	Act it out (7, 8, 12, 13, 14) Draw a diagram (8, 11, 12) Draw a model (3, 8) Eliminating options (2) Guess and check (8, 10) Looking for patterns (3, 13) Making a systematic list (2, 12) Simplify the problem (12) Use a diagram (3, 8, 12) Work backwards (6)	Act it out (7, 10, 14) Draw a diagram (13) Draw a model (3, 4, 10) Guess and check (1, 2, 3, 7, 8, 9) Looking for a pattern (1, 2, 4, 5, 7, 14) Make a systematic list (3, 6, 7, 8, 9, 14) Restate the problem (2, 12) Simplifying the problem)11) Use before-after concept (3)	Act it out (2, 3, 10) Draw a diagram (7, 10, 11) Draw a model (10 Drawing a table (4, 5) Guess and check (4) Make a list (5) Simplifying the problem (2, 6, 8) Solve in parts (1) Solve part of the problem (8) Use before-after concept (5, 11) Work backwards (7)