Kensington Junior Academy
Mathematics Substantive knowledge Progression Map

NUMBER AND PLACE VALUE					
COUNTING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
To know how to count in multiples of twos, fives and tens from different multiples to develop their recognition of patterns in the number system, including varied and frequent practice through increasingly complex questions. To recognise and create repeating patterns with objects and with shapes. To know the term multiple and be able to recognise multiples of two, five and ten.	Know how to count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward.	Know how to count from 0 in multiples of 4, 8, 50 and 100.	Know how to count in multiples of 6, 7, 9, 25 and 1000. Know how to count backwards through zero to include negative numbers. Know how to find 1000 more or less than a given number. A positive number is greater than zero. A negative number is less than zero.	Know how to count forwards and backwards in steps of powers of 10 for any given number up to 1,000,000. Temperatures can be measured in degrees Celsius °C. 0 degrees Celsius °C is the freezing point of water and 100 degrees Celsius is the boiling point of water.	
READING AND WRITING NUMBERS					
Know how to read and write numbers from 1 to 20 in numerals and words. Know how to count, read and write numbers to 100 in numerals.	Know how to read and write numbers to at least 100 in numerals and in words.	Know how to read and write numbers up to 1,000 in numerals and in words.		Know how to read and write numbers to at least 1,000,000 and determine the value of each digit.	Know how to say, read and write numbers up to 10,000,000 accurately and determine the value of each digit.

	MULTIPLICATIONA AND DIVISION- ESTIMATING AND CHECKING				
	Division is the opposite of multiplication and division	Inverse operations are opposite that reverse the effect of the other operation. Multiplication and division are inverse operations.			Estimate means to quickly find, with some thought of calculation, an approximate value close to the right value.

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FRACTIONS- MULTIPLYING AND DIVIDING FRACTIONS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				A proper fraction has a numerator that is less than the denominator. An improper fraction has a numerator equal to or greater than the denominator.	To multiply fractions, multiply the numerators together and then multiply the denominators together. Write the answer in its simplest form.
				A mixed number is the combination of a whole number and a proper fraction.	To divide fractions by whole numbers, multiply the denominator by the whole number.
MULTIPLICATION AND DIVISION- MULTIPLYING AND DIVIDING BY 10, 100 AND 1000					
			A tenth is 1/10 (1 divided by 10). A hundredth is 1/100 (1 divided by 100).		In place value, each place is ten times the value of its place to the right.

NUMBER AND PLACE VALUE- ROUNDING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				For two or more digit numbers if the number to the right of the place value number you are rounding is equal to or greater than 5, round up. If the number to the right of the place value number you are rounding is less than 5, round down.	

FRACTIONS- PROBLEM SOLVING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				½ = 50% = 0.5, ¼ = 25% = 0.25, 1/5 = 20% = 0.2, 2/5 = 40% = 0.4, 4/5 = 80% = 0.8, 1/10 = 10% = 0.1, 1/25 = 4/100 = 4% = 0.04	

FRACTIONS- COMPARE AND ORDER FRACTIONS AND DECIMALS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		The numerator of a fraction is the top number and shows how many parts there are. The denominator is the bottom part of the fraction and shows how many equal parts the item or number is divided. Unit fractions have a numerator of 1, non-unit fractions have a numerator greater than 1.			
		In place value, each place is ten times the value of the place to its right, including after the decimal point.			

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FRACTIONS- COUNTING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		A tenth is 1 divided by 10.	A hundredth is 1 divided by 100.		

FRACTIONS- ADDING AND SUBTRACTING FRACTIONS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		The numerator of a fraction is the top number and shows how many parts there are. The denominator is the bottom part of the fraction and shows into how many equal parts the item or number is divided.	A fraction where the numerator is bigger than the denominator is an improper fraction and has a value greater than 1.	The denominator is the bottom part of the fraction and shows into how many equal parts the item or number is divided.	Equivalent fractions have different numerators and denominators but are equal in value. Addition and subtraction can be carried out once the numerators or denominators have been multiplied or divided to get the same denominator. The answer is then found by adding or subtracting the numerator.

NUMBER					
MULTIPLICATION AND DIVISION- MULTIPLES, FACTORS, PRIME NUMBERS, SQUARE AND CUBE NUMBERS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Multiples are the values in the numbers times	Factors are whole numbers that divide exactly into	Multiples are the result after multiplying a number

			table. For example, the multiples of six are 6, 12 and 18 etc. Multiplying by 2 is the same as doubling, multiplying by 4 is the same as doubling and doubling again. Multiplying by 10 and halving is the same as multiplying by 5.	another number. The original numbers are factors of the product number. Factor pairs are sets of two factors that when multiplied together give a particular number. Common factors are factors found in more than one number. Prime numbers are whole numbers that are greater than 1. Prime factors are prime numbers that can be multiplied together to give the original number. Composite numbers are non-prime. Prime numbers are whole numbers that are greater than 1 and can only divide by themselves. Notation for squared and cubed as identified on vocabulary progression map.	by an integer. They are in the given number's times tables. Common multiples are multiples of two or more numbers. Factors are whole numbers that divide exactly into another number. Common factors are factors found in more than one prime number. Prime numbers are whole numbers that are greater than 1 and can only be divided by 1 and themselves.

FRACTIONS- FINDING FRACTIONS OF AMOUNTS					
		Equivalence means of equal value. 2/4=1/2	Unit fractions have a numerator of 1. Non-unit fractions have a numerator greater than 1.		
MULTIPLICATION AND DIVISION- MULTIPLYING AND DIVIDING MENTALLY					
				Factors are whole numbers that divide exactly into another number. The original numbers are factors of the product number. Factor pairs are sets of two factors that when multiplied together give a particular number. A square number is a number multiplied by itself. A cube number is a number multiplied by itself three times.	
NUMBER- COMPARING, READING AND WRITING NUMBERS					
	Less than symbol shows that the value to the left of it is lower than the value to the right. Greater than symbol shows that the value to left of it is greater than the value to the right.	In roman numerals I=1 II=2 III=3 IV=4 V=5 VI=6 VII=7 VIII=8 IX=9 X=10 XI=11 XII=12	In Roman numerals I=1 V=5 X=10 L=50 C=100 D=500 and M=1000. All numbers can be written using a combination of these.	Positive integers are whole numbers greater than zero. Negative integers are whole numbers less than zero. In Roman numerals I=1 V=5 X=10 L=50 C=100 D=500 and M=1000. All	Negative integers are whole numbers less than zero.

	Equals shows that the number of each side should have or has the same value.			numbers can be written using a combination of these.	
MULTIPLICATION AND DIVISION- MULTIPLICATION TABLES					
	Multiplication is repeated addition and division is repeated subtraction. Division is also splitting or sharing into equal parts. Even numbers end in 0, 2, 4, 6, 8 and odd numbers end in 1, 3, 5, 7, 9.				
ADDITION AND SUBTRACTION- ESTIMATING AND CHECKING					
		Inverse operations are opposites that reverse the effect of the other operation. Addition and subtraction are inverse operations.	Estimate means to quickly find with some thought of a calculation and approximate value close to the right value.		
FRACTIONS- RECOGNISE, REPRESENT AND NAME FRACTIONS					
A half is one of two equal parts of a whole object, shape or quantity. A quarter is one of four equal parts.	A half is one of two equal parts of a whole object, shape or quantity. A quarter is one of four equal parts. A third is one of three equal parts.	Equivalence means of equal value. The numerator of the fraction is the top part and shows how many parts there are. The denominator of the	A tenth is 1 divided by 10 or 1/10 or 0.1. A hundredth is 1 divided by 100 or 1/100 or 0.01. A decimal number is a number with a decimal point which shows the	A proper fraction has a numerator less than the denominator. An improper fraction has a numerator equal to or greater than the denominator. A mixed number is a combination of	A simple fraction has a whole number for a numerator or denominator. A fraction is the representation of the division of the numerator by the denominator.

		fraction is the bottom part and shows how many parts there are. The denominator of the fraction is the bottom part and shows how many equal parts the object or number is divided into. Unit fractions have a numerator of 1. Non-unit fractions have a numerator greater than 1.	whole number to the left of the point and tenths, hundredths, thousandths etc... to the right. Fractions have decimal equivalents e.g. 0.5=1/2	a whole number and a proper fraction. A tenth is 1 divided by 10 or 1/10 or 0.1. A hundredth is 1 divided by 100 or 1/100 or 0.01. A thousandth is 1 divided by 1000 or 1/1000 or 0.001.	Fractions have decimal and percentage equivalences. They also form part of mixed numbers. Fractions can be simplified by dividing the numerator and denominator by the same common factor. Multiples are the result of after multiplying a number by an integer. Common multiples are multiples of two or more numbers. Multiplying a numerator and a denominator by a common multiple can give fractions in the same denomination.
MULTIPLICATION AND DIVISION- PROBLEM SOLVING AND APPLYING					
Know how to make connections between arrays, number patterns and counting in twos, fives and tens. Through grouping and sharing small quantities, pupils begin to understand: multiplication and	Know a variety of language to describe multiplication and division. Know how to count from 0 in multiples of 4, 8, 50 and 100. Recall and use multiplication and division facts from the 2, 5 and 10 multiplication tables,	A positive number is greater than zero. A negative number is less than zero. An integer is a whole number that can be scaled up using repeated addition or multiplication. Correspondence in maths is how things are	The distributive law is that multiplying a number by a group of numbers added together is the same as doing each multiplication separately and then adding them together. The associative law is that it doesn't matter how numbers are grouped (calculated) when adding or multiplying them.		The acronym BODMAS can be used to remember the order in which operations should be calculated. Brackets, Orders (powers), Division and Multiplication (rank equally), Addition and Subtraction (rank equally)

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division, doubling numbers and quantities and finding simple fractions of objects, numbers and quantities.	including recognising odd and even numbers and use them to solve simple problems, demonstrating an understanding of commutativity as necessary.	related. There are different types of relationship: one to one, one to many, many to one and many to many.			
MULTIPLICATION AND DIVISION – MULTIPLYING AND DIVIDING USING WRITTEN METHODS					
Doubling is adding the same number to itself. Halving is dividing or sharing a number into two equal parts or groups.	Numbers can be multiplied in any order and the answer will be the same. Numbers can't ben divided in any order to give the same answer.			A remainder is the whole number left over after the division has been calculated.	Remainders can be interpreted as fractions or rounded to whole numbers, depending on the context.
ADDITION AND SUBTRACTION – PROBLEM SOLVING AND APPLYING					
Know ordinal numbers and solve simple concrete problems.	Know how to use place value and number facts to solve related problems to develop fluency.	Know how to solve number problems and practical problems involving these ideas	Know how to solve number and practical problems that involve all of the above and with increasingly large positive numbers.		The acronym BODMAS can be used to remember the order in which operations should be calculated. Brackets, Orders (powers), Division and Multiplication (rank equally), Addition and Subtraction (rank equally)
ADDITION AND SUBTRACTION – ADDING AND SUBTRACTING MENTALLY					
A number bond is a pair of numbers that add up to a given number: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9	Partitioning breaks a number into its place value units. Know that addition of two numbers can be	Know how to add and subtract numbers mentally, including: two-digit numbers,	Continue to practise both mental methods and columnar addition and subtraction with	Know how to add and subtract numbers mentally with increasingly large numbers.	Know how to perform mental calculations, including with mixed operations and large

and 1 digit numbers. They are ones numbers. Two digit numbers have a tens number and a ones number.	done in any order (commutative) and subtraction of one number from another cannot. Know how to add and subtract numbers using an efficient strategy, explaining their method verbally using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers and three one-digit numbers.	where the answers could exceed 100, a three-digit number and ones, a three-digit number and tens and a three-digit number and hundreds.	increasingly large numbers to aid fluency.		numbers.

ADDITION AND SUBTRACTION – ADDING AND SUBTRACTING USING WRITTEN METHODS					
Addition is putting two or more numbers or objects together to make a larger number or group of objects. Subtraction is removing or taking away numbers or groups of objects. What is left is the difference between two numbers. The equal sign shows that both sides of the equation	Numbers can be added in any order and the answer will be the same. Numbers cannot be subtracted in any order to give the same answer.	See calculation policy for formal calculation methods appropriate to the year group.			

have the same value.					
NUMBER AND PLACE VALUE – IDENTIFYING AND REPRESENTING NUMBERS					
Equal means the same in amount, size or number. Greater than means a larger amount or size. Lesser than means a smaller amount or size. Most means the biggest number or amount of something and least means the smallest amount of something.	Estimate means to have a sensible guess. Estimating is guessing the approximate amount, size or value of something.	A digit is any number 0-9. In place value, each place is 10 times the amount to its right.			
FRACTIONS – PERCENTAGES					
				% is the symbol for percent and percent is the number of parts per hundred. 100% = 100/100 = 0.1 50% = 50/100 = ½ = 0.5 25/100 = ¼ = 0.25 75% = ¾ = 0.75 10% = 10/100 = 0.1 20% = 20/100 = 1/5 = 0.2	