

Holy Trinity Church of England (VA) Primary School



Calculations Policy

SCHOOL VISION

Our vision is for our pupils to flourish in an inclusive, inspirational place of learning where we are happy, respectful, kind and safe.

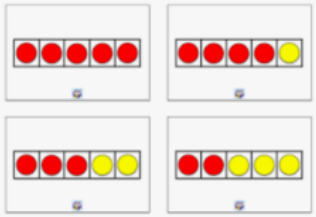
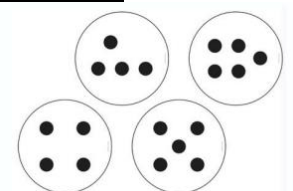
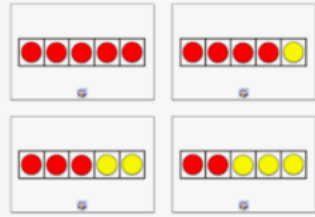
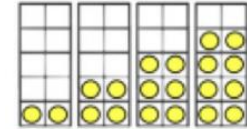
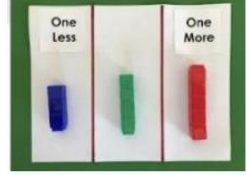
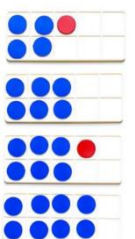
At Holy Trinity Church of England Primary School our Christian vision shapes all we do.

"I know that there is nothing better for people than to be happy and to do good while they live." Ecclesiastes 3:12.

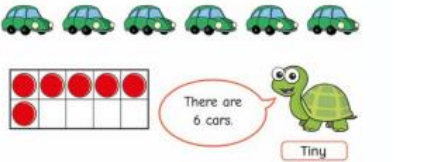
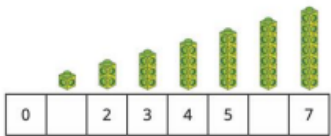
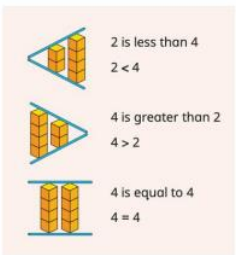
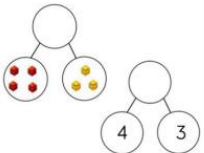
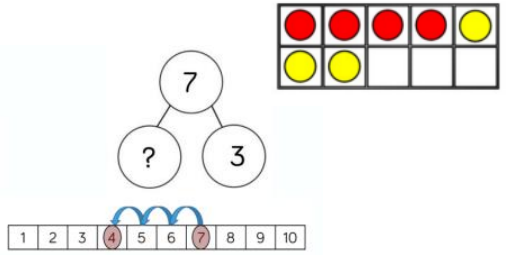
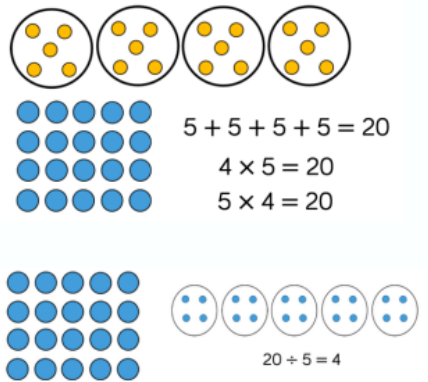
- we facilitate opportunities so every child can flourish in a place where they feel **safe, happy and confident**.
- staff **well-being** and professional development is valued and supported in order to fulfil their roles, **inspire** others and experience personal **fulfilment**.
- the school provides facilities that enables our pupils to reach their potential in an **optimum learning environment**.
- the **school plays a central role within our community** and enjoys strong **links with the church, local companies and other schools**.
- we create a culture of vigilance to **safeguard** all children.

***'I know that there is nothing better for people than to be happy and to do good while they live.'* Ecclesiastes 3:12**

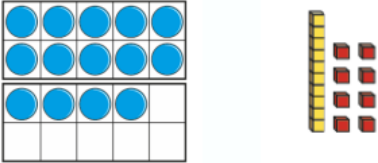
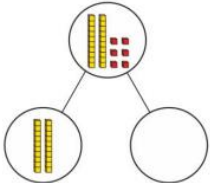
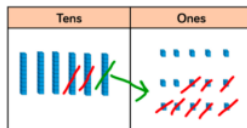
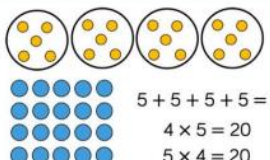
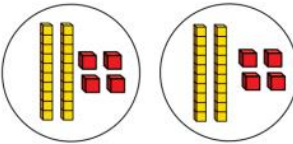
EYFS

EYFS	Number Sense	Counting	Quantities	Number Patterns
ELG	Have a deep understanding of number to 10, including the composition of each number. Subitise (recognise quantities without counting) up to 5	Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including doubling facts. Verbally count beyond 20, recognising the pattern of the counting system.	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.	Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally
Calculation Methods/ Representations	Five and tens frames  Dot Plates  Objects 	Five and tens frames  Counting to 20 	Comparing Quantities    Comparing Sizes 	Doubling   Odds and Evens 

Year 1

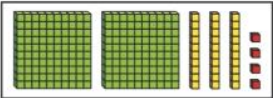
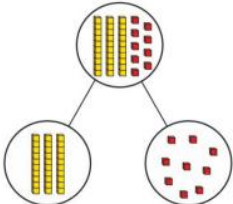
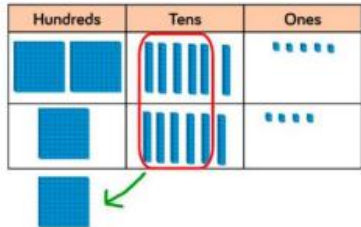
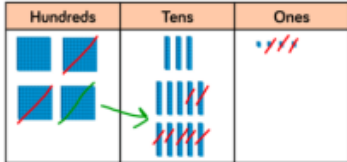
Yr1	Place Value	Addition and Subtraction	Multiplication and Division
NC Objectives	Read and write numbers to at least 100 in numerals and in words. Recognise the place value of each digit in a two digit number (tens, ones) Identify, represent and estimate numbers using different representations including the number line. Compare and order numbers from 0 up to 100; use and = signs. Use place value and number facts to solve problems. Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward.	Represent and use number bonds and related subtraction facts within 10. Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. Add and subtract one digit numbers to 10, including zero. Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems.	Count in multiples of twos, fives and tens. Solve one step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
Calculation Methods/ Representations	Resources to find amounts  1 more / 1 less  Greater than / less than / equal to 	Addition Concrete:  Pictorial  Abstract  Subtraction 	Multiplication and Division  $5 + 5 + 5 + 5 = 20$ $4 \times 5 = 20$ $5 \times 4 = 20$ $20 \div 5 = 4$

Year 2

Yr2	Place Value	Addition and Subtraction	Multiplication and Division
NC Objectives	Read and write numbers to at least 100 in numerals and in words. Recognise the place value of each digit in a two digit number (tens, ones) Identify, represent and estimate numbers using different representations including the number line. Compare and order numbers from 0 up to 100; use and = signs. Use place value and number facts to solve problems. Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward.	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers. Show that the addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures; applying their increasing knowledge of mental and written methods. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems	Recall and use multiplication and division facts for the 2, 5 and 10 times tables, including recognising odd and even numbers. Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) sign. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts. Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
Calculation Methods/ Representations	Resources to find amounts  Pictorial: Base ten + part whole models 	Addition: Concrete/Pictorial  Abstract – number line and moving onto formal method  $\begin{array}{r} 38 \\ + 23 \\ \hline 61 \end{array}$ Subtraction - Abstract – numberline and moving onto formal method   $\begin{array}{r} 38 \\ - 23 \\ \hline 15 \end{array}$	Multiplication and Division Multiplication  $5 + 5 + 5 + 5 = 20$ $4 \times 5 = 20$ $5 \times 4 = 20$ Division  $20 \div 5 = 4$ 48 ÷ 2 = 24 

'I know that there is nothing better for people than to be happy and to do good while they live.' Ecclesiastes 3:12

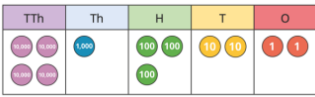
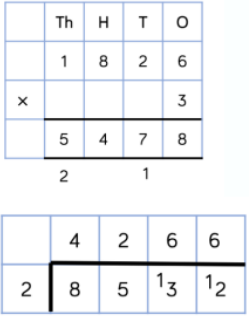
Year 3

Yr3	Place Value	Addition and Subtraction	Multiplication and Division												
NC Objectives	Identify, represent and estimate numbers using different representations. Find 10 or 100 more or less than a given number. Recognise the place value of each digit in a three-digit number (hundreds, tens, ones). Compare and order numbers up to 1000. Read and write numbers up to 1000 in numerals and in words. Solve number problems and practical problems involving these ideas. Count from 0 in multiples of 4, 8, 50 and 100	Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens, a three digit number and hundreds. Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction. Estimate the answer to a calculation and use inverse operations to check answers. Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	Count from 0 in multiples of 4, 8, 50 and 100. Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. Write and calculate mathematical statements for multiplication and division using the multiplication tables they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objectives												
	Calculation Methods/ Representations	Concrete resources: Base 10 / PV Counters   Pictorial: Base 10 / PV Counters <table border="1" data-bbox="407 1181 728 1367"><thead><tr><th>H</th><th>T</th><th>O</th></tr></thead><tbody><tr><td>100 100</td><td>10</td><td>1 1</td></tr><tr><td></td><td></td><td>1 1</td></tr><tr><td></td><td></td><td>1 1</td></tr></tbody></table>	H	T	O	100 100	10	1 1			1 1			1 1	Addition  $\begin{array}{r} 265 \\ + 164 \\ \hline 429 \end{array}$ Subtraction  $\begin{array}{r} 435 \\ - 273 \\ \hline 262 \end{array}$
H	T	O													
100 100	10	1 1													
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		1 1													

Year 4

Yr4	Place Value	Addition and Subtraction	Multiplication and Division																																																												
NC Objectives	Count in multiples of 6, 7, 9, 25 and 1000. Find 1000 more or less than a given number. Recognise the place value of each digit in a four digit number (thousands, hundreds, tens and ones). Order and compare numbers beyond 1000. Identify, represent and estimate numbers using different representations. Round any number to the nearest 10, 100 or 1000. Solve number and practical problems that involve all of the above and with increasingly large positive numbers. Count backwards through zero to include negative number	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. Estimate and use inverse operations to check answers to a calculation. Solve addition and subtraction two step problems in contexts, deciding which operations and methods to use	Recall and use multiplication and division facts for multiplication tables up to 12 × 12. Count in multiples of 6, 7, 9, 25 and 1000. Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects																																																												
	Concrete and pictorial resources: Base 10 / PV Counters	<u>Addition</u> <table><tr><td></td><td>1</td><td>3</td><td>7</td><td>8</td></tr><tr><td>+</td><td>2</td><td>1</td><td>4</td><td>8</td></tr><tr><td></td><td>3</td><td>5</td><td>2</td><td>6</td></tr></table> 1 1 <u>Subtraction</u> <table><tr><td></td><td>3</td><td>1</td><td></td><td></td></tr><tr><td></td><td>4</td><td>3</td><td>5</td><td>7</td></tr><tr><td>-</td><td></td><td>2</td><td>7</td><td>3</td></tr><tr><td></td><td></td><td>1</td><td>6</td><td>2</td></tr></table>		1	3	7	8	+	2	1	4	8		3	5	2	6		3	1				4	3	5	7	-		2	7	3			1	6	2	<u>Multiplication and Division</u> <table><tr><td></td><td>H</td><td>T</td><td>O</td></tr><tr><td></td><td>2</td><td>4</td><td>5</td></tr><tr><td>x</td><td></td><td></td><td>4</td></tr><tr><td></td><td>9</td><td>8</td><td>0</td></tr></table> 1 2 <table><tr><td></td><td></td><td>2</td><td>1</td><td>4</td></tr><tr><td></td><td>4</td><td>8</td><td>5</td><td>16</td></tr></table>		H	T	O		2	4	5	x			4		9	8	0			2	1	4		4	8	5
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Calculation Methods/ Representations																																																															

Year 5

Yr5	Place Value	Addition and Subtraction	Multiplication and Division
NC Objectives	Read, write, order and compare numbers to at least 1000000 and determine the value of each digit. Count forwards or backwards in steps of powers of 10 for any given number up to 1000000. Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero. Round any number up to 1000000 to the nearest 10, 100, 1000, 10000 and 100000. Solve number problems and practical problems that involve all of the above. Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	Add and subtract numbers mentally with increasingly large numbers. Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction). Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	Identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers. Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19. Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers. Multiply and divide numbers mentally, drawing upon known facts. Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000. Recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³). Solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes. Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
Calculation Methods/Representations	PV Counter Chart 	Addition $\begin{array}{r} 3.65 \\ + 2.41 \\ \hline 6.06 \\ 1 \end{array}$ Subtraction $\begin{array}{r} 5.43 \\ - 2.7 \\ \hline 2.73 \end{array}$	Multiplication and Division 

Year 6

Yr6	Place Value	Addition, Subtraction, Multiplication and Division	Fractions (including decimals and percentages)
NC Objectives	Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit. Round any whole number to a required degree of accuracy. Use negative numbers in context, and calculate intervals across zero. Solve number and practical problems that involve all of the above.	Solve addition and subtraction multi step problems in contexts, deciding which operations and methods to use and why. Multiply multi-digit number up to 4 digits by a 2-digit number using the formal written method of long multiplication. Divide numbers up to 4 digits by a 2-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding as appropriate for the context. Divide numbers up to 4 digits by a 2-digit number using the formal written method of short division, interpreting remainders according to the context. • Perform mental calculations, including with mixed operations and large numbers. Identify common factors, common multiples and prime numbers. Use their knowledge of the order of operations to carry out calculations involving the four operations. Solve problems involving addition, subtraction, multiplication and division. Use estimation to check answers to calculations and determine in the context of a problem, an appropriate degree of accuracy	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. Compare and order fractions, including fractions >1. Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $1/4 \times 1/2 = 1/8$). Divide proper fractions by whole numbers (e.g. $1/3 \div 2 = 1/6$). Associate a fraction with division to calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $3/8$). Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places. Multiply one digit numbers with up to two decimal places by whole numbers. Use written division methods in cases where the answer has up to two decimal places. Solve problems which require answers to be rounded to specified degrees of accuracy. Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
Calculation Methods/Representations	PV Counter Chart	; whole numbers, fractions and decimals.	

Vocabulary EYFS

NUMBER

1 less/1 less than	doubles	less	one, two, three... twenty
1 more/1 more than	equal(s)	more	pair(s)
big/bigger/biggest	equal amounts/shares	none	part(s)
count (up/down)	even	number	pattern(s)
from/to	few/fewer/fewest	number bond	repeating pattern(s)
count/counting	first, second... tenth	number cards	same/same as
count back (from, to)	five, 5	number facts	ten, twenty... one hundred
count in ones	four, 4	number line	ten less/more
count on (from, to)	great/greater/greatest	number square	the same number as
count out	high/higher/highest	number track	three, 3
difference (between)	how many...?	odd	two, 2
double/doubling	large/larger/largest	one, 1	zero

PLACE VALUE & ORDER

after	digit	next	size
as many as	first	ones	ten(s)
backwards	forwards	order	
between	increase	partition	
decrease	last	parts of a number	

ADDITION & SUBTRACTION

add	double	minus	subtraction
adding	how many fewer is... than...?	more	subtracting
adding more	how many left/left over?	one/two/ten less	sum
addition	how many more is... than...?	one/two/ten more	take (away)
altogether	how many more to make... ?	plus	taking away
and	make	subtract	total

MULTIPLICATION & DIVISION

each	fair share	left over	sharing
equal	group	share (out)	

Year 1

NUMBER

amount	few/fewest	least	pair
bigger/smaller	figure	most	sequence
count on/back/in	great/greater/greatest	odd/even	smallest
equal to	greater than	one hundred	
equivalent to	how many (more)...?	ones, twos, fives, tens	
even	is the same value as	order/in order	

PLACE VALUE & ORDER

after	halfway	partition
as many as	hundred square	smaller/smallest
base 10	larger/largest	total
before	number(s)	unit(s)
compare	number line	whole
fewer	part	
greater/greatest	part-whole model	

ADDITION & SUBTRACTION

add(ed)	difference (between)	minus	plus
addition	equals	missing number	subtract/subtracting
altogether	fact family	near doubles	subtraction
calculation	half/halve	number bonds/pairs	take away
combine/combination	how many...?	number sentence	total

MULTIPLICATION & DIVISION

array	double/doubling/doubled	lots of	repeated addition
balances	equal groups	multiple	sharing
columns/rows	group/groups of	multiplication	
count in tens	halving	multiplied by	
division/divided by	left/left over	once, twice, three/five times	

Year 2

NUMBER

1-digit number	quantity	turn
2-digit number	set	units
digit	tally	value
predict	tens	

PLACE VALUE & ORDER

column	hundred less/more	ones column	position
decrease	increase	partition	recombine
halfway between	interval(s)	pattern	tens column
higher	lower	placeholder	twenty-first
hundreds	multiples of (ten)	place value	twenty-second

ADDITION & SUBTRACTION

adding sentence/story	in total	number facts	smaller
balances/balancing	inverse	numeral	sum
column(s)	larger	part-whole model	whole tens
count back	multiple	row	

MULTIPLICATION & DIVISION

altogether	equivalent	part	times
balances	group (equally/between)	product	times table
combinations	groups of	scale up	total
divide	inverse	set	twice as big/small as
each	left over	share (equally/between)	
equal/unequal	lots of...	signs/symbols	
equation	multiplication table	split (equally/between)	

Year 3

NUMBER

3-digit number
factor (of)
fifties

number names to 1000
one thousand
Roman numerals

PLACE VALUE & ORDER

3-digit number(s)
arrange
arrangement

ascending
descending
midpoint

one hundred less/more
pattern
thousand(s)

ADDITION & SUBTRACTION

balances/balancing
bar model
column addition/subtraction

complete
error
function machine

number trio
part-whole model
partition/partitioning

rearrange
regroup
related facts

MULTIPLICATION & DIVISION

bar model
compact method
divided equally
divisor

equal/unequal parts
fact family
grouped equally
half/double the size

how many times bigger/smaller?
part-whole model
partition
quarter/quartering

regroup/regrouping
remain/remains/remaining
remainder
scaling up/down

Year 4

NUMBER

4-digit number
classify
consecutive
decimal
decimal number

decimal place
decimal point
horizontal
hundredths
increasing/decreasing

integer
magnitude
minus
negative numbers
number range

positive numbers
ten thousand
tenths
whole number

PLACE VALUE & ORDER

1/2 decimal place
column value
decimal point

hundredth(s)
hundred thousand
hundredths column

million
numeral
round to the nearest...

tenths column
thousandth(s)

ADDITION & SUBTRACTION

column method/calculation
complements

not equal to
regrouping

rounding
zero as a place holder

MULTIPLICATION & DIVISION

... times bigger/smaller
common multiples
derive
divisible by...

factor pair
fraction
hundred square
lowest common multiple

multiples
ratio
related facts
square/squared

times table square
triple

Year 5

NUMBER

cubed
cubed number
divisible/divisibility

factor pair
formula
hundred thousand

one million
prime number
squared

square number
 $\leq$ less than or equal to
 $\geq$ greater than or equal to

PLACE VALUE & ORDER

5-digit number(s)
hundred thousand

part-whole relationship
power(s) of 10

ten times
thousandths column

thousand times

ADDITION & SUBTRACTION

bridging
decimals

efficient writing method
integers

inverse relationship
quantity value

tenths boundary
units boundary

MULTIPLICATION & DIVISION

area model
common factors
common multiple
composite number
cube number

decimal
dividend
divisibility
formal written method
highest common factor

long multiplication
one thousandth
prime factors
prime number
quotient

short division
square number

Year 6

NUMBER

digit total
factorise
figures

prime
prime factor
zero

NUMBER

digit total
factorise
figures

prime
prime factor
zero

PLACE VALUE & ORDER

7-digit number
hundred thousand column
millions column

one million
scale interval
ten million

ten thousand column
zero

ADDITION & SUBTRACTION

above/below zero
brackets
negative

order of operations
positive

MULTIPLICATION & DIVISION

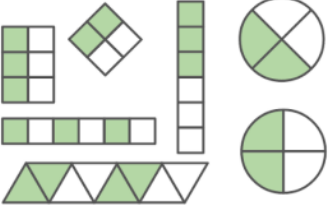
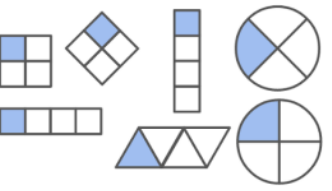
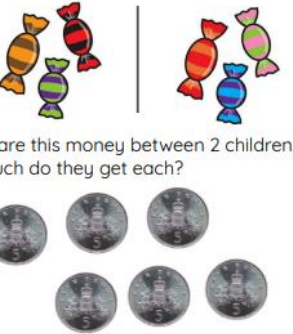
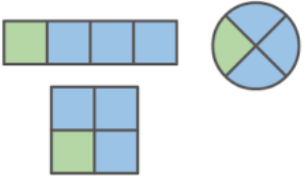
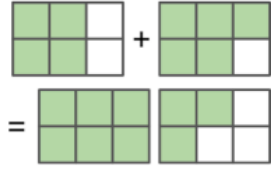
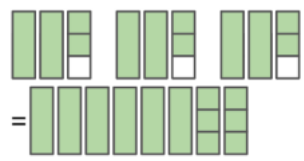
brackets
decimal point
factor tree

long division
operations
order of operations

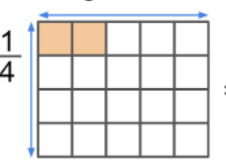
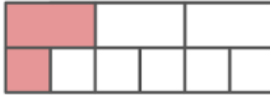
power of 10
powers
prime factorisation

repeated subtraction

Fractions

ARE Y2	ARE Y3	ARE Y4	ARE Y5
Identify one half of a shape given in a range of pictorial representations.  $\frac{1}{2}$ means one out of every 2. Identify one quarter of a shape given in a range of pictorial representations.  Halve a set of objects or amount of money by sharing.  Share this money between 2 children. How much do they get each?	Adding fractions with common denominators Identify what must be added to a fraction to make 1 whole one. E.g. $\frac{1}{4} + \frac{3}{4} = \frac{4}{4} = 1$  One whole on is where the numerator and denominator are the same. Extend to the addition of fractions with the same denominator, not bridging the whole. $\frac{1}{7} + \frac{5}{7} = \frac{6}{7}$  When denominators are the same, we can simply add the numerators.	Adding fractions with common denominators Continue to practice addition of fractions with the same denominator. Subtracting fractions with the same denominator. $\frac{6}{7} - \frac{3}{7} = \frac{3}{7}$  Adding fractions when the whole is bridged, $\frac{4}{6} + \frac{5}{6} = \frac{9}{6}$  Finding fractions of quantities. E.g. $\frac{2}{5} \text{ of } 10 = 4$ $10 \div 5 = 2$ $2 \times 2 = 4$ Rule: Divide by the denominator then multiply by the numerator. Divide by the bottom then times by the top. Use models and images to support. Use concrete objects to begin then move to pictorial and abstract.	Adding and subtracting fractions with common denominators See Year 4 to add and subtract fractions with common denominators. Give answers as mixed numbers. E.g. $\frac{4}{6} + \frac{5}{6} = \frac{9}{6} = 1\frac{3}{6}$ 6 into 9 goes 1 remainder 3 Extend to add and subtract fractions with different denominators, including simplification. $\frac{2}{3} + \frac{5}{9} =$ $\frac{6}{9} + \frac{5}{9} = \frac{11}{9} = 1\frac{2}{9}$ Multiply a single fraction by a whole number $5 \times \frac{1}{4} = \frac{5}{4} = 1\frac{1}{4}$  Multiply a mixed number by a whole number. Begin with a pictorial methods. $3 \times 2\frac{2}{3} = 6\frac{6}{3} = 8$  Extend to a formal written method.

Fractions in Y6:

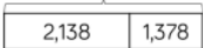
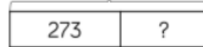
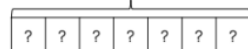
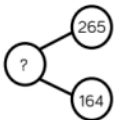
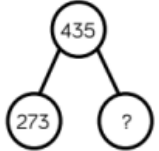
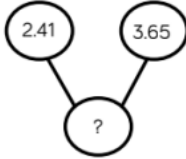
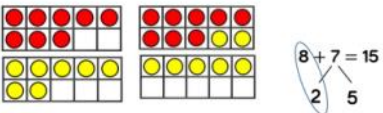
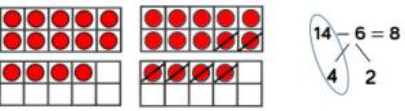
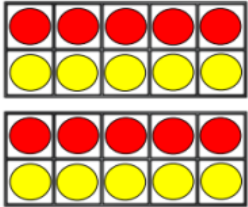
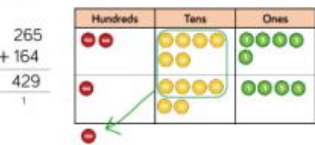
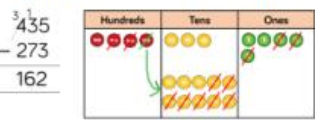
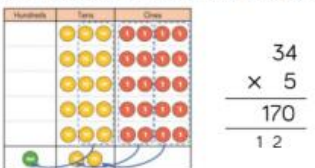
Addition	Subtraction	Multiplication	Division
Formal written methods for addition. Find common denominators using table facts and common multiples. <i>Here, 28 is a common multiple of 4 and 7.</i> $\frac{3}{4} + \frac{2}{7} =$ $\frac{21}{28} + \frac{8}{28} = \frac{29}{28} = 1 \frac{1}{28}$ Extend to the addition of mixed numbers. Convert mixed numbers to improper fractions before addition. $1\frac{1}{4} + \frac{2}{7} =$ $\frac{5}{4} + \frac{2}{7} =$ $\frac{35}{28} + \frac{8}{28} = \frac{43}{28} = 1 \frac{15}{28}$ Always give answers in their lowest form by finding common factors of numerator and denominators. $\frac{4}{12} = \frac{2}{6} = \frac{1}{3}$ Numerator and denominator can be halved. 2s go into 2 and 6.	Formal written methods for subtraction. Find common denominators using table facts and common multiples. $\frac{3}{4} - \frac{2}{7} =$ $\frac{21}{28} - \frac{8}{28} = \frac{13}{28}$ Notice here, 13 is a prime number and so this fraction cannot be simplified. Extend to the addition of mixed numbers. Convert mixed numbers to improper fractions before subtraction. $1\frac{1}{4} - \frac{2}{7} =$ $\frac{5}{4} - \frac{2}{7} =$ $\frac{35}{28} - \frac{8}{28} = \frac{27}{28}$ Always give answers in their lowest form by finding common factors of numerator and denominators. $\frac{4}{12} = \frac{2}{6} = \frac{1}{3}$ Numerator and denominator can be halved. 2s go into 2 and 6.	Multiplying single fraction by whole number. Multiply two proper fractions. Begin with a pictorial method. E.g. $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$  E.g. $\frac{2}{5} \times \frac{1}{4} = \frac{2}{20} = \frac{1}{10}$  Once the pupils are confident, extend to a formal written method. E.g. $\frac{2}{5} \times \frac{1}{4} = \frac{2 \times 1}{5 \times 4} = \frac{2}{20} = \frac{1}{10}$ E.g. $\frac{1}{3} \times \frac{1}{2} = \frac{1 \times 1}{3 \times 2} = \frac{1}{6}$	Dividing proper fractions by whole numbers E.g. $\frac{1}{3} \div 2 = \frac{1}{6}$  Children must understand that dividing by a whole number is the same as multiplying by the <i>reciprocal</i>. E.g. $\frac{1}{3} \div 2 = \frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$

Questioning

BIG questions to develop reasoning		Questions to check understanding . . .	
- What is the same / different about . . . - Which of these numbers/calculations are trickier? Why? - Do you agree or disagree that . . . - Is it always/sometimes/never true that . . . - What do you notice about . . . - Give me an example of . . . and another . . . - Spot the mistake . . . explain the mistake - What couldn't it be? What could it be? - Give me a silly suggestion for . . . - Convince me that . . . - Prove by drawing/using dienes/using algebra that . . . - What comes next . . . What came before? - The answer is . . ., what's the question? - What's in the empty box? - If we know . . . what else do we know? - Spot the pattern, explain the pattern. - Find an equivalent for . . . - Can I change the order I do this in? - Can you make up a story/real situation for this maths?		- Can you explain how you know that? - Why must that be the correct answer? - How do you know that? - Are you sure you're correct?	
Starter Questions:	Questions to stimulate mathematical thinking:	Assessment Questions:	Final Discussion Questions:
These take the form of open-ended questions which focus the children's thinking in a general direction and give them a starting point. Examples: How could you sort these.....? How many ways can you find to ? What happens when we ? What can be made from....? How many different can be found?	These questions assist children to focus on particular strategies and help them to see patterns and relationships. The questions can serve as a prompt when children become 'stuck'. Examples: What is the same? What is different? Can you group these in some way? Can you see a pattern? How can this pattern help you find an answer? What do think comes next? Why? Is there a way to record what you've found that might help us see more patterns? What would happen if....?	Questions such as these ask children to explain what they are doing or how they arrived at a solution. They allow the teacher to see how the children are thinking, what they understand and what level they are operating at. Examples: What have you discovered? How did you find that out? Why do you think that? What made you decide to do it that way? What else do you know now? How do you know that?	These questions draw together the efforts of the class and prompt sharing and comparison of strategies and solutions. This is a vital phase in the mathematical thinking processes. It provides further opportunity for reflection and realisation of mathematical ideas and relationships. It encourages children to evaluate their work. Examples: Who has the same answer/ pattern/ grouping as this? Who has a different solution? Are everybody's results the same? Why/why not? Have we found all the possibilities? How do we know? Have you thought of another way this could be done? Do you think we have found the best solution?

'I know that there is nothing better for people than to be happy and to do good while they live.' Ecclesiastes 3:12

Visual Representations to support written methods

Bar Models	Part, Part, Whole Models	Ten Frames	Place Value Counters
Bar models are a visual representation of a written method. They are used to represent all the calculations and can be used with fractions, decimals and percentages. Bars are drawn and then used to combine numbers together or find missing amounts. Addition $2,138 + 1,378 =$  Subtraction $435 - 273 =$  Multiplication  $3 \times 7 = 21$ $7 \times 3 = 21$ Division  $21 \div 7 = 3$	Part, part, whole models are used within addition and subtraction to highlight the link between place value and calculation. When the parts are complete and the whole is empty, children use aggregation (bringing parts together) to add the parts to find the total.  When the whole is complete and at least one of the parts is empty, children use subtraction through partitioning to find the missing part.  In upper Key Stage 2, children can use part, part whole models to add and subtract with decimals, percentages and fractions where required. 	Tens frames are a visual representation to allow children to see calculations within ten and to see exchanges. Addition of numbers allows children to see which parts of numbers can go together to make whole tens.  Subtraction can be demonstrated by children removing counters from the tens frame and by partitioning to support mental calculation.  Tens frames are also used within Key stage 1 to look at patterns within early times tables, multiplication and division problems by looking at simple groups and patterns within numbers. 	To support children writing out calculation, place value grids and counters are used to support clarity in exchanges between the columns and to visualise calculation processes. Addition - physical counters are used to support images used.  Subtraction - In subtraction grids can be shown in removing counters whilst also exchanging between columns  Multiplication - Place value counters can be used to support the understanding of column multiplication, showing exchanges  Division - counters within columns are used for grouping in division. 