BRINDLEY HEATH ACADEMY

MENTAL MATHS

PROGRESSION POLICY

July 2020

Introduction

At Brindley Heath Academy we believe that Oral and mental work in mathematics is essential, particularly so in calculation. Early practical, oral and mental work must lay the foundations by providing children with a good understanding of how the four operations build on efficient counting strategies and a secure knowledge of place value and number facts. Later work must ensure that children recognise how the operations relate to one another and how the rules and laws of arithmetic are to be used and applied.

Ongoing oral and mental work provides practice and consolidation of these ideas. It must give children the opportunity to apply what they have learned to particular cases, exemplifying how the rules and laws work, and to general cases where children make decisions and choices for themselves. The ability to calculate mentally forms the basis of all methods of calculation and has to be maintained and refined.

A good knowledge of numbers or a 'feel' for numbers is the product of structured practice and repetition. It requires an understanding of number patterns and relationships developed through directed enquiry, use of models and images and the application of acquired number knowledge and skills. Secure mental calculation requires the ability to:
- ✓ recall key number facts instantly;
- ✓ use taught strategies to work out the calculation;
- ✓ understand how the rules and laws of arithmetic are used and applied.

Age Related Expectations

The following document is divided into year groups and shows the age related expectations for each operation. However, we understand that not all children will progress at the same rate and will need to consolidate previous year objectives. It is important to secure these prior expectations before progressing to new learning. With this in mind, the policy also shows the progression for years one and two.

Core Understanding for each Operation

- ✓ For addition, children understand that:
- ✓ Addition is the combining of two or more quantities resulting in a larger total.
- ✓ Addition is the inverse of subtraction.
- ✓ Addition is commutative i.e. that 3 + 5 = 8 and 5 + 3 = 8.

- ✓ For subtraction, children understand that:
- ✓ Subtraction is the removing or taking away a quantity from another.
- ✓ Subtraction is the inverse of addition.
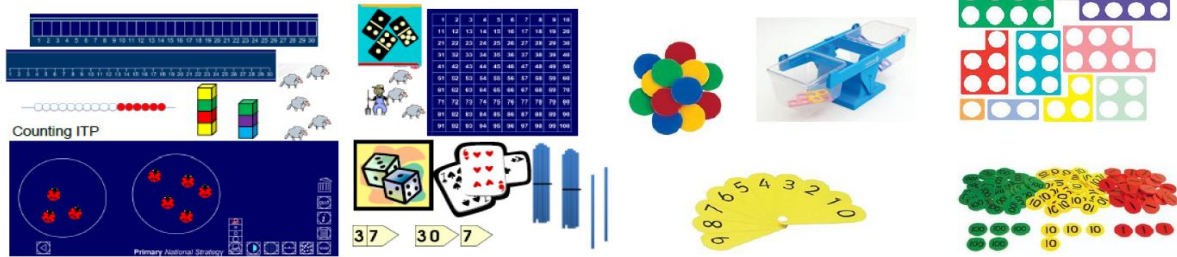- ✓ Subtraction is **not** commutative i.e. 3 + 5 = 5 + 3 but 5 − 3 ≠ 3 − 5.

- ✓ For multiplication, children understand that:
- ✓ Multiplication is repeated addition.
- ✓ Multiplication is the inverse of division.
- ✓ Multiplication is commutative i.e. that 3 x 5 = 15 and 5 x 3 = 15.

- ✓ For division, children understand that:
- ✓ Division is sharing or grouping (repeated subtraction).
- ✓ Division is the inverse of multiplication.
- ✓ Division is **not** commutative i.e. 3 x 5 = 5 x 3 but 15 ÷ 3 ≠ 3 ÷ 15.

It is important that any type of calculation is given a real life context or problem solving approach to help build children's understanding of the purpose of calculation, and to help them recognise when to use certain operations and methods when faced with problems. This must be a priority within calculation lessons.

Year One

Practical equipment, models and images to support children v

YEAR 1 ADDITION

Mental Calculation Skill	Example	Prior Knowledge
Add a pair of single digit numbers	✓ 3 + 5 ✓ Represent this calculation using cubes, cars, small world people, a number track / line. ✓ If 3 + 5 = 8, what else do you know?	✓ Know the number names up to 20 in order, in symbols (using numerals) and words (spoken). ✓ Know number bonds to 20. ✓ Understand the amounts the symbols and words represent. ✓ Count on from any given single digit number. ✓ Know that the last number said is the total (cardinality). ✓ Place value - identify the largest number in order to count on from this. ✓ Reorder the numbers to start from the largest number making the count more efficient. ✓ Group small amounts to make the count more efficient.
Add a single digit number to a teens number	✓ 13 + 5 ✓ Represent this calculation using cubes, cars, small world people, a number track / line. ✓ If 13 + 5 = 18, what else do you know?	As above plus: ✓ Count on from any given teens number. ✓ Know and use related addition facts e.g. 3 + 5 = 8 so 13 + 5 = 18. ✓ Place value - understand what each digit represents in a teens number.
Add a single digit number to 10 or a multiple of 10	✓ 10 + 7 ✓ 7 + 30 ✓ 7 + ? = 73 ✓ Represent these calculations using cubes, base 10 equipment, bundles of straws, a number track/line, a 100 square.	As above plus: ✓ Know the decade number names up to 100 in order, in symbols (using numerals) and words (spoken). ✓ Understand the amounts the symbols and words represent. ✓ Place value – understand what each digit represents in a two-digit number. ✓ Use knowledge of place value to recognise that combining 60 and 5 equals 65.
Add near doubles	✓ 6 + 7	✓ Place value - recognise when numbers are close to each other. ✓ Double any single digit number. ✓ Add or subtract 1 to or from any number.

YEAR 1 SUBTRACTION

Mental Calculation Skill	Example	Prior Knowledge
Subtract a pair of single-digit numbers	✓ 8 - 3 ✓ Model this calculation using cubes, small world people, a number line/track. ✓ If 8 – 3 = 5, what else do you know?	✓ Know number names up to 10 in order in symbols and words and understand the amounts they represent. ✓ Understand the amounts the symbols and words represent. ✓ Count back from any given single digit number. ✓ Know that the last number said is the amount left. ✓ Place value – identify the largest number in order to count back from this.
Subtract a single-digit number from a teens number	✓ 15 - 3 ✓ Model this calculation using cubes, small world people, a number line/track. ✓ If 15 – 3 =12, what else do you know?	As above plus: ✓ Know number names up to 20 in order in symbols (using numerals) and words (spoken). ✓ Count back from any given teens number. ✓ Count back in ones. ✓ Know and use related subtraction facts e.g. 5 – 3 = 2 so 15 – 3 = 12. ✓ Place value- understand what each digit represents in a teens number.
Subtract a single-digit number from 10	✓ 10 - 7 ✓ 10 - ? = 6 ✓ 10 - ? = ?	As above plus: ✓ Count back in ones. ✓ Know number bonds to 10. ✓ • Understand and use subtraction as the inverse of addition.

YEAR 1 MULTIPLICATION
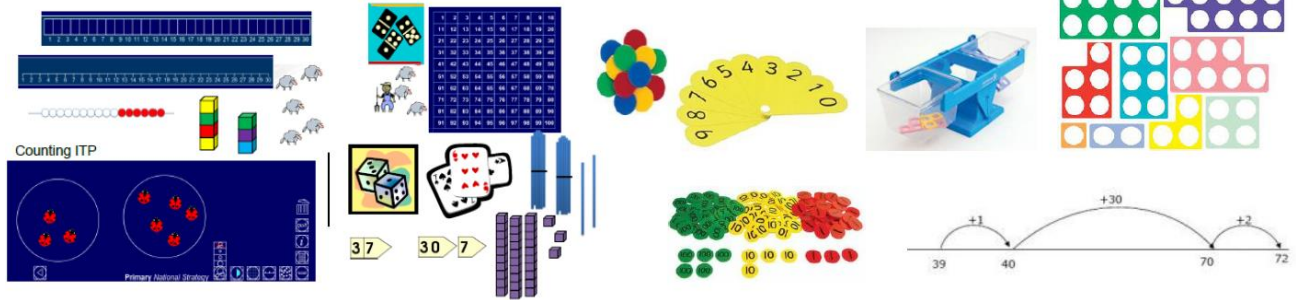
Count on in ones from any number to 100.	✓ If you count in twos from 0, what will be the first six numbers? ✓ I'm putting 10p coins into this piggy bank. Count in tens to check how much money is going in. ✓ Count the number of eyes in this class.	✓ Begin to understand the link between multiplication and repeated addition. ✓ Know the number names up to 100 in order, in symbols (using numerals) and words (spoken). ✓ Recognise number patterns, in numeric symbols and spoken words. ✓ Cross tens boundaries when counting in ones and twos by understanding the base 10 number system. ✓ Learn and apply 2x table and 10x table. Understand and use commutativity (multiplication can be done in any order).

YEAR 1 DIVISION

Count back to zero in ones, twos, fives or tens	✓ Count back in ones from 14 to 0. ✓ Now try counting back in twos from 14 to 0. How many numbers did you say? ✓ Count back in tens from 90 to 0.	✓ Begin to understand the link between division and repeated subtraction ✓ Count on from 0 in ones, twos, fives and tens. ✓ Cross tens boundaries when counting in ones and twos by understanding the base 10 number system. ✓ Know the number names up to 100 in order, in symbols (using numerals) and words (spoken). ✓ Understand the amounts the symbols and words represent. ✓ Place value – understand what each digit represents in a two-digit number. ✓ Recognise number patterns, in numeric symbols and spoken words.

Year Two

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YEAR 2 ADDITION

Mental Calculation Skill	Example	Prior Knowledge
Add two or three single-digit numbers, including crossing 10	✓ 5 + 8 ✓ 2 + 4 + 3 ✓ Represent this calculation using cubes, cars, small world people, a number track/line, straws, multi-link, bead bars.	✓ Know the number names up to 10 in order, in symbols (using numerals) and words (spoken). ✓ Understand the amounts the symbols and words represent. ✓ Count on from any given single digit number. ✓ Place value – identify the largest number in order to count on from this. ✓ Reorder the numbers to start from the largest number making the count more efficient. ✓ Place value –value of tens/units. ✓ Addition can be done in any order. ✓ Know and use number bonds to 10. ✓ Subitise small amounts to make the count more efficient.
Add a single-digit number to a two-digit number, including crossing a tens boundary	✓ 23 + 5 ✓ 28 +5	✓ Count on from any two-digit number in 1s. ✓ Use number bonds to efficiently add numbers to bridge 10.
Add a multiple of 10 to any single or two-digit number	✓ 27 + 60 ✓ Show how to work this out on a 100 square /number line/base 10/a bead string. ✓ If there is 36p in the piggy bank and I drop in four 10p coins, how much does the piggy bank have in it now?	✓ Know what is 10 more than any given two-digit number ✓ Count on in 10s from any two-digit number
Add 9, 19, 29,... or 11, 21, 31,...	✓ 23 + 9 34 + 11 ✓ Show what these calculations would look like on a number line.	✓ Add 10 to any number. ✓ Add a multiple of 10 to any number. ✓ Be able to round to the nearest 10.
Add near doubles	✓ 13 + 14	✓ Double any two-digit number.

YEAR 2 SUBTRACTION

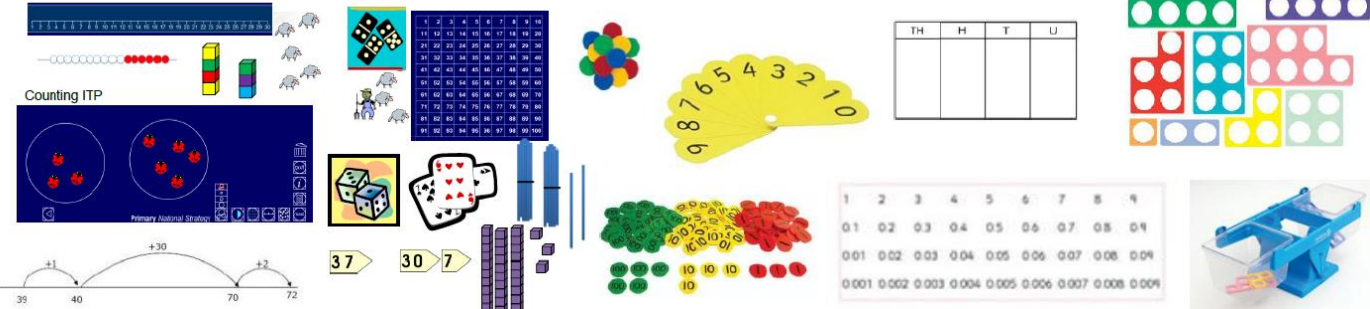|		
Subtract a pair of single-digit numbers and a single-digit number from a teens number, including crossing 10	✓ 12 – 7 ✓ Model this calculation using cubes, small world people, a number line/track. ✓ If 12 – 7 = 5, what else do you know?	✓ Know the number names up to 20 in order, in symbols (using numerals) and words (spoken). ✓ Understand the amounts the symbols and words represent. ✓ Use and apply number bonds to 10. ✓ Count back in ones from any teens number or single digit number. ✓ Place value – identify the largest number in order to count back from this. ✓ Place value – understand the value of each digit in a teens number. ✓ Know number bonds of all numbers up to 10
Subtract any single-digit from a multiple of 10	✓ 20 – 3 ✓ 40 - ? = 32 ✓ 30 - ? = 2?	As above plus: ✓ Know the decade number names up to 100 in order, in symbols (using numerals) and words (spoken). ✓ Understand the amounts the symbols and words represent. ✓ Place value – understand what each digit represents in a two-digit number.
Subtract a single-digit number from any two-digit number including crossing the tens boundary	✓ 32 – 6 ✓ 44 - ? = 37 ✓ 52 - ? = 4?	As above plus: ✓ Understand subtraction as finding the difference. ✓ Count back from any two-digit number in ones. ✓ Count on from any two-digit number in ones. ✓ Use number bonds to efficiently bridge through a multiple of 10.
Subtract a multiple of 10 from any two-digit number	✓ 63– 40 ✓ 47 - ? = 7 ✓ 73 - ? = 33 ✓ 56 - ? = ?6	As above plus: ✓ Know what is 10 less than any given two-digit number. ✓ Count back in tens from any given number.
Subtract a two-digit number from any multiple of 10	✓ 90 - 27	✓ Partition the non-multiples of 10 e.g. 27 into 20 + 7. ✓ Count on and back in tens and ones. ✓ Use knowledge of place value to relate 9 – 2 =7 to 90 – 70 = 20
Subtract pairs of two-digit numbers without crossing the tens boundary	✓ 86 – 23 ✓ 39 – 17 ✓ 52 – 49	✓ Partition two-digit numbers into tens and units. ✓ Recombine tens and units. ✓ Count on and back in tens and ones. ✓ Know and use knowledge of number bonds to 10. ✓ Know that they can count on if the numbers are close together.
Subtract near multiples of ten and adjust	✓ 27 – 11 ✓ 32 – 9	✓ Know what is 10 less than any given two-digit number. ✓ Understand whether to add on or take away in order to adjust.

YEAR 2 MULTIPLICATION

Double any multiple of 10 up to 100	✓ Double 15 ✓ 30 + 30 = ✓ Explain how you could work out double 45. ✓ Twice 25 is... ✓ 40 multiplied by 2 equals...	✓ Double single digit numbers. ✓ Double multiples of 10. ✓ Partition two-digit numbers into T and U and recombine T and U (by adding components). ✓ Understand that doubling is adding the same number to itself. ✓ Understand that doubling is multiplying by 2.
Find the total number of objects when they are organised in groups of 2, 5 or 10	✓ What is the total of six groups of 5? ✓ How many fingers do these 4 children have? How did you work it out? ✓ What is the total of this tally? IIII IIII IIII IIII ✓ How else could you write 10 + 10 + 10 + 10?	✓ Count on from zero in twos, fives and tens. ✓ Relate 'groups of' to repeated addition. ✓ Understand that the last number said in the count is the total of the group. Learn and apply 2x table, 10x table and 5x table. ✓ Understand and use commutativity (multiplication can be done in any order). ✓ Use estimation to predict and check answers.

YEAR 2 DIVISION

Halve any multiple of 10 up to 100 where the answer is even	✓ 40 ÷ 2 ✓ Use these bundles of straws to help you halve 90.	✓ Know multiples of 10. ✓ Halve even numbers to 20. ✓ Understand that halving is dividing by 2 and half as one of two equal parts. ✓ Understand and use knowledge of base 10 number system to relate 8 ÷ 2 to 80 ÷ 2.
Find half of even numbers to 40	✓ Halve 24 ✓ 32 ÷ 2 ✓ ?? x 2 = 20 ✓ 28 = ?? x 2	As above plus: ✓ Know even numbers. ✓ Partition numbers in different ways e.g. when finding half of 36 partitioning 36 into 20 + 16.
Use times tables facts to divide two-digit numbers by 2, 5 or 10	✓ 18 ÷ 2 ✓ 45 ÷ 5 ✓ 60 ÷ 10	✓ Know and use division facts related to the 2x table, 5x table and 10x table.

Year Three

Practical equipment, models and images to support children

YEAR 3 ADDITION

Mental Calculation Skill	Example	Prior Knowledge
Add groups of small numbers	✓ 15 + 13 + 2 ✓ 6 + 1 + 4	✓ Count on from any given number. ✓ Know number bonds to 10 and 20. ✓ Add number bonds first.
Add a two or three digit number to a multiple of 10 or 100	✓ 50 + 38 ✓ 132 + 60 ✓ 325 + 200 ✓ Show how to work this out on a 100 square/ number line/ base 10/ bead string/bundles of straws.	✓ Partition the non-multiple of 10 e.g. 381 into 300 + 80 +1. ✓ Count on in 10s from a multiple of 10. ✓ Use knowledge of place value to relate 5+3 = 8 to 50+30 = 80.
Add any pair of two-digit numbers, including tens and 100 boundary.	✓ 47 + 58 ✓ Prove that 67 + 55 = 122 using practical equipment or jottings.	✓ Partition two-digit numbers into tens and units. ✓ Understand place value in three-digit numbers.
Add near doubles	✓ 25 + 26	✓ Double any two-digit number

YEAR 3 SUBTRACTION

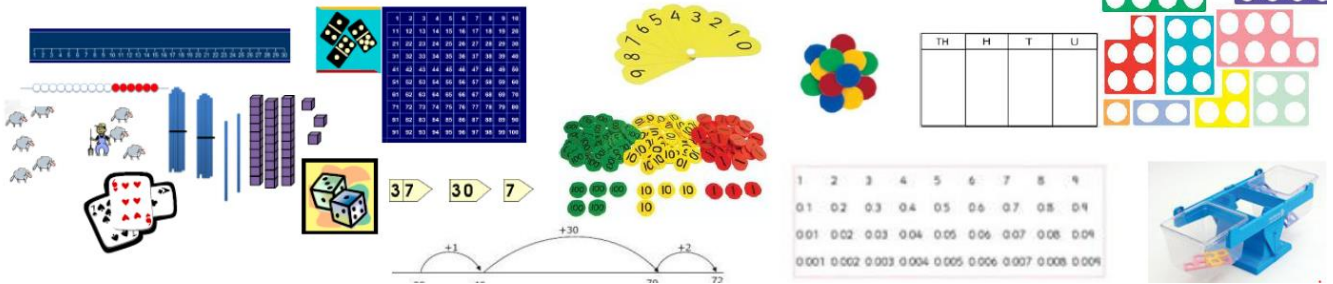|	Example	Prior Knowledge
Subtract groups of small numbers	✓ 7 - 3 - 2 in context e.g. There were 7 children on the bus, 3 got off in Preston, 2 got off in Chipping. How many were left on the bus?	✓ Count on and back in ones from any given number. ✓ Know number bonds to 10.
Subtract pairs of two-digit numbers including crossing the tens boundary	✓ 65 – 38 ✓ 91 – 35	✓ Count on and back in ones from any two-digit number. ✓ Count on and back in tens from any two-digit number. ✓ Partition two digit numbers to tens and units. ✓ Recombine tens and units. ✓ Understand place value in two digit numbers.
Subtract single-digit numbers and multiples of 10 or 100 from three-digit numbers from any three-digit number.	✓ • 348 – 7 ✓ • 283 – 20 ✓ • 364 – 100	✓ Count on and back in ones from any three-digit number. ✓ Count on and back in tens from any three-digit number. ✓ Count on and back in hundreds
Reorder and recombine numbers to enable more efficient calculations	✓ 7 – 3 – 2 = 7 - (3+2) ✓ 14 – 5 – 4 = 14 – 4 – 5	✓ Understand that subtraction is not commutative. ✓ Know and use knowledge of number bonds to 10. ✓ Count on and back in tens and ones.

YEAR 3 MULTIPLICATION

Double any multiple of 5 up to 100	✓ Double 55 ✓ 30 + 30 = ✓ Explain how you could work out double 65. ✓ Twice 70 is... ✓ 40 multiplied by 2 equals...	✓ Double single digit numbers. ✓ Double multiples of 10. ✓ Partition two-digit numbers into T and O and recombine T and O (by adding components). ✓ Understand that doubling is adding the same number to itself. ✓ Understand that doubling is multiplying by 2.
Multiply one-digit and two-digit numbers by 10 or 100	✓ 13 x10 = ✓ 7 x 100 = ✓ Balloons are sold in packs of 10. How many balloons are in 24 packs?	✓ Understand base 10 number system i.e. 10 ones / units = 1 ten and vice versa and 10 tens = 1 hundred and vice versa. ✓ Understand that zero can be used as a place holder. ✓ Learn and apply 2x table, 10x table, 5x table, 3x table, 4x table and 8x table. ✓ Use estimation to predict and check answers.

YEAR 3 DIVISION

Halve any multiple of 10 up to 100 where the answer is even	✓ 40 ÷ 2 ✓ Use these bundles of straws to help you halve 90.	✓ Know multiples of 10. ✓ Partition multiples of 10 into pairs of multiples of 10 e.g. 90 = 80 + 10. ✓ Halve even numbers to 20. ✓ Understand that halving is dividing by 2 and half as one of two equal parts. ✓ Understand and use knowledge of base 10 number system to relate 8 ÷ 2 to 80 ÷ 2.
Halve any multiple of 10 up to 200	✓ Halve 170 ✓ 150 ÷ 2 ✓ ?? x 2 = 140 ✓ 130 = 2 x ?? ✓ ½ of 110	✓ Know multiples of 10 up to 200. ✓ Partition multiples of 10 into pairs of multiples of 10 e.g. 170 = 160 + 10. ✓ Halve even numbers to 20. ✓ Understand that halving is dividing by 2 and half as one of two equal parts. ✓ Understand and use knowledge of base 10 number system to relate 8 ÷ 2 to 80 ÷ 2.
Use times tables facts to divide two-digit numbers by 3, 4 or 8	✓ 21 ÷ 3 ✓ 36 ÷ 4 ✓ 48 ÷ 8	✓ Know and use division facts related to the 3x table, 4x table and 8x table.
Use times tables facts to divide multiples of ten by 2, 3, 4, 5, 8 and 10	✓ 15 ÷ 5 = 3 ✓ 150 ÷ 5 = 30 ✓ 150 ÷ 50 = 3	✓ Know and use division facts related to the 2x table, 3x table, 4x table, 5x table, 8x table and 10x table. ✓ Use place value to find related facts.
Find unit fractions of numbers and quantities involving halves, thirds, quarters, fifths and tenths	✓ Find ¼ of 24. ✓ One third of a number is 5. What is the number? ✓ What is a fifth of 20ml?	✓ Understand fractions as equal parts of a whole. ✓ Understand what the numerator and denominator represent in a fraction. ✓ Understand that finding a fraction of an amount is related to sharing equally (division). ✓ Know multiplication facts and related division facts for 2, 3, 4, 5 and 10x tables. ✓ Count in equal steps (groups). ✓ Understand fractions of shapes.

Year Four

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YEAR 4 ADDITION

Mental Calculation Skill	Example	Prior Knowledge
Add two-digit or three-digit multiples of 10	✓ 140 + 150 ✓ 140 + 70	✓ Use knowledge of place value to relate e.g. 14 +15 = 29 so 140 +150 = 290. ✓ Count on in 10s from any multiple of 10. ✓ Use knowledge of number bonds to efficiently add numbers to bridge 100.
Add a near multiple of 10, 100 or 1000 and adjust	✓ 56 + 29 ✓ 42 + 199 ✓ Show what this would look like on a number line or 100 square.	✓ Add 10/100/1000 to any number. ✓ Add a multiple of 10 to any number. ✓ Round to the nearest 10/100/1000.
Add near doubles of two-digit numbers	✓ 38 + 37	✓ Double any two-digit number.
Add two 2-digit numbers by partitioning and counting on	✓ 29 + 43 = 43 + 20 + 9	✓ Understand that addition can be done in any order. ✓ Use knowledge of place value to partition 2-digit numbers. ✓ Count on in 10s from any number. ✓ Use knowledge of number bonds to efficiently add numbers to bridge 10 or 100.
Add a decimal number to a single-digit number	✓ 7 + 3.2 ✓ 9 + ? = 10.7	✓ Count on in tenths. ✓ Use knowledge of place value to partition decimal numbers. ✓ Use knowledge of number bonds to efficiently add numbers to bridge 1.

YEAR 4 SUBTRACTION

Mental Calculation Skill	Example	Prior Knowledge
Subtract two-digit or three-digit multiples of 10	✓ 120 – 40 ✓ 370 – 180	✓ Use knowledge of place value to relate12 - 4 to 120 - 40 ✓ Count on and back in tens. ✓ Use knowledge of number bonds to efficiently subtract numbers.
Subtract a near multiple of 10	✓ 63 – 19 ✓ Model using practical equipment. ✓	✓ Round to the nearest 10. ✓ Add a multiple of 10 to any number. ✓ Count on and back in tens and ones.
Subtract single-digit numbers and multiples of 10, 100 or 1000 from four-digit numbers	✓ 2739 – 7 ✓ 1876 – 50 ✓ 2718 – 300 ✓ 3827 – 1000	✓ Count on and back in ones from any four-digit number. ✓ Count on and back in tens from any four-digit number. ✓ Count on and back in hundreds from any four-digit number. ✓ Count on and back in thousands from any four-digit number.

Use known facts and knowledge of place value to work out new facts	✓ 32 – 6 = 26 ✓ 3200 – 600 = 2600	✓ Count on and back in ones from any two-digit number. ✓ Count on and back in tens from any two-digit number. ✓ Partition two digit numbers to tens and ones. ✓ Recombine tens and ones. ✓ Understand place value in two digit numbers. ✓ Understand the effect of multiplying by 10/100/1000.

YEAR 4 MULTIPLICATION

Double any multiple of 10 or 100	✓ Double 80	✓ Double single digit numbers. ✓ Understand and use knowledge of base 10 number system to relate 4 x 2 to 40 x 2.
Double any two-digit number	✓ Double 78 ✓ Double ?? and double ? is the same as doubling 36	As above plus: ✓ Partition two-digit numbers into T and O and recombine (by adding components).
Multiply numbers to 1000 by 10 and then 100	✓ 268 x 10 ✓ 407 x 100	✓ Understand base 10 number system i.e. 10 ones / units = 1 ten and vice versa and 10 tens = 1 hundred and vice versa. ✓ Understand that zero can be used as a place holder.
Multiply a multiple of 10 up to 100 by a single-digit number	✓ 30 x 6 ✓ How would you work out 60 x 8?	✓ Know multiplication facts to 12 x 12 ✓ Understand and use knowledge of base 10 number system to relate 3 x 4 to 3 x 40.
Multiply numbers to 20 by a single-digit	✓ 14 x 8 ✓ 16 x 3 = (10 x 3) + (? x 3)	✓ Know multiplication facts to 12 x 12 ✓ Partition two-digit numbers into T and O and recombine (by adding components).
Give the factor pair associated with a multiplication fact	✓ The factor pairs of 24 are 24 and 1, 12 and 2, ? and 3, ? and ? ✓ If 14 x 3 = 42, give a factor pair for 42.	✓ Understand that some numbers can be represented as an array. ✓ Know multiplication facts to 12 x 12 ✓ Know that prime numbers only have two factors.

YEAR 4 DIVISION

Halve any multiple of 10 and 100	✓ ½ of 500 ✓ Halve 470 ✓ ? x 2 = 240 ✓ 360 = ? x 2	✓ Know multiples of 10 up to 200. ✓ Partition multiples of 10 into pairs of multiples of 10 e.g. 170 = 160 + 10. ✓ Partition multiples of 100 into pairs of multiples of 100 e.g. 700 = 600 + 100. ✓ Halve even numbers to 20. ✓ Understand that halving is dividing by 2 and half as one of two equal parts. ✓ Understand and use knowledge of base 10 number system to relate 8 ÷ 2 to 80 ÷ 2 to 800 ÷ 2.
Halve any even number to 200	✓ ½ of 146 ✓ Halve 108	As above plus: ✓ Partition three-digit numbers into H T and O. ✓ Recognise odd and even numbers.
Use times tables facts up to 12 to find related division facts, including multiples of ten	✓ 24 ÷ 6 ✓ 42 ÷ 7 ✓ 54 ÷ 9 ✓ 18 ÷ 6 = 3 ✓ 180 ÷ 6 = 30 ✓ 180 ÷ 60 = 3	✓ Know and use division facts related to all times table sup to 12 x 12. ✓ Use place value to find related facts.
Find unit fractions and simple non-unit fractions of numbers and quantities	✓ Find of 3/8 of 24. ✓ Find a quarter of 28 cm.	✓ Know multiplication facts to 12 x 12 and related division facts. ✓ Understand fractions of shapes. ✓ Understand fractions as equal parts of a whole. ✓ Understand what the numerator and denominator represent in a fraction. ✓ Count in equal steps (groups). ✓ Understand that finding a fraction of an amount is related to sharing equally (division). ✓ Find simple unit fractions of numbers.

Divide numbers to 1000 by 10 and then 100 (whole number answers)	✓ 340 ÷ 10 ✓ ? x 100 = 440 ✓ How many metres are in 900 cm? ✓	✓ Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa. ✓ Understand that zero can be used as a place holder.
Identify the remainder when dividing by 2, 5 or 10	✓ 26 ÷ 5 ✓ 17 ÷ 2 ✓ How many teams of 5 can be made from 28 children? How many children will be left over?	✓ Know multiplication and related division facts for 2, 5 and 10x tables. ✓ Count in equal steps of 2, 5 and 10 from non-multiples of those tables.

Year Five

Practical equipment, models and images to support children

YEAR FIVE ADDITION

Mental Calculation Skill	Example	Prior Knowledge
Add a pair of three-digit numbers or four-digit multiples of 10	✓ 38 + 86 ✓ 350 +360	✓ Partition two-digit numbers into tens and units. ✓ Understand place value in three-digit numbers. ✓ Use knowledge of place value to relate e.g. 35 +36 = 71 to 350 +360 = 710.
Add a near multiple of 10 or 100 to any two-digit or three digit number	✓ 235 + 198	✓ Add 100 to any number. ✓ Add a multiple of 100 to any number. ✓ Round to the nearest 100.
Add any pair of decimal fractions each with units and tenths	✓ 5.7 + 2.5	✓ Partition units and tenths. ✓ Count on in tenths, including bridging through ✓ Use knowledge of place value to relate e.g. 57 + 25 = 82 to 5.7 + 2.5 = 8.2.
Add simple fractions with the same denominator	✓ 1/5 + 3/5	✓ Understand what fractions represent. ✓ Know that a number is whole if the numerator and denominator are the same.
Find doubles of decimals each with units and tenths	✓ 1.6 + 1.6	✓ Double any two-digit number. ✓ Understand place value.

YEAR FIVE SUBTRACTION

Mental Calculation Skill	Example	Prior Knowledge
Subtract a pair of two-digit numbers or three-digit multiples of 10	✓ 620 - 380	✓ Partition three-digit numbers into hundreds, tens and ones ✓ Understand place value in two- and three-digit numbers. ✓ Use knowledge of place value to relate 62 - 38 to 620 – 380.
Subtract a near multiple of 10 or 100 from any two-digit or three-digit number	✓ 326 – 99 ✓ £5.00 - £1.99	✓ Subtract a multiple of 10 from any number. ✓ Subtract a multiple of 100 from any number. ✓ Round numbers to the nearest 10 and 100.

Subtract any pair of decimal fractions each with units and tenths	✓ 6.3 - 4.8	✓ Partition units and tenths. ✓ Count on and back in tenths including bridging through 1. ✓ Understand and use the link between decimals and whole numbers e.g. multiply by 10 to give whole numbers then divide the answer by 10.
Find the difference between near multiples of 100 or of 1000	✓ 607 – 588 ✓ 6070 - 3992	✓ Know number bonds to 100 and related facts (to 1000). ✓ Count on and back in hundreds, tens and thousands.

YEAR 5 MULTIPLICATION

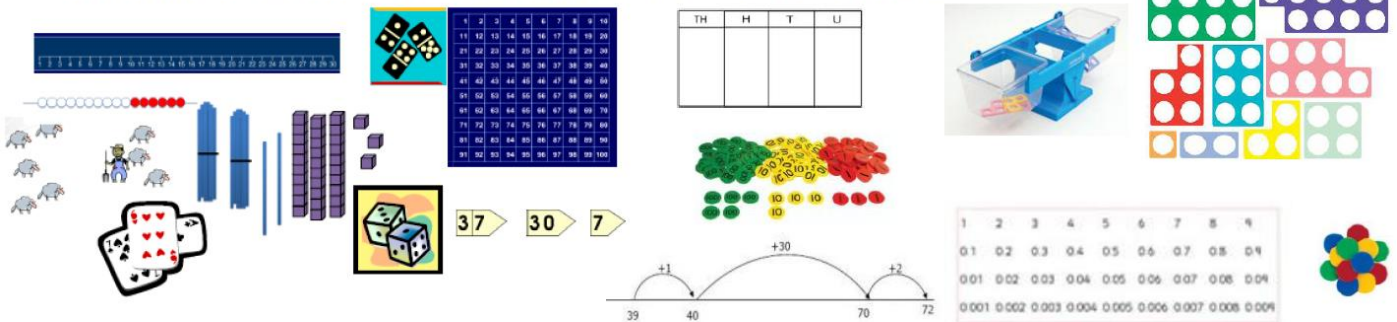| Double three-digit multiples of 10 to 500	✓ Double 460	✓ Double single digit numbers. ✓ Understand and use knowledge of base 10 number system to relate 4 x 2 to 40 x 2 to 400 x 2. ✓ Partition three-digit numbers into H, T and O and recombine (by adding components).
Multiply whole numbers and decimals by 10, 100 or 1000	✓ 1.7 x 100	✓ Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa and 10 tenths = 1 one and vice versa. ✓ Understand that zero can be used as a place holder
Multiply pairs of multiples of 10	✓ 20 x 30	✓ Know multiplication facts to 10 x 10. ✓ Understand and use knowledge of base 10 number system to relate 3 x 4 = 12 to 3 x 40 = 120 to 30 x 40 = 1200.
Multiply two-digit numbers by 5 or 20	✓ • 17 x 5 ✓ • 38 x 5 ✓ • 74 x 20	✓ • Multiply two-digit numbers by 10. ✓ • Double two-digit and three-digit numbers. ✓ • Halve two-digit and three digit numbers. ✓ • Understand that (x 10 x 2) is the same as x 20 and that (x 10 ÷ 2) is the same as x 5.
Multiply numbers by 4 or 8	✓ 16 x 4	✓ Double two-digit and three-digit numbers. ✓ Understand the relationship between x 2, x 4 and x 8.
Multiply by 25 or 50	✓ 14 x 25	✓ Multiply two-digit and three-digit numbers by 100. ✓ Halve numbers. ✓ Understand why halving and halving again is the same as finding a quarter.
Find factor pairs for numbers to 100	✓ Factors of 42	✓ Understand that some numbers can be represented as an array ✓ Know multiplication facts to 12 x 12. ✓ Recall prime numbers to 100. ✓ Know that square numbers have an odd number of factors.

YEAR 5 DIVISION

Halve three-digit multiples of 10 to 1000	✓ 760 ÷ 2 ✓ Halve 770 ✓ Find ½ of 440 ✓ ? x 2 = 290	✓ Know multiples of 10 up to 1000. ✓ Partition multiples of 10 into pairs of multiples of 10 e.g. 170 = 160 + 10. ✓ Partition multiples of 100 into pairs of multiples of 100 e.g. 700 = 600 + 100. ✓ Halve even numbers to 100. ✓ Understand that halving is dividing by 2 and half as one of two equal parts. ✓ Understand and use knowledge of base 10 number system to relate 8 ÷ 2 to 80 ÷ 2 to 800 ÷ 2.
Find the remainder after dividing a two-digit number by a one-digit number	✓ 27 ÷ 4	✓ Know multiplication facts to 12 x 12 and related division facts. ✓ Count in equal steps of 2, 3, 4, 5, 6, 7, 8, 9 and 10 from non-multiples of those numbers e.g. count back in sixes from 43.

Divide whole numbers by 10, 100 or 1000 (decimal answers)	✓ 25 ÷ 10 ✓ 673 ÷ 100 ✓ 74 ÷ 100 ✓ How many metres are there in 456cm?	✓ Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa. ✓ Understand base 10 decimal number system i.e. 1 ONE = 10 tenths, 1 tenth = 10 hundredths. ✓ • Understand that zero can be used as a place holder.
Divide a multiple of 10 by a single-digit number (whole number answers)	✓ 80 ÷ 4 ✓ 270 ÷ 3	✓ Know multiplication facts to 12 x 12 and related division facts. ✓ Understand and use knowledge of base 10 number system to relate 8 ÷ 4 to 80 ÷ 4 to 800 ÷ 4.
Find fractions of whole numbers or quantities	✓ 2/3 of 27 ✓ 4/5 of 70 kg	✓ Know multiplication facts to 12 x 12 and related division facts. ✓ Understand fractions of shapes. ✓ Understand fractions as equal parts of a whole. ✓ Understand what the numerator and denominator represent in a fraction. ✓ Count in equal steps (groups). ✓ Understand that finding a fraction of an amount is related to sharing equally (division). ✓ Find simple unit fractions of numbers.
Find 50%, 25% or 10% of integers or quantities	✓ 25% of 20kg ✓ 10% of £80	As above plus: ✓ Know percentage equivalences for ½, ¼ and 1/10 and vice versa.
Divide two-digit numbers by 4 or 8	✓ 72 ÷ 4 ✓ 96 ÷ 8	✓ Understand the relationship between ÷ 2, ÷ 4 and ÷ 8. ✓ Halve two-digit numbers.

Year Six

Practical equipment, models and images to support children

YEAR 6 ADDITION

Mental Calculation Skill	Example	Prior Knowledge
Add pairs of decimals with units, tenths or hundredths	✓ 0.7 + 3.38 ✓ 4.52 + 2.78	✓ Partition ones, tenths and hundredths. ✓ Understand place value of tenths and hundredths. ✓ Recombine ones, tenths and hundredths.
Add a decimal with units and tenths, that is nearly a whole number	✓ 4.3 + 2.9	✓ Round a decimal to the nearest whole number. ✓ Add a whole number to any decimal number.
Add near doubles of decimals	✓ 2.5 + 2.6	✓ Double any two-digit number. ✓ Use knowledge of place value and related facts.
Add fractions with denominators that are multiples of the same number	✓ 3/5 + 4/10	✓ Understand what fractions represent. ✓ Know that a number is whole if the numerator and denominator are the same. ✓ Recognise equivalent fractions. ✓ Simplify fractions by cancelling.

YEAR 6 SUBTRACTION

Subtract pairs of decimals with units, tenths or hundredths	✓ 5.6 - 3.38	✓ Partition ones, tenths and hundredths. ✓ Understand place value of tenths and hundredths. ✓ Recombine ones, tenths and hundredths.
Subtract a decimal with units and tenths, that is nearly a whole number	✓ 6.5 - 3.8	✓ Understand place value of tenths and hundredths. ✓ Be able to round to the nearest whole number. ✓ Subtract a whole number from any decimal number.

YEAR 6 MULTIPLICATION

Multiply pairs of two-digit and single-digit numbers	✓ 28 x 3	✓ Know multiplication facts to 12 x 12. ✓ Partition two-digit numbers into T and O and recombine (by adding components). ✓ Understand and use knowledge of base 10 number system to relate 3 x 4 = 12 to 3 x 40 = 120.
Double decimals with ones and tenths	✓ Double 7.6[W1]	✓ Double single digit numbers. ✓ Partition decimal numbers into O and tenths and recombine (by adding components).

		✓	Understand and use knowledge of base 10 number system to relate double 4 to double 0.4.
Multiply pairs of multiples of 10 and 100	✓ 50 x 30 600 x 20	✓ ✓	Know multiplication facts to 12 x 12. Understand and use knowledge of base 10 number system to relate 3 x 4 = 12 to 3 x 40 = 120 to 30 x 40 = 1200.
Multiply two-digit decimals	✓ 0.8 x 7 ✓ 5.6 x 9	✓ ✓	Know multiplication facts to 12 x12. Understand and use knowledge of base 10 number system to relate 8 x 7 = 56 to 0.8 x 7 = 5.6.
Scale up or down using known facts	✓ Given that three oranges cost 24p, find the cost of four oranges.	✓	Know multiplication facts to 12 x 12, including related division facts.
Identify numbers with an odd number of factors and no factor pairs other than one and themselves	✓ • What are the factors of 25? ✓ • Is it always true, sometimes true or never true that square numbers have an odd number of factors? ✓ • How many different sized rectangular arrays can you make using 12 counters? 17 counters? 13 counters? 16 counters?	✓ ✓ ✓ ✓ ✓	Understand that some numbers can be represented as an array. Understand that some numbers can be represented as a square array which is why they are called square numbers. Understand that some numbers have only two factors, one and themselves, and that they are called prime numbers. Understand that every number greater than one is either a prime number or a composite number. Know multiplication facts to 12 x 12.

YEAR 6 DIVISION

Divide a two-digit number by a single-digit number	✓ 68 ÷ 4 ✓ 88 ÷ 3	✓ ✓	Know multiplication facts to 12 x 12 and related division facts. Partition numbers in different ways e.g. when finding 84 ÷ 7, recognising 84 as 70 + 14.
Halve decimals with tens, ones and tenths	✓ Halve 72.7 ✓ Find ½ of 15.2. ✓ 13.1kg ÷ 2	✓ ✓ ✓ ✓	Halve whole numbers to 100. Understand that halving is dividing by 2 and half as one of two equal parts. Understand base 10 decimal number system i.e. 1 ONE = 10 tenths, 1 tenth = 10 hundredths. Understand and use knowledge of base 10 number system to relate 8 ÷ 2 to 80 ÷ 2 and 0.8 ÷ 2.
Divide multiples of 100 by a multiple of 10 or 100 (whole number answers)	✓ 400 ÷ 20 ✓ 4000 ÷ 200 ✓ How many 20p coins in £20?	✓ ✓ ✓	Know multiplication facts to 12 x 12 and related division facts. Understand base 10 number system i.e. 10 ones = 1 ten and vice versa and 10 tens = 1 hundred and vice versa. Understand and use knowledge of base 10 number system to relate 8 ÷ 4 to 80 ÷ 40 to 800 ÷ 40 to 800 ÷ 400.
Divide two-digit decimals	✓ 4.8 ÷ 6	✓ ✓	Know multiplication facts to 12 x 12 and related division facts. Understand and use knowledge of base 10 number system to relate 18 ÷ 6 to 180 ÷ 6 and 1.8 ÷ 6.
Find 10% or multiples of 10% of whole numbers or quantities	✓ Find 30% of 50ml ✓ What is 70% of 200g? ✓ How much would you pay for an item worth £30 with 40% off?	✓ ✓ ✓	Know multiplication facts to 12 x 12 and related division facts. Know equivalence between 1/10 and 10% and related fractions e.g. 3/10 = 30%, 9/10 = 90%. Divide whole numbers or quantities by 10.
Simplify fractions by cancelling	✓ What is 14/35 in its simplest form? ✓ Reduce 56/100 to its simplest form.	✓ ✓	Know multiplication facts to 10 x 10 and related division facts. Identify all factors of numbers to 100.
Scale up or down using known facts	✓ Given that 3 oranges cost 24p, find the cost of 4 oranges3	✓	Know multiplication facts to 12 x 12, including related division facts.
Divide by 25 or 50	✓ 480 ÷ 25 ✓ 3200 ÷ 50	✓ ✓	Divide numbers by 100. Double numbers.