

**Number - Calculating**

| Year 1   | Year 2   | KS2 Range  | Year 3   | Year 4  | Year 5  | Year 6   |
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| <p>Use the vocabulary related to the four operations.<br/><i>Use mathematics as an integral part of classroom activities.</i></p> <p>Know that more than two numbers can be added together.</p> <p><i>Add and subtract numbers when solving problems involving up to 10 objects.</i></p> <p>Understand addition as combining sets to make a total and steps along a number track, and subtraction as 'take away' or 'difference'</p> <p><i>Represent work with objects or pictures and discuss it.</i></p> <p>Group objects into twos, fives and tens.</p> <p>Count in 2s, 5s and 10s.</p> <p>Share sets of objects in practical situations.</p> | <p>Use and begin to read vocabulary related to the four operations.<br/><i>Talk about work using familiar mathematical language.</i></p> <p><i>Use mental recall of number facts to 10 to add or subtract larger numbers.</i></p> <p>Understand addition as counting steps on a number line and subtraction as taking away, difference and complementary addition.</p> <p>Know that addition can be done in any order.<br/>Begin to understand that addition reverses subtraction.</p> <p>Check addition and multiplication calculations by doing them in a different order.</p> <p>Record mental additions / subtractions in a number sentence using +, - and =<br/><i>Represent work using symbols and simple diagrams.</i></p> <p>Understand multiplication as repeated addition or as describing an array.</p> <p>Know and use halving as the inverse of doubling.</p> <p>Begin to understand division as grouping, repeated subtraction or sharing.</p> <p><i>Identify and use halves and quarters in practical situations.</i></p> | <p><b>Investigate patterns and relationships:</b></p> <p><i>Explore the inverse relationships of addition and subtraction, and of multiplication and division.</i></p> <p><b>Calculate in a variety of ways:</b><br/><i>Use the relationships between the four operations, including inverses; recognise situations to which the different operations apply</i></p> <p><i>Use a variety of mental methods of computation; extend informal written methods to non-calculator methods</i><br/><i>Use fractions and percentages to estimate, describe and compare proportions of a whole.</i></p> | <p>Use and read vocabulary related to the four operations.<br/><i>Talk about and explain their work.</i></p> <p>Continue to develop understanding of addition as counting on steps along a number line.<br/>Understand subtraction as taking away, difference and complementary addition.</p> <p>Know that subtraction is not commutative.<br/>Know that addition reverses subtraction.</p> <p>Check subtraction with addition, halving with doubling, division with multiplication.</p> <p>Use jottings to help mental calculations.<br/><i>Use and interpret mathematical symbols and diagrams.</i></p> <p>Understand the operation of multiplication as repeated addition.<br/>Know that multiplication can be done in any order.<br/>Recognise that + is inverse of x and that halving is the inverse of doubling.<br/>Use knowledge of doubling and halving to multiply and divide.</p> <p>Understand division as grouping, repeated subtraction or sharing.<br/>Understand the idea of a remainder in practical situations.<br/>Know that division is not commutative.<br/>Recognise unit fractions such as <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{1}{10}</math> and use them to find fractions of shapes and numbers</p> | <p><i>Organise their work, check results, and try different approaches.</i></p> <p>Know that when a larger number is subtracted from a smaller one, the answer is negative.</p> <p>Explain and use the principles of the commutative and associative laws as they apply to addition.</p> <p>Use the inverse to check results.</p> <p>Use informal and pencil and paper methods.<br/>Begin to develop efficient standard methods that can be applied generally.</p> <p>Know that larger numbers can be partitioned to make multiplication easier.</p> <p>Understand division as sharing equally or grouping.<br/>Find whole number remainders after division.<br/>Begin to relate division to fractions.</p> <p>Recognise the equivalence of simple fractions.<br/>Use fraction notation.<br/>Order familiar fractions.</p> <p>Recognise simple fractions that are several parts of a whole.</p> | <p>Develop own strategies for solving problems, and present information and results systematically.</p> <p>Respond to oral or written questions involving the four operations and explain the strategy used.</p> <p>Know and use the principles of the commutative, associative and distributive laws as they apply to multiplication.</p> <p>Know that multiplication is the inverse of division and use this to check results.</p> <p><i>Use a variety of mental and written methods for computation.</i></p> <p>Continue to develop efficient standard methods that can be applied generally.</p> <p>Know that, with positive whole numbers, multiplying makes a number larger.<br/>Start to use brackets: know that they determine the order of operations.</p> <p>Relate division to fractions.</p> <p>Begin to express a remainder as a fraction, or as a decimal when dividing a whole number by 2, 4, 5 or 10.</p> <p>Recognise when two simple fractions are equivalent, including relating hundredths to tenths.<br/>Convert improper fractions to mixed numbers, and vice versa.</p> <p><i>Use simple fractions and percentages to describe approximate parts of a whole e.g. find <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{1}{10}</math> of numbers or quantities.</i></p> | <p>Search for a solution by trying out ideas of their own.</p> <p><i>Describe situations mathematically using symbols, words and diagrams and draw own conclusions, explaining their reasoning.</i></p> <p><i>Check results are reasonable by considering the context or size of the numbers.</i></p> <p>Extend methods of recording to include decimals.<br/>Explain how methods work.</p> <p>Use brackets: know that they determine the order of operations.<br/>Use factors when multiplying and dividing.</p> <p>Express a remainder as a fraction or as a decimal rounded to one decimal place.</p> <p>Compare or order simple fractions by converting them to a common denominator.</p> <p><i>Calculate fractional or percentage parts of quantities and measurements eg <math>\frac{5}{8}</math> of 32, <math>\frac{7}{10}</math> of 40, <math>\frac{9}{100}</math> of 400 centimetres.</i></p> |

**Calculate fractions and percentages of quantities.**

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|   |  |  |   | <p>Begin to relate fractions to division and recognise the equivalence between the decimal and fraction form of <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math> and tenths.<br/>Understand decimal notation for tenths and hundredths in context.<br/>Know the value of each digit in a decimal fraction.</p>  | <p>Relate fractions to division and to their decimal representations.</p> <p>Use decimal notation for tenths and hundredths.</p> <p>Know percentage as the number of parts in every 100 and find simple percentages of smaller whole-number quantities.</p>   | <p>Recognise equivalence between decimals, fraction and percentages.</p> <p>Use decimal notation for tenths and hundredths in calculations, and tenths, hundredths and thousandths when recording measurements.</p> <p>Know percentage as the number of parts in every 100 and find simple percentages of small whole-number quantities.</p>  |
| <p>Use mental strategies to solve simple problems<br/>Explain methods and reason orally.</p>  | <p>Choose appropriate operations when solving addition and subtraction problems. Use mental calculation strategies to solve number, money and measure problems.</p>  |  | <p>Choose and use appropriate operations to solve word problems, and appropriate ways of calculating: mental, mental with jottings, pencil and paper. Explain methods and reasoning.</p>  | <p>Choose and use appropriate number operations and ways of calculating to solve problems involving multiplication and division, including those that gave rise to remainders.</p>  | <p>Choose and use appropriate number operations and ways of calculating. To solve word problems involving simpler numbers. Explain methods and reasoning.</p>   | <p>Identify and use appropriate operations to solve word problems involving numbers. Explain methods and reasoning.</p>   |
| <p>Know by heart all pairs of numbers that total 10.</p>  | <p>Know by heart all pairs of numbers that total 20 and pairs of multiples of 10 that total 100.</p>   |  | <p>Know by heart all addition and subtraction facts for each number to at least 20 and pairs of multiples of 100 that total 1000.</p>   | <p>Consolidate knowing by heart all addition and subtraction facts for each number to at least 20.<br/>Derive number pairs that total 100, pairs of multiples of 50 that total 1000.</p>  | <p>Derive all 2-digit pairs that total 100 and all pairs of multiples of 50 with a total of 1000.<br/>Derive pairs of decimals that total 1</p>   | <p>Derive quickly pairs of decimals that total 10.</p>  |
| <p>Understand double and halve in practical contexts. Know addition doubles by heart to at least 5+5</p>                                | <p>Know addition doubles up to 15+15.<br/>Halve even numbers to 20. Identify near doubles.</p> <p>Know by heart multiplication facts for the 2 and 10 times tables and derive quickly the corresponding division facts.</p>                |  | <p>Derive doubles to 20+20 and multiples of 5 to 100+100.<br/>Halve any multiple of 10 to 100<br/>Identify and use near doubles.</p> <p>Know by heart all multiplication and division facts for 2, 5, 10 x tables.</p>  | <p>Derive quickly addition doubles to 50+50 and multiples of 10 to 500+500.</p> <p>Use mental recall of 2,3,4,5 and 10X tables in solving whole-number problems involving multiplication and division, including those with remainders.</p>   | <p>Derive addition doubles to 100 + 100, multiples of 10 to 1000 + 1000 and multiples of 100 to 10000+10000.</p> <p>Know by heart all multiplication facts up to 10 x 10 and derive the corresponding division facts.<br/>Know squares of all numbers up to 10x10.</p>  | <p>Double and halve decimal fractions to 1 or 2 decimal places.</p> <p>Consolidate knowing by heart all multiplication facts up to 10 x 10 and the corresponding division facts.</p>  |
| <p>Say a number that is one more/less than a given number to 20.<br/>Add 9 to single-digit numbers by adding 10 then subtracting 1.</p> | <p>Say a number that is 1 or 10 more/less than any 2-digit number.<br/>Mentally add / subtract 11 or 21, or 9 or 19, to/ from any 2-digit number by using next multiple of 10 and adjusting.</p>   |  | <p>Say a number that is 1, 10 or 100 more/less than any 3-digit number.<br/>Mentally add / subtract 11, 21....or 9,19 ....to/ from any 2-digit number by using multiples of 10 and adjusting.</p>   | <p>Develop further mental strategies for adding and subtracting numbers with at least two digits.<br/>Add and subtract mentally a 'near multiple of 10' to or from a 2-digit number.</p>  | <p>Add and subtract a near multiple of 100 or 1000 by adjusting.</p>  | <p>Add/subtract 0.9,1.9... or 1.1, 2.1....by adding/subtracting the whole number and adjusting by 0.1<br/>Multiply by 99 or 101 by multiplying by 100 and adjusting.</p>  |
| <p>Put the larger number first in order to count on more efficiently.<br/>Partition numbers into "5 and a bit".</p>                     | <p>Find a small difference between a pair of numbers lying either side of a multiple of 10 by counting up.</p> <p>Add three numbers by putting largest first, finding pairs to make 10.<br/>Partition into tens and units.</p>             |  | <p>Find a small difference by counting up through the next multiple of 100.</p> <p>Add several numbers by putting largest first, finding pairs to make 10, pairs to make 9 or 11 and adjusting.<br/>Partition into tens and units.</p>  | <p>Find a small difference by counting up through the next multiple of 1000.</p> <p>Further develop mental strategies e.g.use known number facts and place value to add or subtract mentally, numbers with at least 2-digits.<br/>Partition into hundreds, tens and units.</p>  | <p>Find a difference by counting up through the next multiple of 10000.</p> <p>Use known number facts and place value to add or subtract mentally, including 3-digit numbers, and numbers to 1 decimal place.<br/>Partition numbers into hundreds, tens, ones and tenths<br/>Use known number facts and place value to mentally:<br/>+/- 3 or more 3-digit multiples of 10 and 100;<br/>+/- pairs of decimal fractions with units and tenths;<br/>x 2-digit multiple of 10 by 3-digit multiple of 100;<br/>÷ 4 digit multiple of 1000 by 10 or 100 or 1000.</p> | <p>Find a difference by counting up through the next multiple of 10, 100 or 1000.</p> <p>Use known number facts and place value to add or subtract mentally, including 4-digit numbers, and numbers to 2 decimal places.<br/>Partition numbers into hundreds, tens, ones, tenths and hundredths.<br/>Use known number facts and place value to mentally:<br/>+/- pair of 4-digit multiples of 100;<br/>+/- pairs of decimal fractions with up to 2 decimal places;<br/>x decimal fraction with up to 2 decimal places by 10, 100;<br/>x decimal fraction by a single digit;<br/>÷ 1 or 2 digit number by 10 or 100.</p> |
| <p>Use known number facts and place value to mentally:<br/>+/- pairs of numbers to 10;<br/>+/- single digit to/from teens number;</p>   | <p>Use known number facts and place value to mentally:<br/>+/- single digit and teens number and 10 to/from 2 digit number;<br/>+/- pairs of multiples of 10;<br/>x single digits by 1 or 10;<br/>÷ 2 digit multiple of 10 by 1 or 10.</p> |  | <p>Use known number facts and place value to mentally:<br/>+/- single digit to/from 3-digit number;<br/>+/- 2-digit number from multiple of 10 / 100;<br/>+/- pairs of 2-digit numbers and pairs of multiples of 10 / 100;<br/>x single digits by 1, 10, 100;<br/>÷ 3 digit multiple of 100 by 10 or 100.</p> | <p>Use known number facts and place value to mentally:<br/>+/- single digit to/from 3 or 4-digit number;<br/>+/- pairs of 2-digit numbers and pairs of multiples of 100;<br/>+/- multiples of 10 to/from 2 or 3 digit numbers;<br/>+/- 3-digit numbers to/from multiples of 10, 100, 1000;<br/>x 2/3-digit numbers by 10 or 100;<br/>÷ 4 digit multiple of 1000 by 10 or 100.</p> |   |   |