

Bollin Primary School

Calculation Policy

Year 5

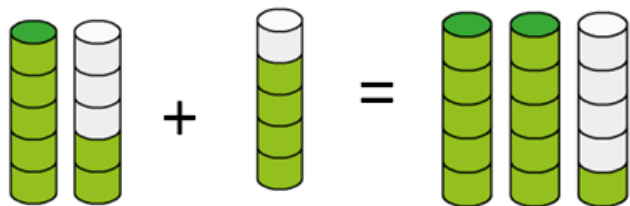
Bollin Primary School



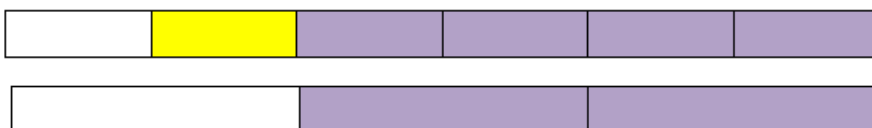
Growing hearts and minds together

Addition Guidelines

	Calculation Strategy	Questioning (adapt to use real life contexts where possible)	Vocabulary
Year 5	<p><u>+ = signs and missing numbers</u> Continue using a range of equations as in Year 1, 2, 3 and 4 but with appropriate numbers. Continue to use bar models to help understand system of addition and subtraction (commutative and distributive laws)</p> <p><u>Mental Methods</u> Continue to partition numbers to add mentally where appropriate or to regroup numbers to the nearest hundred; e.g. $254 + 362 = (200+300) + (50+60) + (4+2) = 500+110+6=616$ <i>partitioning</i> $388 + 274 = 400+262 = 662$ <i>regrouping to nearest 100</i></p> <p><u>Pencil and paper procedures</u> Extend to numbers with at least five digits and include decimals. Add numbers with different amount of digits, e.g. 4 digit and 5 digit, presented horizontally, so children have to consider place value when setting out in column format) $3587 + 675 = 4262$</p> $\begin{array}{r} 23587 \\ + 4675 \\ \hline 28262 \\ 111 \end{array}$ <p>Extend to up to two places of decimals (same number of decimals places) and adding several numbers (with different numbers of digits).</p> $\begin{array}{r} 372.8 \\ 127.7 \\ + 54.6 \\ \hline 555.1 \\ 112 \end{array}$ $\begin{array}{r} 23.361 \\ 9.080 \\ + 1.300 \\ \hline 93.741 \\ 212 \end{array}$ <p><u>Fractions</u> Add fractions with the same denominator or denominators which are multiples of the same number. $\frac{2}{8} + \frac{3}{8}$ $\frac{6}{8} + \frac{9}{8} = \frac{7}{8} + \frac{8}{8}$ (regrouping) $\frac{7}{8} + \frac{14}{8}$ $3\frac{3}{8} + \frac{15}{8}$</p> <p>Representations are used to support this.</p>	<p>Derive quickly decimals that total 1 or 10. $\blacksquare + 0.8 = 1$; $6.2 + \blacksquare = 10$ • Use known number facts and place value for mental addition and subtraction. What needs to be added to 3.7 to make 4? $0.9 + 0.7 = \blacksquare$; $470 + 380 = \blacksquare$; $810 - 380 = \blacksquare$; $7.4 + 9.8 = \blacksquare$; $9.2 - 8.6 = \blacksquare$ Work mentally to complete questions such as $27 + 36 + 13 = \blacksquare$ looking for pairs that make multiples of 10 and doing these first.</p> <ul style="list-style-type: none"> Add three or four 4 digit numbers or decimal numbers using column method. Include numbers with different place value - $564.2 + 1548 + 56.5 + 12.09$ Add numbers with different units e.g cm and m, kg and g, £ and p understanding to convert to same unit before calculating. Solve addition with missing digits including decimals $\square + 368.6 = 156 + \square + 67.8$ $\square - 264 = 561 - \square$ $1\frac{2}{5} + \frac{9}{5} = \frac{17}{5} + \square$ (mastery - challenges with same denominator) $\frac{11}{6} + 2\frac{1}{3}$ (include improper and mixed number) 	<p>+, add, more, addition, increase, plus make, sum, total altogether, double, near double, one more..., two more... ten more..., 100 more...greater, more, units, ones, tens, count, count (up) to count on (from, to) how many...?tens boundary hundreds boundary, inverse, ones boundary, tenths boundary</p>

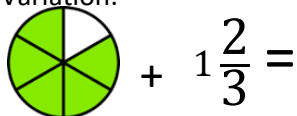


$\frac{1}{6} + \frac{4}{6}$ is the same as $\frac{1}{6} + \frac{2}{3}$: (Understanding equivalence is important before teaching this)



e.g.: $\frac{2}{4} + \frac{3}{8}$ $3\frac{2}{4} + 6\frac{3}{8}$ $\frac{7}{4} + 1\frac{3}{8}$

Variation:



Subtraction Guidelines

	Calculation Strategy	Progression	Vocabulary
Year 5	<p>Mental Methods Find a difference by adjusting e.g. $8006 - 2993 = 8013 - 3000 = 5013$</p> <p>Pencil and Paper Procedures Refine compact decomposition methods, ensuring method is being used for the right type of question, avoid using it for questions such as $3005 - 1897$, as it is much more appropriate to use adjusting or counting on (as difference is small)</p>	<p>Derive quickly decimals that total 1 or 10. $\blacksquare + 0.8 = 1$; $6.2 + \blacksquare = 10$ • Use known number facts and place value for mental addition and subtraction. What needs to be added to 3.7 to make 4? $0.9 + 0.7 = \blacksquare$; $470 + 380 = \blacksquare$; $810 - 380 = \blacksquare$; $7.4 + 9.8 = \blacksquare$; $9.2 - 8.6 = \blacksquare$ Work mentally to complete questions such as $27 + 36 + 13 = \blacksquare$ looking for pairs that make multiples of 10 and doing these first.</p>	<p>subtract, subtraction, take (away), minus, decrease leave, how many are left/left over? difference between half, halve how many more/ fewer is... than...? how much more/less is...? equals, sign, is the same as tens boundary, hundreds boundary units boundary, tenths</p>

4₁ 5₁

Include where there is one zero on top line - but more than this and adjusting should really be used as in Year 4.

$$\begin{array}{r} 5561 \\ - 3624 \\ \hline 1937 \end{array}$$

Extend to subtraction of decimals in real life contexts: money, measures. Ensure inclusion of numbers to different decimal places.

Mastery :

e.g. £327.68 - £48.56 22.36m - 9.78m 2.5L - 189ml ♦ - 5.6kg = 2450g 7543ml - ♦ = 3.45L



Fractions

Subtract fractions with the same denominator or denominators which are multiples of the same number.

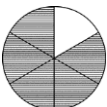
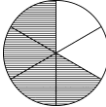
$$\frac{5}{8} - \frac{3}{8} \qquad 1\frac{6}{8} - \frac{9}{8} = 1\frac{6}{8} - 1\frac{1}{8} \qquad \frac{14}{8} - 1\frac{5}{8}$$

$$3\frac{3}{8} - 2\frac{7}{8} = 3\frac{4}{8} - 3 = \frac{4}{8} \quad (\text{Use of adjusting makes this very easy!})$$

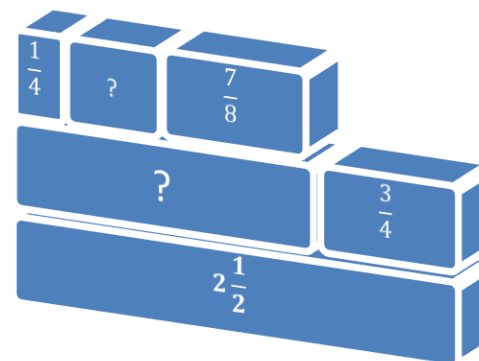
Representations are used to support this.

e.g.: $\frac{3}{4} - \frac{3}{8}$ $6\frac{2}{4} - 3\frac{3}{8}$ $\frac{9}{4} - 1\frac{3}{8}$ Variation:  -  = —

Variation:

  - $1\frac{1}{3} =$

$$\begin{array}{r} 1. \quad \begin{array}{|c|c|c|} \hline 5 & & 8 \\ \hline \end{array} \\ - \begin{array}{|c|c|c|} \hline 3 & 7 & \\ \hline \end{array} \\ \hline \begin{array}{|c|c|c|} \hline 1 & 7 & 6 \\ \hline \end{array} \end{array} \qquad \begin{array}{r} 2. \quad \begin{array}{|c|c|c|} \hline 6 & & 9 \\ \hline \end{array} \\ - \begin{array}{|c|c|c|} \hline 2 & 4 & \\ \hline \end{array} \\ \hline \begin{array}{|c|c|c|} \hline 3 & 9 & 3 \\ \hline \end{array} \end{array}$$



boundary
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Multiplication Guidelines

	Calculation Strategy	Progression	Vocabulary
Year 5	<p>Consolidate multiplying by 10, 100 and 1000.</p> <p>Rapidly recall 10×0 using mental method of partitioning.</p> <p>Use knowledge of relationships to regroup multiplication:</p>	<p>65, 73, 82, 91, 100.... Is 181 in this sequence, how do you know? Why would 899 not be in the sequence?</p> <p>What are the factors of 36?</p>	<p>lots of, groups of</p> <p>times, multiplication, multiply, multiplied by</p> <p>multiple of, product</p>

e.g. I know that $16 \times 4 = 8 \times 8$ or $25 \times 48 = 50 \times 24 = 100 \times 12$

$$24 \times 15 = 12 \times 30 = 360$$

$$36 \times 16 = 72 \times 8 = 576$$

$$\square \times 25 = 64 \times 100$$

$$162 \times \square = 81 \times 30$$

Continue short multiplication ThHTO \times 0 and TO.ths \times 0 (with numbers up to 2 decimal places).

$$\begin{array}{r} 1238 \\ \times 7 \\ \hline 8666 \\ 125 \end{array}$$

Use long multiplication methods to multiply TO \times TO. Extend to HTO \times TO when confident.

Begin with partitioning:

$$14 \times 22 = \square$$



$$\begin{aligned} 14 \times 20 \\ = 14 \times 2 \text{ tens} \\ = 28 \text{ tens} \end{aligned}$$



280

$$14 \times 22 = 308$$



$$14 \times 2 = 28$$

$$14 \times 20 = 280$$

$$14 \times 2 = 28$$

$$14 \times 22 = 308$$

Before moving onto:

Which is larger 6^2 or 2^3 ? (after exploration of cubed and square numbers)

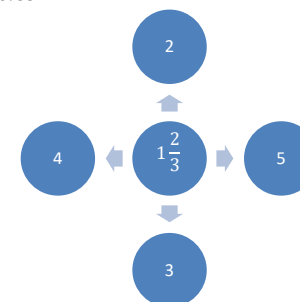
Is 81 a multiple of 3? Is 156 divisible by 6? How do you know?

Use mental or mental with jottings to answer: $80 \times 9 = \blacksquare$; $\blacksquare \times 9 = 0.36$; $10.2 \times 4 = \blacksquare$

In a school there are 1 and a third times the number of boys to girls. There are a quarter of the number of adults working in the school to girls. If there are 48 girls in the school, how many people are in the school altogether?

Which is bigger 5 lots of $\frac{3}{4}$ or 7 lots of $\frac{1}{2}$?

Multiply the inner number by the number in the outer circles



Always sometimes never

It is always, sometimes or never true that

once, twice, three times
four times, five times...
ten times
times as (big, long, wide,
and so on)
repeated addition
array, row, column

$$\begin{array}{r} 39 \\ \times 51 \\ \hline \end{array}$$



→ multiply 39×1

$$+ \begin{array}{r} \\ \hline \end{array}$$

→ multiply 39×50



$$28 \times 26 = \begin{array}{r} \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ 28 \\ \times 26 \\ \hline 8 \end{array}$$



$$\begin{array}{r} 4 \\ 28 \\ \times 26 \\ \hline 168 \end{array}$$

$$\begin{array}{r} 1 \\ 28 \\ \times 26 \\ \hline 168 \\ 6 \end{array}$$



$$\begin{array}{r} 1 \\ 28 \\ \times 26 \\ \hline 168 \\ 56 \end{array}$$

$$\begin{array}{r} 1 \\ 4 \\ 28 \\ \times 26 \\ \hline 168 \\ + 56 \\ \hline 728 \end{array}$$

→ 28×6

→ 28×20

$$\begin{array}{r} 728 \end{array}$$

multiplying a number
always makes it bigger

Is it always, sometimes or never true that prime
numbers are odd.

Is it always, sometimes or never true that when
you multiply a whole number by 9, the sum of its
digits is also a
multiple of 9

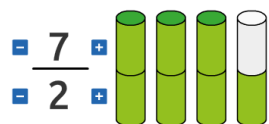
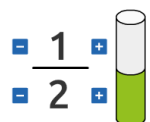
Fractions

Multiply proper, mixed number and improper fractions by whole numbers:

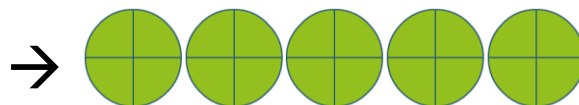
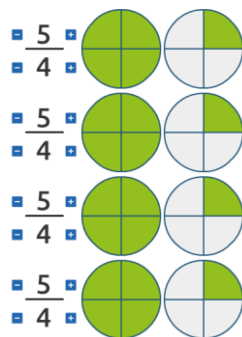
$$\frac{1}{2} \times 7$$

Reinforce \times is 'of' so $\frac{1}{2}$ of 7 =

Use pictorial representations:



At Pizza Palace each of the 4 family members eats five quarters of pizza. How many whole pizzas were eaten?

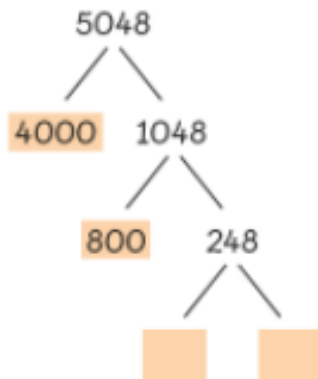


Division Guidelines

	Calculation Strategy	Progression	Vocabulary
Year 5	Ensure division is taught using real contexts at all times so children understand if it is grouping or sharing and this will help them interpret the answer.	Use the remainder in real context, interpreting it correctly in context to the question:	double, halve share, share equally one each, two each,

Continue with partitioning as with the bubbles and bar used in Year 4.

$$5048 \div 4 = \boxed{}$$



Manipulation:

$$240 \div 15 = 480 \div 30 = 48 \div 3 = 16$$

$$75 \div 2.5 = 150 \div 5 = 30$$

Continue with the short method of division including up to four and five digit numbers and progressing to dividing by 2 digit number, where they will write out the times tables of the two digit number to help them complete the calculation as they do with the short division method.

E.g.

e.g. 7455ml paint is shared equally between 10 pots, how much is in each pot? 745.5ml (it is not appropriate to have a remainder)

CDs are sold in batches of 50, in an hour 8761 CD are printed at the manufactures, how many batches are ready to be sold? $8761 \div 50 = 175$ (The remainder of 11 cannot be used in this context.)

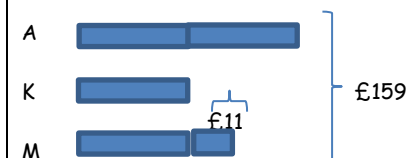
Eggs are sold in boxes are 6. A chicken farmer collects 344 eggs. If all eggs need to be put in a box, how many boxes does the farmer need? $344 \div 6 = 57r2$ (but the farmer requires 58 boxes, so the remaining eggs are in boxes).

Bar Modelling:

Zakir and Alison have some marbles. Zakir has $\frac{1}{3}$ the amount of marbles of Alison. If Alison has 24 more marbles than Zakir. How many marbles do they have altogether?



Mei, Kate and Amy have a total of £159. Mei has £11 more than Kate. Amy has twice as much money as Kate. How much money does Amy have?



Use a fact

$$3 \times 75 = 225$$

Use this fact to work out

$$450 \div 6 =$$

three each...
group in pairs, threes...
tens
equal groups of
divide, division, divided
by, divided into
remainder
factor, quotient, divisible
by
inverse

$547 \div 23 =$

$$\begin{array}{r} 23 \overline{) 5487} \end{array}$$

$$547 \div 23 = 23 \text{ r}18$$

Count up in 23's as this is the divisor:

23, 46, 69, 92....

Continue with short division - extending to decimals if chn show a secure understanding with remainders and confidence in decimal numbers.

E.g.

$$\begin{array}{r} 78.16 \\ 3 \overline{) 234.54} \end{array}$$

 $225 \div 0.6 =$

Making links

$$7 \times 8 = 56$$

How can you use this fact to solve these calculations?

$0.7 \times 0.8 =$

$$5.6 \div 8 =$$