Bollin Primary School

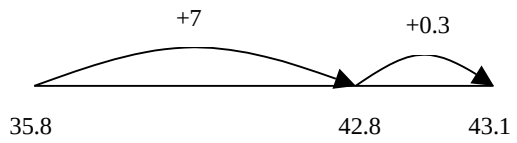
Calculation Policy

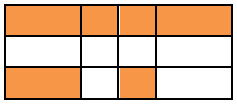
Year 6

Bollin Primary School

Growing hearts and minds together

Addition Guidelines

	Calculation Strategy	Questioning (adapt to use real life contexts where possible)	Vocabulary
Year 6	**+ = signs and missing numbers** Continue using a range of equations as above but with appropriate numbers. **Continue to use bar models to help understand system of addition and subtraction (commutative and distributive laws)** **Mental Methods** Partition into hundreds, tens, ones and decimal fractions and recombine Either partition both numbers and recombine or partition the second number only e.g. 35.8 + 27.3 = 35.8 + 7 + 0.3 = 42.8 + 0.3 = 43.1  Regroup numbers where possible in order to add mentally Continue as in Year 2, 3, 4 and 5 but with appropriate numbers including extending to adding 0.9, 1.9, 2.9 etc e.g 54.8 + 12.7 = 55.0 + 12.5 = 67.5 *using regrouping to the nearest whole number* **Pencil and paper procedures** Revise addition methods to numbers with any number of digits and decimals with 1, 2 and/or 3 decimal places. Same as Year 5. **Fractions** Add fractions with different denominators – understanding equivalence is vital before this work commences. Answers should be expressed in their lowest form or as mixed numbers if appropriate. Use of visual representations is useful to support this. e.g.: $\frac{2}{4} + \frac{3}{7} = \frac{14}{28} + \frac{12}{28} = \frac{26}{28} = \frac{13}{14}$	• Use known number facts and place value for mental addition and subtraction. What needs to be added to 6.47 to make 7? 5 – 4.81 = ■; 5700 + 2500 = ■; 6200 – 3800 = ■; 0.67 + 0.2 = ■; 0.5 + 0.31 = ■ • Add numbers with different units: lbs and ounces, kg and g, minutes and hours, mm and cm etc understanding to convert to same unit first and which is best to convert • Give children calculations for addition – they need to decide whether they can be done mentally (m) or using a written method (wm). E.g 1256 + 2543 (m), 2997 + 14367 (m – by adjusting), 567901 + 72598 (wm), 10.88+ 3.25 (m – adjusting 10.88 to 11) etc • $\frac{7}{10} + \frac{3}{15} + \frac{3}{5} =$ • Using adjusting to add fractions e.g. $\frac{2}{4} + \frac{3}{8} = \frac{3}{4} + \frac{?}{8}$ $\frac{7}{4} + 3\frac{10}{12} = \frac{3}{4} + ?\frac{?}{12}$	+, 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, *units boundary, tenths boundary*

	Add a mixture of proper, improper and mixed number fractions: e.g. $\frac{8}{9} + 4\frac{3}{10} = \frac{80}{90} + 4\frac{27}{90} = 4 + \frac{107}{90} = 5\frac{17}{90}$ (this is a more challenging example – children would start with smaller and easier denominators to begin with) Mastery: $6\frac{5}{8} + \frac{17}{9}$  $+ 2\frac{5}{6} =$  $+ \square = 2\frac{3}{4}$		

Subtraction Guidelines

	Calculation Strategy	Progression	Vocabulary
Year 6	**Mental Methods** Find a difference by counting up e.g. 8000 – 2785 = 5215 To make this method more efficient, the number of steps should be reduced to a minimum through children knowing: ▪ Complements to 1, involving decimals to two decimal places (0.16 + 0.84) ▪ Complements to 10, 100 and 100 Subtract the nearest multiple of 10, 100 or 1000, then adjust **Pencil and Paper Procedures** Children will revise using the decomposition method efficiently extending use for decimals and large numbers, knowing when it is appropriate to use this method and when it is appropriate to count up or adjust numbers. e.g 21476 – 18739 (use column) 20008 – 19993 (count up) 14.3 – 10.92 (adjust to 14.38 – 11.00) **Fractions**	• Use known number facts and place value for mental addition and subtraction. What needs to be added to 6.47 to make 7? 5 – 4.81 = ■; 6200 – 3800 = ■; 0.67 + 0.2 = ■; 0.5 + 0.31 = ■ 12.1 - □ = 6.2 $\frac{8}{10} - \square = \frac{1}{5}$ $\frac{17}{20} - \square = \frac{3}{4}$	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…? is the same as, equals, sign tens boundary, hundreds boundary units boundary, tenths boundary inverse

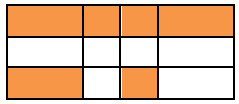
Subtract fractions with different denominators – understanding equivalence is vital before this work commences. Answers should be expressed in their lowest form or as mixed numbers if appropriate. Answers **do not** have to be expressed in their **simplest forms**, however it is good practise to do so.

e.g.: $1\frac{2}{4} - \frac{3}{7} = \frac{42}{28} - \frac{12}{28} = \frac{30}{28}$ The answer can does not have to be expressed in its simplest form practise

Subtract a mixture of proper, improper and mixed number fractions:

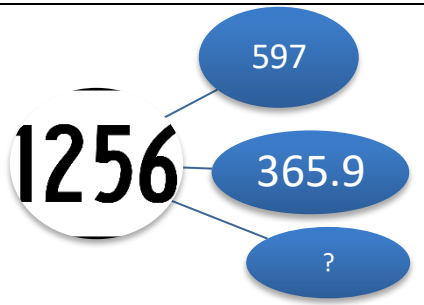
e.g. $2\frac{8}{9} + 1\frac{3}{10} = 2\frac{80}{90} - 1\frac{27}{90} = 1\frac{53}{90}$ (this is a more challenging example – children would start with smaller and easier denominators to begin with)

Mastery: $6\frac{5}{8} - \frac{17}{9}$

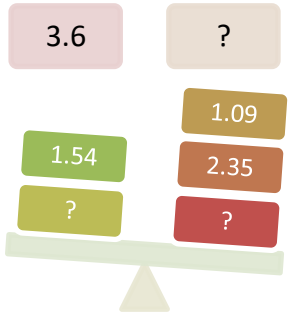


$-\frac{1}{6} =$

$\square - \;=\; 2\frac{3}{4}$



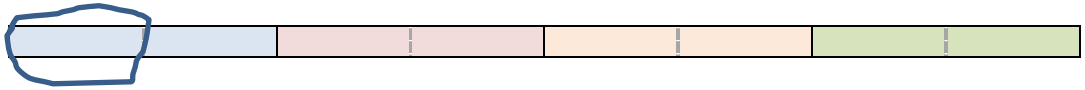
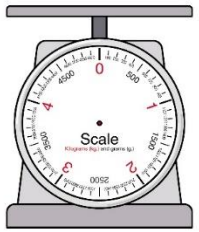
Find the missing number in the part-part-whole above.



What could the missing numbers be? Can 0.2 go in the red box, why?

Multiplication Guidelines

	Calculation Strategy	Progression	Vocabulary
Year 6	Multiply numbers with up to 2 decimal places by 10, 100 and 1000. Regroup numbers to make multiplication easier where possible: 12.4 x 16 = 24.8 x 8 1.5 x 3.6 = 3 x 1.8 Use appropriate short and long methods to multiply HT0 by T0 and multiplying decimals by 0 and T0 as practised in previous years.	What is the product of 125 and 14? What are the factors of 98? Use mental or mental with jottings to answer: 0.7 × 20 = ■; 0.3 × ■ = 2.4;	lots of, groups of times, multiplication, multiply, multiplied by multiple of, product once, twice, three times four times, five times… ten times times as (big, long, wide,

	Use Bar models to solve/represent understanding of multiplication and ratio problems. **Fractions:** Multiply simple pairs of proper fractions (express answer in simplest form). $\frac{1}{4} \times \frac{1}{2}$ Begin by ensuring full understanding of adjusting fractions such as doubling a fraction or halving a fraction (and also regrouping multiplication by doubling one number and halving the other) e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8} \times 1 = \frac{1}{8}$ $\frac{3}{4} \times \frac{1}{4} = \frac{3}{8} \times \frac{1}{2} = \frac{3}{16} \times 1 = \frac{3}{16}$ **Explain that $\frac{1}{4} \times \frac{1}{2}$ is also half lots of $\frac{1}{4}$**  This can then lead to seeing the relationship between the denominators/numerators being multiplied	Solve questions involving brackets and BODMAS: Sarah says 3 + 7 x 4 is 40, but Sunni says it is 31. Who is correct? Why do we need a rule? What is the difference in these two calculations? 7 + 6 x 3 + 5 7 + 6 x (3 + 5) Is it **always, sometimes or never** true that multiples of 7 are 1 more or 1 less than prime numbers. Word problems involving mixed units. A recipe has 445g of apples, twice the amount of bananas, 0.115kg of sugar and 0.25kg of flour. Show where the needle will point on the scales below:  Bob has 1/3 the amount of air-miles to Theresa. If Bob has 36 airmiles, how many do they have in total? Use of bar models: Mel had 40 more stickers than Jay. After Jay gave away 20 stickers, Mel had 4 times as many stickers as Jay. How many stickers did Mel first have?	and so on) repeated addition array, row, column

Division Guidelines

	Calculation Strategy	Progression	Vocabulary
Year	Continue with partitioning where necessary for mental calculation (see year 4 bar partitioning)	**Missing numbers**	double, halve

6

Manipulation:

136 ÷ 25
= 272 ÷ 50
= 544 ÷ 100 = 5.44
27 ÷ 1.5 = 54 ÷ 3

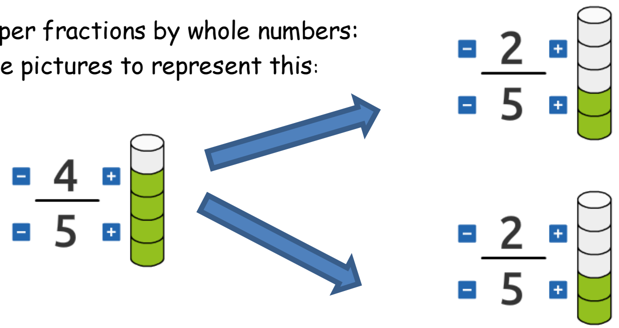
Continue with short division – extending to decimals.

78.16 (carries 2 2 2)
3 | 234.54

14.6 (carries 16, 21)
35 | 511.0

Fractions:

Divide proper fractions by whole numbers:
$\frac{4}{5} \div 2$ Use pictures to represent this:



Divide whole numbers by fractions:

2.4 ÷ 0.3 = □ x 1.25

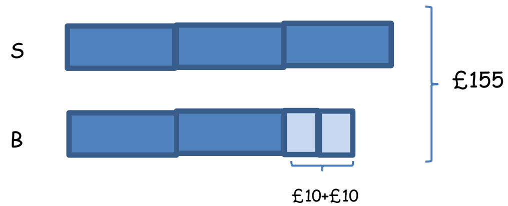
Which number could be written in the box?

Use a fact
12 x 1.1 = 13.2
Use this fact to work out
15.4 ÷ 1.1 =
27.5 ÷ 1.1 =

Making links
0.7 x 8 = 5.6
How can you use this fact to solve these calculations?
0.7 x 0.08 =
0.56 ÷ 8 =

Can you find?
Can you find the smallest number that can be added to or subtracted from 87.6 to make it exactly divisible by 8/7/18?

Use bar models to solve questions:
The cost of 3 shirts and 2 bags is £155. Each bag costs £10 ore than each shirt. How much does each shirt cost?



£155 - £20 = £135
£135 ÷ 5 = £27 (cost of shirt)

Always, sometimes, never
Is it always, sometimes or never true

share, share equally
one each, two each, three each…
group in pairs, threes… tens
equal groups of
divide, division, divided by, divided into
remainder
factor, quotient, divisible by
inverse

	$6 \div \frac{1}{2} \rightarrow$ how many halves make 6? Suddenly this becomes easy. Manipulation: However, with understanding of division manipulation they can make fractional division easy: $24 \div \frac{1}{4} = 48 \div \frac{1}{2} = 96 \div 1$	that dividing a whole number by a half makes the answer twice as big. Is it always, sometimes or never true that when you square an even number, the result is divisible by 4	