CALCULATION POLICY

NEW CURRICULUM 2014

MENTAL AND WRITTEN CALCULATIONS

This policy outlines both the **mental** and **written** methods that should be taught from Year 1 to Year 6.

The policy has been written according to the National Curriculum 2014 and the written calculations for all four operations are as outlined on the appendices of the Programme of Study.

The document builds on the interconnectedness of mathematics and outlines the progression for addition, subtraction, multiplication and division. It is our intention that addition and subtraction should be taught at the same time to ensure children are able to see the clear links between the operations and the inverse nature of them along with multiplication and division.

Children should **secure mental strategies**. They are taught the strategy of counting forwards and backwards in ones and tens first and then ‘Special Strategies’ are introduced. Children are taught to look carefully at the calculation and decide, which strategy they should use. Children should explain and reason as to why they have chosen a strategy and whether it is the most efficient.

The formal written methods should be introduced with caution. Calculations that require a written method should be presented to the children and models and images, such as dienes apparatus, place value counters, etc. should be used to ensure children have a conceptual understanding of the written method and that it is not a process that the children use for every type of calculation regardless of whether it can be completed mentally or mentally with jotting i.e. the number line.

The policy outlines the **mental strategies** that children should be encouraged to use:

A mental strategy that they can always rely on E.g. counting in tens and ones, forwards and backwards E.g. 56 – 25 (count back in 10s 56, 46, 36 and back in ones 36, 35, 34, 33, 32, 31)

A special strategy they can select from a small range of strategies if they can see something special about the numbers they are being asked to calculate with E.g. 46 – 24 (I can use near doubles to support my calculation E.g. 46 – 23 – 1)

The policy outlines the **written methods** as suggested on the appendices of the Curriculum 2014 and suggests that children:

- Look at a calculation and decide whether it can be done mentally, mentally with a jotting or whether it needs a written method.
- Should always be shown written methods with place value apparatus to ensure children are clear about the value of the numbers that they are calculating with and the numbers do not just become digits.
- Estimate, calculate and check to ensure that the answer they generate has some meaning.

For the purpose of developing understanding there may be occasions when examples that can be completed mentally may be shown as a written method purely to develop understanding of the method. This needs to be made very clear to children and when they are practising the methods, appropriate calculations should be used.

There is also a section on calculating with fractions; the expectations from Y1—Y6 and examples with the models and images that should be used in order to ensure children develop a conceptual understanding when calculating with fractions.

Key representations to support conceptual understanding of addition and subtraction.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

36… 46, 56, 66

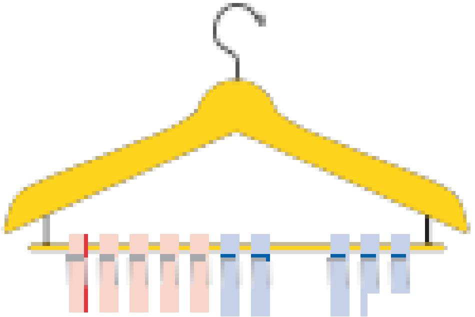
76… 66, 56, 46

6 + 10 = 16
16 + 10 = 26
26 + 10 = 36
36 + 10 = 46

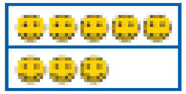
36 + 20 = 56

96 − 10 = 86
86 − 10 = 76
76 − 10 = 66
etc.

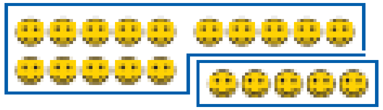
76 − 30 = 46



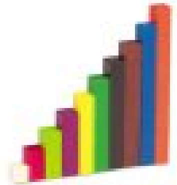
10 = 7 + 3

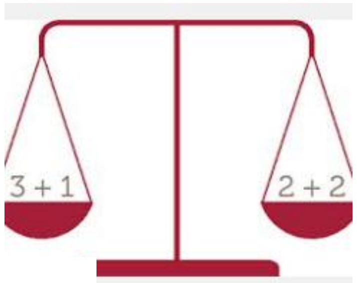


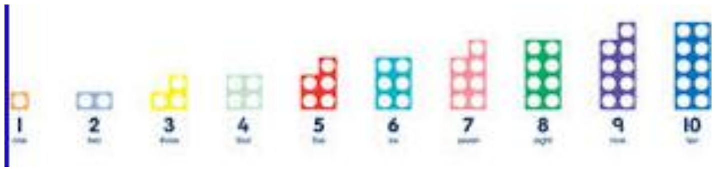
8 + ? = 10

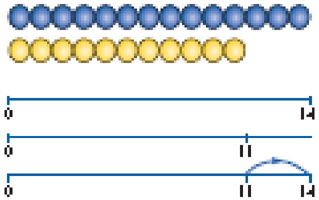


15 + 5 = 20

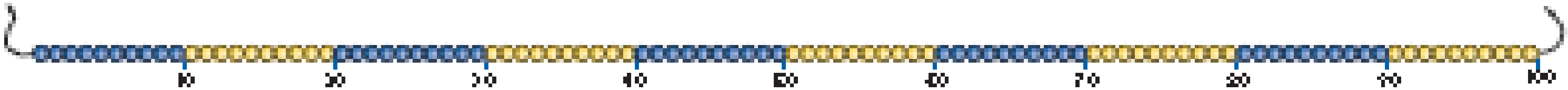


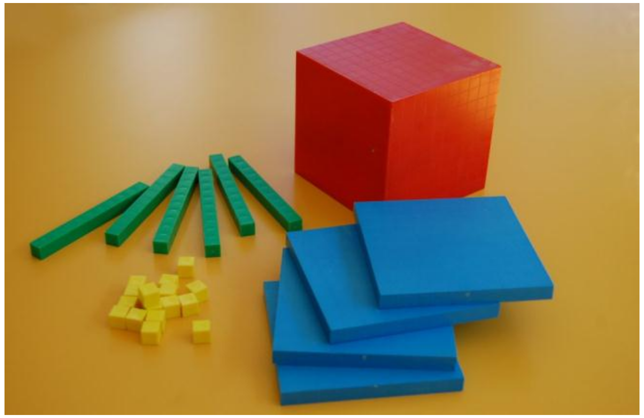






The difference between 11 and 14 is 3.
14 − 11 = 3
11 + □ = 14





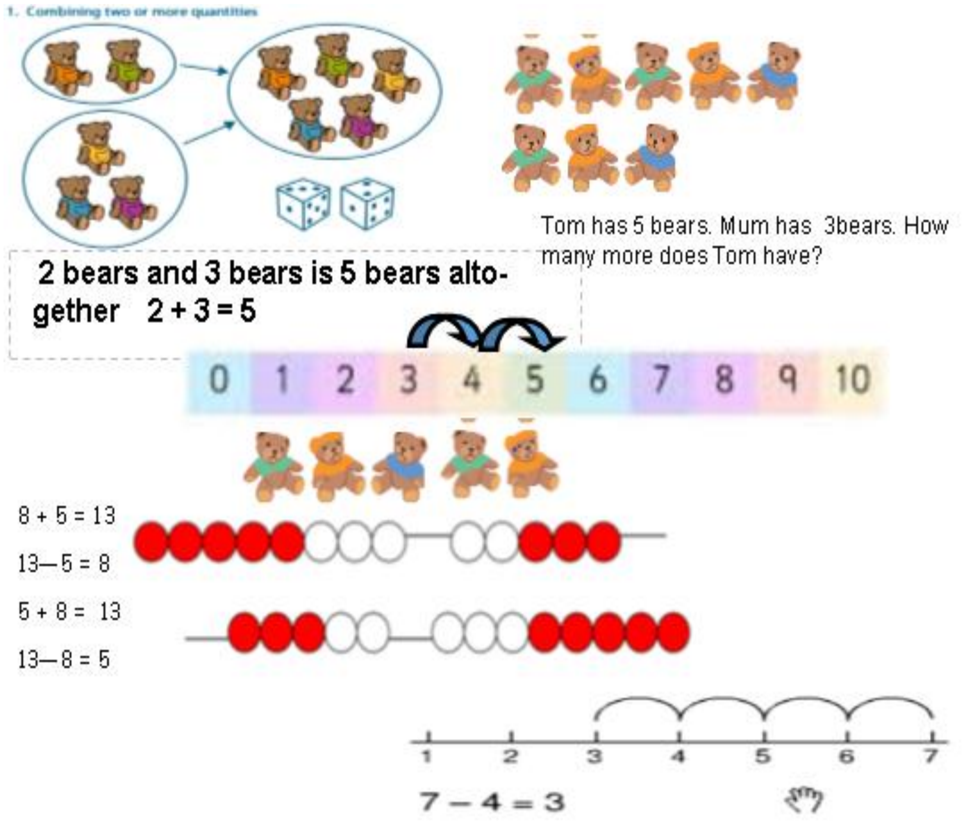
DEVELOPING UNDERSTANDING OF ADDITION AND SUBTRACTION

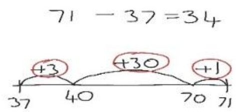
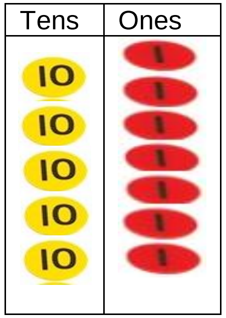
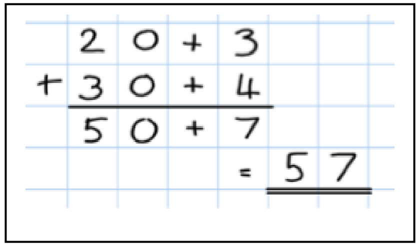
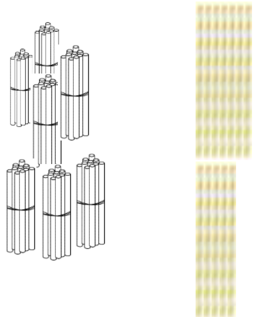
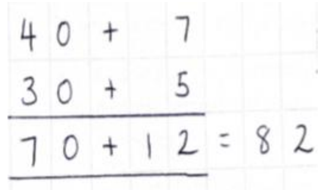
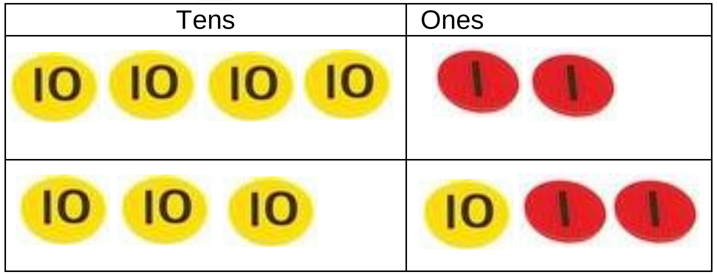
Year 1	
Objectives	**Recall of Facts**
read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs	$\blacksquare = \blacksquare + \blacksquare$ If we know 4 + 5 = 9 We also know: , 5 + 4 = 9 9 - 5 = 4 9 - 4 = 5 14 + 5 = 19 19 - 14 = 5, etc
represent and **use** number bonds and related subtraction facts within 20	
add and subtract one-digit and two-digit numbers to 20, including zero	Work with all numbers up to 20.

Children need to be secure with Using and Applying these skills in unfamiliar contexts before moving into the Year 2 objectives.

Mental Jottings with representations

Immerse children in practical opportunities to develop understanding of addition and subtraction. Link practical representations on a number track on a beadstring to recording on a number line. By the end of Year 1 children should be able to recall and use facts within and to 20.



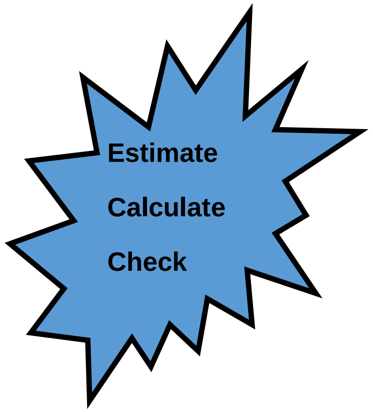
Year 2		
Objectives:	**Mental Recall/Jottings:**	**Written Methods with representations**
Show that addition of two numbers can be done in any order and subtraction cannot. Recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100. Add and subtract numbers using concrete objects, pictorial presentations and mentally including: 2 digit number and ones 2 digit number and tens Two 2 digit numbers Add three 1 digit numbers 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	**Using known facts** If I know: 2+3 = 5 I also know: 3+2 = 5 20 + 30 = 50 30 + 20 = 50 50—30 = 20 50—20 = 30 **Bridge through 10** 26 + 7 = 26 + 4 + 3 26 + 4 = 30 30 + 3 = 33 **Counting on/back in10s** 26 + 20 = 67-20 **Partitioning** 23 + 34 = 46—25 **Special Strategy** **Rounding and adjusting** + 9—9 +11—11 **Bonds to 10** 2 + 7 + 8 = 8 + 2 + 7 **Finding the difference between two numbers. 71 – 37:**  **Partitioning numbers in different ways in preparation for subtracting using decomposition:** 90 + 2 80 + 12 (I have subtracted a ten and added it onto the ones) Continue to record mental jottings as outlined in Year 2 with increasingly larger numbers. Use suitable resources as required (See models and images page). Children that have not achieved the age related expectations for Year 2 should not move onto formal written methods until they are secure with mental recall/jottings.	Recording addition and subtraction in columns supports place value and prepares for formal written methods.    Encourage children to recognise this can be completed mentally: 42 → 40 + 2 → 30 + 12 → 42 – 15 = 27 -15 → 10 + 5 → 10 + 5 20 + 7

Year 3

Objectives:

Add and subtract numbers mentally
A 3 digit number and 1s
A 3 digit number and 10s
A 3 digit number and 100s

Add and subtract numbers with up to 3 digits using formal written methods of columnar addition and subtraction.



Mental Recall/Jottings:

Bridging to 10

425 + 8 = 425 + 5 + 3
= 430 + 3
= 433

Rounding and Adjusting

425 + 90 = 425 + 100
= 525 - 10
= 515

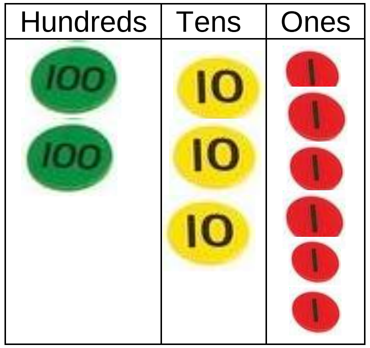
146 – 9 = 146 – 10 + 1
= 136 + 1
= 137

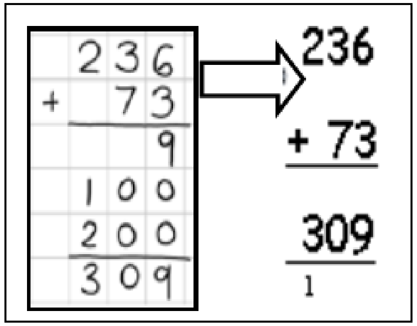
146 – 50 = 146 – 40 – 10
= 106 – 10
= 96

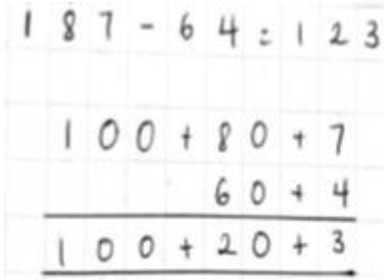
Counting forwards or backwards in 100s
636 – 500 = 136

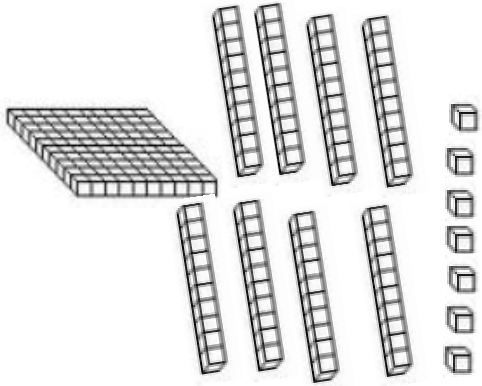
Written Methods with representations

Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with incr easingly large numbers up to three digits to become fluent

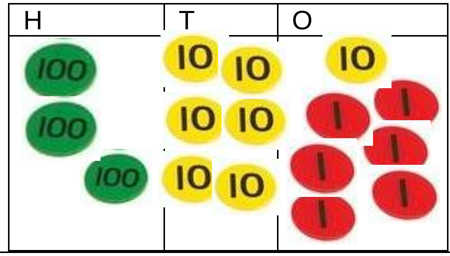


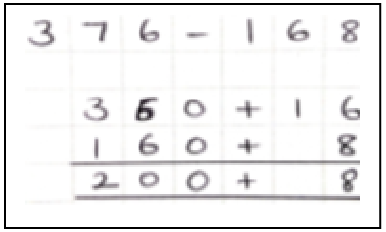






376—168 =
Using my knowledge of partitioning in different ways. 376 = 360 + 16.





Year 4		
Objectives:	**Mental Recall/Jottings:**	**Written Methods:**
Continue to secure and extend mental methods from previous year groups. To select whether a calculation can be done mentally, with a jotting or using a formal written method. Add and subtract numbers with up to 4 digits using formal written methods of column addition and subtraction where appropriate.	Develop confidence at calculating mentally with larger numbers. Using the full range of strategies: · **Counting in 1s/10s** · **Bridging through multiples of 10** · **Partitioning** · **Rounding and Adjusting** · **Reordering** · **Near Doubles** · **Bridging through 60 when calculating with time.** **Can I do it mentally?** **Should I use a jotting?** **Should I use a written method?**	Add and subtract numbers up to four digits.  Revert to expanded methods if the children experience any difficulty. Use the written method with decimals in the context of money £ 32.50 + £ 21.75 = £54.25 £32.50 + £21.75 £54.25 1 £ 42.50 - £ 13.35 = £ 29.15 £ $^{3}\cancel{4}\,^{1}2.\ ^{4}\cancel{5}\ ^{1}0$ - £ 1 3. 3 5 £ 2 9. 1 5 Using number to ensure children understand the process before quickly moving into numbers that do require a written method.

Year 5		
Objectives:	**Mental Recall/Jottings:**	**Written Methods:**
Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Add and subtract numbers mentally with increasingly large numbers 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.	12 462 – 2300 Use knowledge of place value to calculate mentally with increasingly larger numbers. Employ a range of special strategies to develop confidence in calculating mentally. E.g. **2364 + 1999 =** 2364 + 2000 = 4364 4364—1 = 4363 **13484 + 2400 =** 13000 + 2000 = 15000 484 + 400 = 884 15000 + 884 = 15884 4 = 2001—1997  1997 2000 2001 13486—5000 13486—3000 = 10486 10486—2000 = 8486	**Estimate:** 800 + 640 = 1440 789 + 642 becomes 7 8 9 + 6 4 2 1 4 3 1 1 1 Answer: 1431 900 – 500 = 400 874 – 523 becomes 8 7 4 – 5 2 3 3 5 1 Answer: 351 900 – 500 = 400 932 – 457 becomes 8 12 1 ~~9~~ ~~3~~ 2 – 4 5 7 4 7 5 Answer: 475 932 – 457 becomes 1 1 9 3 2 – ~~4~~ ~~5~~ 7 5 6 4 7 5 Answer: 475 **Check:** **Is your estimate close to the answer you have calculated?** 25.356 + 346.28 becomes: Estimate: 25 + 350 = 375 25.356 +346.28 371.636 1 1 9.076 – 3.142 becomes: Estimate: 9 – 3 = 6 8 ~~9~~.1 076 3. 142 5. 934

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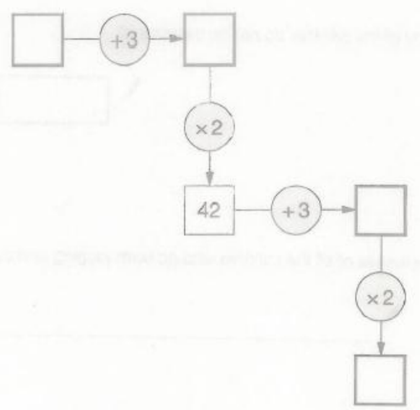
<tr><td colspan="3">Year 6</td></tr>
<tr><td>Objectives:</td><td>Mental Recall/Jottings:</td><td>Written Methods:</td></tr>
<tr>
<td>Perform mental calculations, including with mixed operations and large numbers

Use their knowledge of the order of operations to carry out calculations involving the four operations

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</td>
<td>Ensure children use a wide range of mental strategies when calculating including decimals and increasingly larger numbers.

What is 2 minus 0.005?

What is 5.7 added to 8.3?



57 + $\square$ = 125

911 – 47 = $\square$

149 + 137 + 158 = $\square$

($\square$ + $\square$) x $\square$ = 10</td>
<td>12 462 + 8456
<table><tr><th>Tth</th><th>Th</th><th>H</th><th>T</th><th>U</th></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>
Estimate:
21 000 = 12 500 + 8 500
$$\begin{array}{r} 12\,462 \\ +\ \underline{8\,456} \\ \underline{20\,918} \\ 1\ 1\ \ \end{array}$$
3906 = 12 462 – 8556

Estimate:
4000 = 12 500 – 8 500
$$\begin{array}{rl} & \cancel{1}\,{}^{11}\cancel{2}\ {}^{1}4\ {}^{5}\cancel{6}\ {}^{1}2 \\ - & \underline{8\ 5\ 5\ 6} \\ & \underline{3\ 9\ 0\ 6} \end{array}$$
Add and subtract numbers with a different number of decimal places.

12.4 – 3.56 =

Estimate: 12 – 4 = 8 (my answer should be between 8 and 9)
$$\begin{array}{rl} & 1\,{}^{1}\cancel{2}.\ {}^{13}\cancel{4}\ {}^{1}0 \\ - & \underline{3.\ 5\ 6} \\ & \underline{8.\ 8\ 4} \end{array}$$</td>
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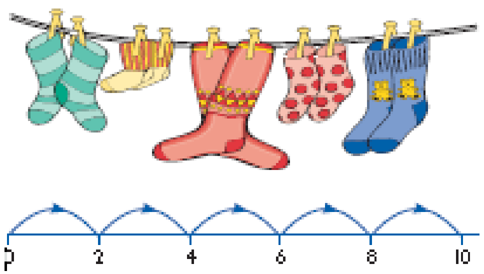
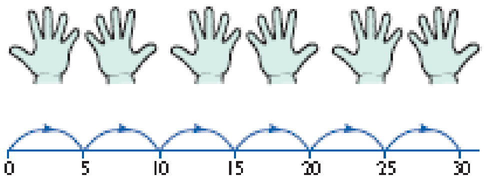
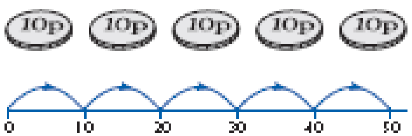
Key representations to support conceptual understanding of multiplication and division



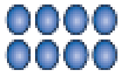
2 + 2 + 2 + 2 + 2 = 10
2 × 5 = 10
2 multiplied by 5
5 pairs
5 hops of 2



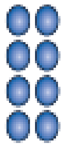
5 + 5 + 5 + 5 + 5 + 5 = 30
5 × 6 = 30
5 multiplied by 6
6 groups of 5
6 hops of 5



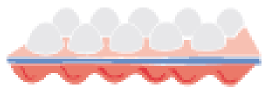
10p + 10p + 10p + 10p + 10p = 50p
10p × 5 = 50p
5 hops of 10



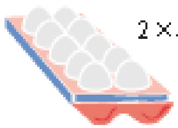
4 × 2 = 8
2 × 4 = 8



2 × 4 = 8
4 × 2 = 8

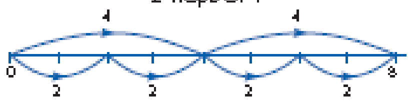


5 × 2 = 10
2 × 5 = 10



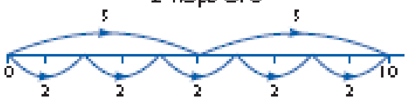
2 × 5 = 10
5 × 2 = 10

2 hops of 4

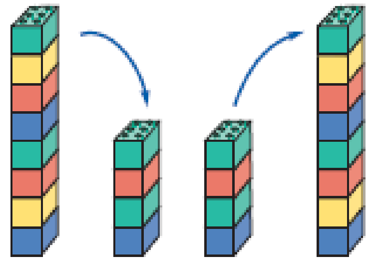


4 hops of 2

2 hops of 5

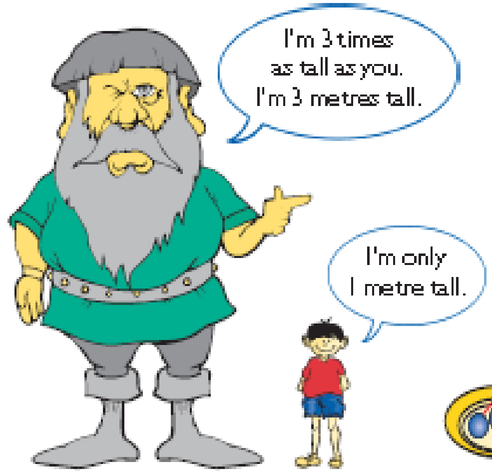


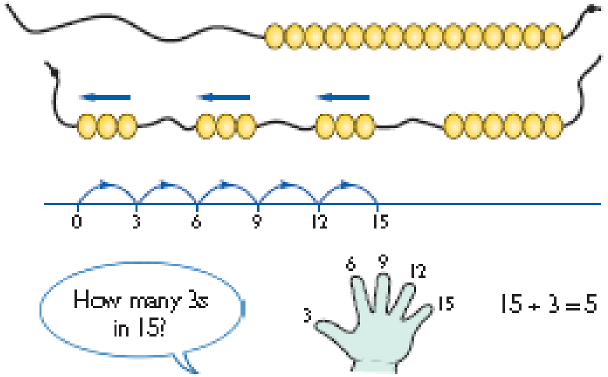
5 hops of 2



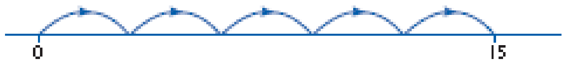
half of 8 is 4
8 ÷ 2 = 4

double 4 is 8
4 × 2 = 8

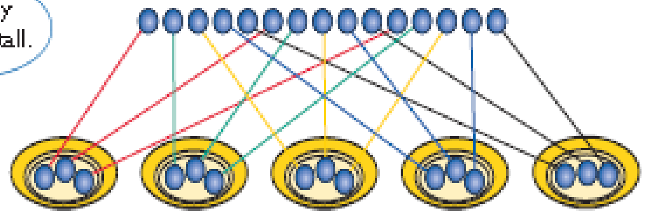


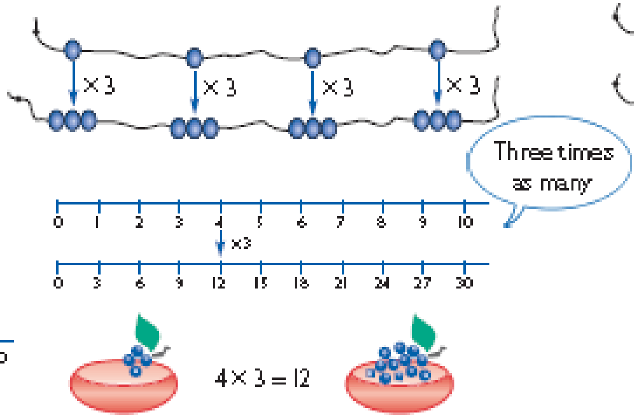


15 ÷ 3 = 5

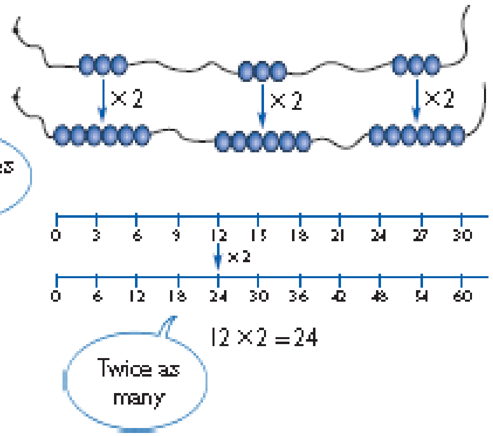


5 hops in 15. How big is each hop?
15 ÷ 5 = 3
15 shared between 5



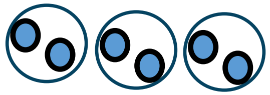
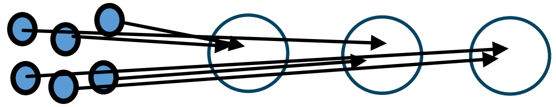
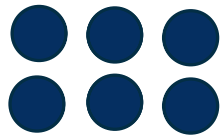
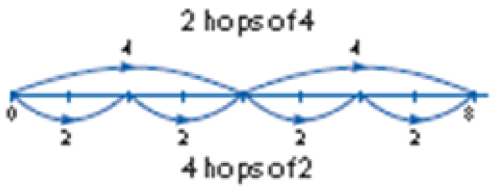
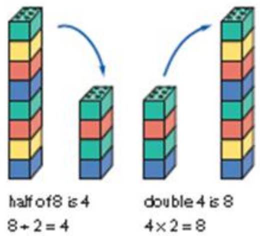
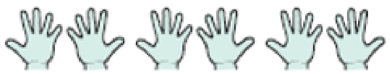


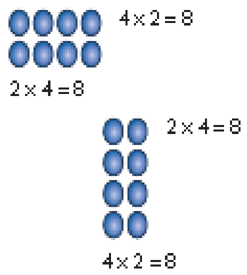
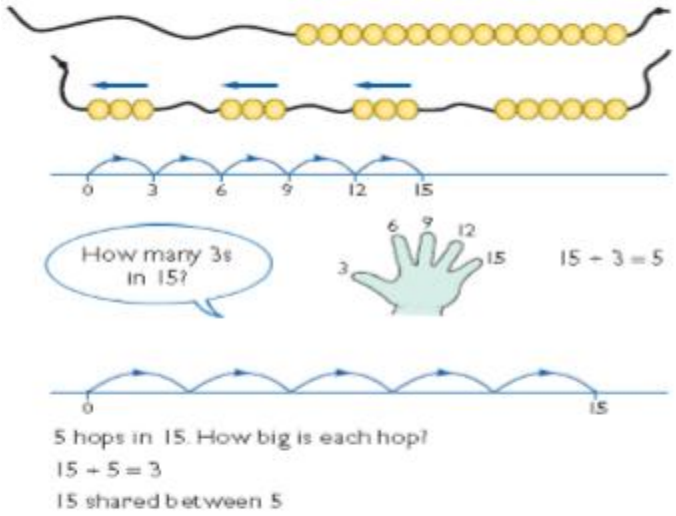
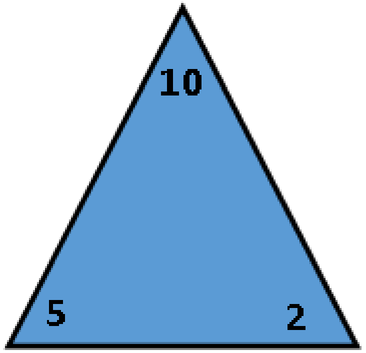
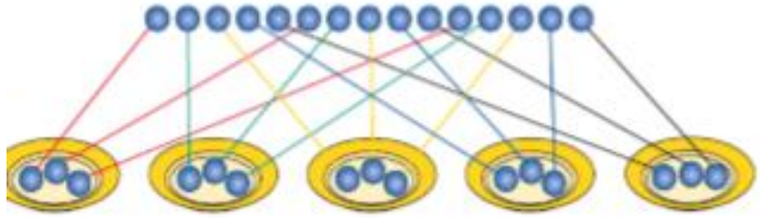
4 × 3 = 12



12 × 2 = 24

Year 1

Objective	Examples	Representations
count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens Double numbers to 20	Use of visual models to support counting in 2, 5, 10 Ensure children begin to see the patterns of counting in 2, 5, 10. Double/halve numbers up to: 10 + 10 = 10 x 2 20 – 10 = 20 ÷ 2 Children do not need to record number sentences using the symbols. Develop the vocabulary by encouraging children to explain what they are doing.	Grouping and sharing    How many legs will 3 teddies have? **Arrays**        

Year 2		
Objective	**Examples**	**Models and Images**
count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward (copied from Number and Place Value) recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Written calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	2 x 5 = 10 5 x 2 = 10 10 ÷ 2 = 5 10 ÷ 5 = 2 Use knowledge of doubling: 2 x 10 = 20 10 x 2 = 20 20 ÷ 2 = 10 20 ÷ 10 = 2	    3 x 5 = 15 15 ÷ 5 = 3

Year 3

Objective	Mental Recall Examples	Progressing from Mental to Written Methods with representations

Objective

count from 0 in multiples of 4, 8, 50 and 100 (copied from Number and Place Value)

recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

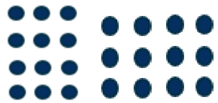
write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (appears also in Written Methods)

Mental Recall Examples

If the children know 2/5/10 facts they now need to learn:

3 x 3	4 x 4	6 x 8
4 x 3	6 x 4	7 x 8
6 x 3	7 x 4	8 x 8
7 x 3	8 x 4	9 x 8
8 x 3	9 x 4	11 x 8
9 x 3	11 x 4	12 x 8
11 x 3	12 x 4	
12 x 3		

With corresponding division facts. Recall facts along with counting in steps sizes.



4 x 3 = 3 x 4

12 ÷ 3 = 4

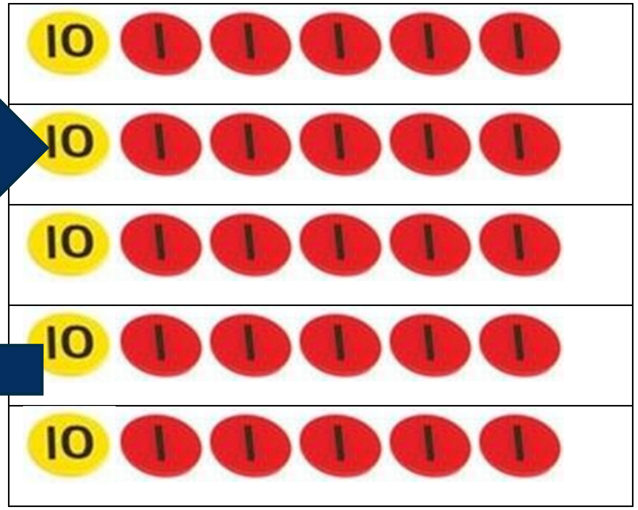
12 ÷ 4 = 3

To make 6 fairy cakes you need...

How much will you need for 12?

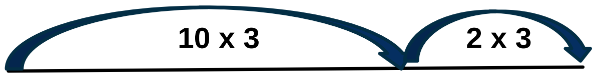
Progressing from Mental to Written Methods with representations

x	10	5
5	50	25



$$\begin{array}{r} 15 \\ \times \quad 5 \\ \hline 25 \\ + \quad 50 \\ \hline 75 \end{array}$$

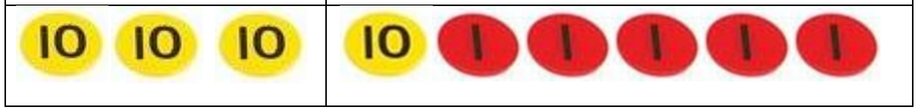
36 ÷ 3 =



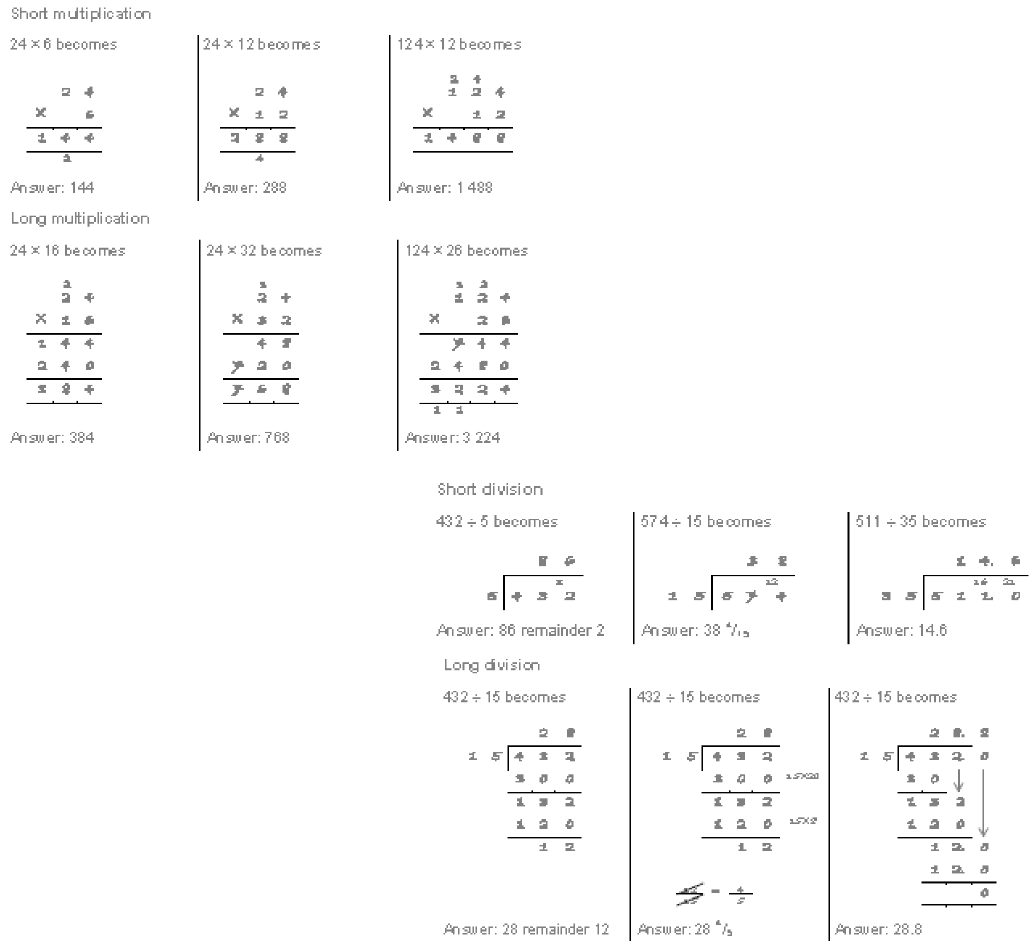
45 ÷ 3 = 1 5

$3\overline{)\,{}^{3}\cancel{4}\,{}^{1}5}$

40	5



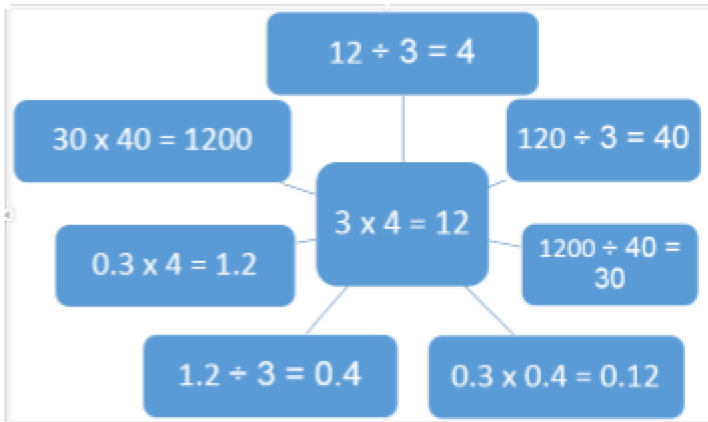
Short multiplication and division rely on mental methods – children should be given short multiplication and division involving 2/3/4/5/6/10 times tables

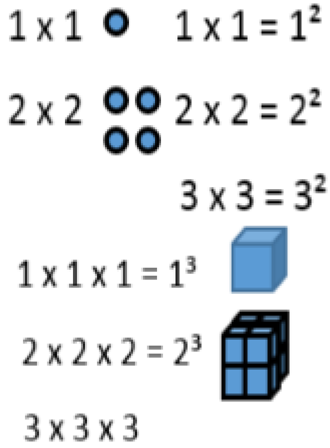
Year 4		
Objective	**Mental Methods**	**Written Methods with representations**
count in multiples of 6, 7, 9, 25 and 1 000 (copied from Number and Place Value) recall multiplication and division facts for multiplication tables up to 12 × 12 use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. recognise and use factor pairs and commutativity in mental calculations (appears also in Properties of Numbers) multiply two-digit and three-digit numbers by a one-digit number using formal written layout	If the children know multiplication and division facts for: 2/5/10/3/4/8/ they now need to learn. 6 x 6 7 x 7 9 x 9 11 x 11 7 x 6 9 x 7 11 x 9 12 x 11 9 x 6 11 x 7 12 x 9 12 x 12 11 x 6 12 x 7 12 x 6 Explore what happens when we divide by 1 and 0. To solve 24 x 3 Use knowledge of factor pairs. 8 x 3 x 3 6 x 4 x 3 In measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).	**These are the methods from the appendix of the National Curriculum. Schools should agree the methods that they are going to use.** 

Year 5

Objective	Mental Methods
count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 multiply and divide numbers mentally drawing upon known facts multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 identify multiples and factors, including finding all factor pairs of a number, and common factors of two 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 recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)	see below

Mental Methods





Multiplying and dividing whole numbers and decimals by 10, 100 and 1000.

Thousands	Hundreds	Tens	Ones	/10 (tenths)	/100 (Hundredths)

Year 5 Continued.

Objective	Written Methods	
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 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	2307 x 8 = Estimate: 2000 x 8 = 16000 Calculate: (Short multiplication) 2 3 0 7 X 8 18 4 5 6 2 5 1431 x 23 = Estimate: 1431 x 20 = 28620 1 Calculate: (Long multiplication) 1 4 3 1 X 2 3 4 2 9 3 (1431 x 3) 2 8 6 2 0 (1431 x 20) 3 2 9 1 3 1 1 Examples with decimals: 4.65 x 9 =	432 ÷ 5 = Estimate: 400 ÷ 5 = 80 Calculate (short division) 432 ÷ 5 becomes 8 6 r 2 5 | 4 3 ^{3}2 Answer: 86 remainder 2 Estimate: 450 ÷ 15 = 30 Calculate: (Long division) 432 ÷ 15 becomes 2 8 r 12 1 5 | 4 3 2 3 0 0 1 3 2 1 2 0 1 2 Ensure children are able to express remainders either as remainder, fraction or decimal. For example remainder 12 or 12/15 (4/5) or 0.8) Examples with decimals: 37.2 ÷ 8 =

Year 6	
Objective	**Mental Methods**
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	They undertake mental calculations with increasingly large numbers and more complex calculations. Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency. Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures. Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9. Common factors can be related to finding equivalent fractions. Calculate 900 ÷ (45 × 4). A bag of four oranges costs thirty seven pence. How much do twelve oranges cost?

<table>
<tr><th colspan="2">Year 6 Continued</th></tr>
<tr><th>Objective</th><th>Written Methods</th></tr>
<tr>
<td>multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for the context divide numbers up to 4 digits by a two-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</td>
<td>

Short division

98 ÷ 7 becomes

$$\begin{array}{r|ll} & 1 & 4 \\ \cline{2-3} 7 & 9 & {}^{2}8 \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r|llll} & & 8 & 6 & r\,2 \\ \cline{2-4} 5 & 4 & 3 & {}^{3}2 & \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{rr|llll} & & & 4 & 5 & r\,1 \\ \cline{3-6} 1 & 1 & 4 & 9 & {}^{5}6 & \end{array}$$

Answer: $45\frac{1}{11}$

Long division

432 ÷ 15 becomes

$$\begin{array}{rr|rrrl} & & & 2 & 8 & r\,12 \\ \cline{3-5} 1 & 5 & 4 & 3 & 2 & \\ & & 3 & 0 & 0 & \\ \cline{3-5} & & 1 & 3 & 2 & \\ & & 1 & 2 & 0 & \\ \cline{3-5} & & & 1 & 2 & \end{array}$$

432 ÷ 15 becomes

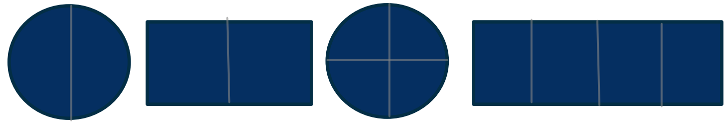
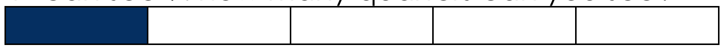
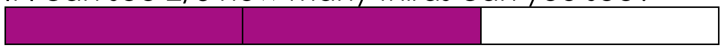
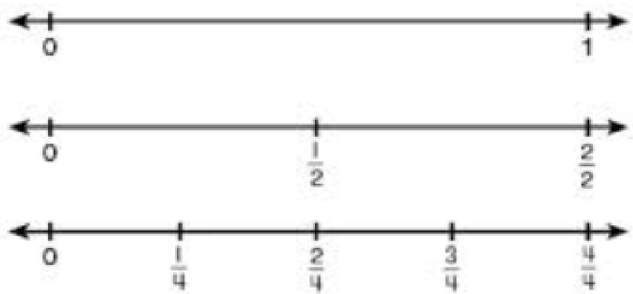
$$\begin{array}{rr|rrrl} & & & 2 & 8 & \\ \cline{3-5} 1 & 5 & 4 & 3 & 2 & \\ & & 3 & 0 & 0 & 15\times20 \\ \cline{3-5} & & 1 & 3 & 2 & \\ & & 1 & 2 & 0 & 15\times8 \\ \cline{3-5} & & & 1 & 2 & \end{array}$$

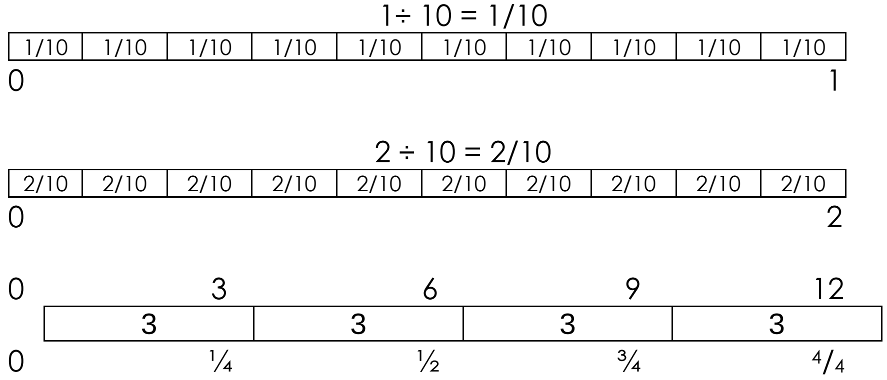
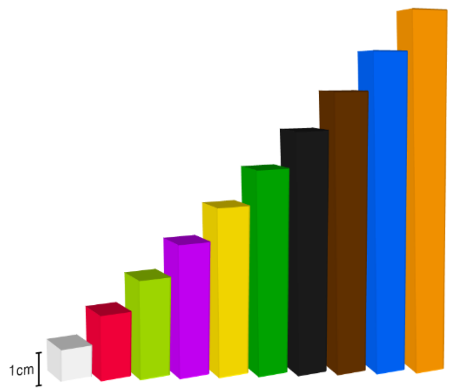
$\frac{\cancel{12}}{\cancel{15}} = \frac{4}{5}$

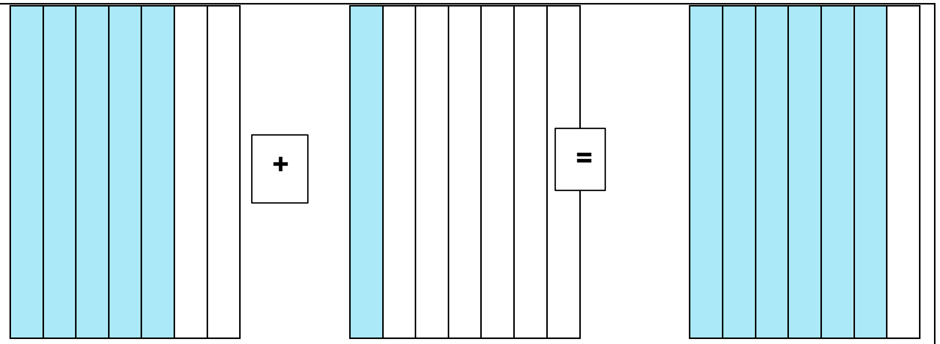
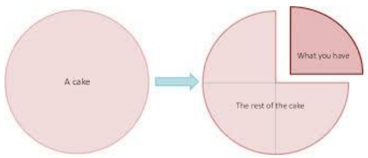
432 ÷ 15 becomes

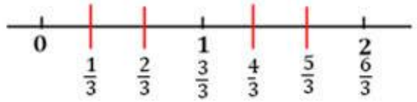
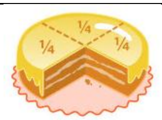
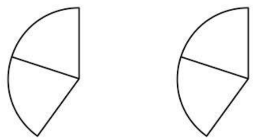
$$\begin{array}{rr|rrrr} & & & 2 & 8\cdot & 8 \\ \cline{3-5} 1 & 5 & 4 & 3 & 2\cdot & 0 \\ & & 3 & 0 & \downarrow & \downarrow \\ \cline{3-4} & & 1 & 3 & 2 & \\ & & 1 & 2 & 0 & \\ \cline{3-5} & & & 1 & 2 & 0 \\ & & & 1 & 2 & 0 \\ \cline{4-6} & & & & & 0 \end{array}$$

</td>
</tr>
</table>

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES			
Year	**Objectives**	**Examples**	**Models and Images**
Year 1	• Recognise, find and name a half as one of two equal parts of an object, shape or quantity • Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	Children use their knowledge of fractions of shape to find fractions of quantities. Children should be give practical apparatus to find halves and quarters of quantities within 20. Record work pictorially.	
Year 2	• Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity • Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.	Children use their knowledge of unit and non-unit fractions of shapes to find fractions of quantities. They relate this to find fractions of a length e.g. 2/4 of 1m = Children need to relate finding a quarter to halving and halving again. *Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line (Non Statutory Guidance)*	If I can see ¼ how many quarters can you see?  If I can see 2/3 how many thirds can you see?   

Year	Objectives	Examples	Models and Images
Year 3	• count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one digit numbers or quantities by 10 • recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators • recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators • recognise and show, using diagrams, equivalent fractions with small denominators	Encourage children to count up and down in tenths. 1 ÷ 10 = 1/10 2 ÷ 10 = 2/10 3 ÷ 10 = 3/10 Continue the pattern. What do you notice? What's the same? What's different? Children can use fractions as an operator E.g. 1/4 of 12 = 12 ÷ 4 = 3 Children can relate fractions to the division of integers 1 ÷ 4 = ¼ 4 x ¼ = 1 3 ÷ 4 = ¾ ¾ x 4 = 3 (12/4 or ¾ + ¾ + ¾ + ¾) Children need to relate and reason about why their diagrams are equivalent to a half – make connections between the numerator and the denominator E.g. ½ = 4/ 8 The numerator will be half of the denominator. Children should be encouraged to make the connection between their multiplication tables and	 Use Cuisenaire rods to develop vocabulary of equivalence. 

	• add and subtract fractions with the same denominator within one whole • compare and order unit fractions, and fractions with the same denominators	equivalents E.g. 1/3 = 3/9 because 3 x 3 = 9. $\frac{5}{7}+\frac{1}{7}=\frac{6}{7}$ Children need to use practical resources/visual representations to support the comparison of fractions E.g. 1/3 > ¼ Children should also be taught how to order fractions on a number line	 
Year 4	• recognise and show using diagrams, families of common equivalent fractions • count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by tenths • solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number • add and subtract fractions with the same denominator	1 ÷ 100 = 1/100 2 ÷ 100 = 2/100 3/7 of 56 = 24 3/10 of 120 = 36 ¼ = 12 ¾ = __ 3/10 + 4/10 = 7/10 9/100 – 7/100 = 2/100	  Count back in 1 and 1/10 from 101. 

	• recognise and write decimal equivalents of any number of tenths or hundredths • recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ • find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths • round decimals with one decimal place to the nearest whole number • compare numbers with the same number of decimal places up to two decimal places • Solve simple measure and money problems involving fractions and decimals to two decimal places	Children can record on a number line equivalents between 1/10 and 0.1 Count on and back in tenths as decimals and relate to counting on/back in 10ths (fractions). 25 ÷ 10 = 2.5 2 ones and 5 tenths 25 ÷ 100 = 0.25 0 ones, 2 tenths and 5 hundredths or 25 hundredths	
Year 5	• Add and subtract fractions with the same denominator and denominators that are multiples of the same number. • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	$\frac{3}{4} - \frac{1}{4} =$ $\frac{1}{10} + \frac{2}{5} =$ $\frac{2}{5}$ x 2 =	 I eat 1 more piece of this cake. What fraction would be left? 

Year 6	• 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 • Divide proper fractions by whole numbers	¼ x ½ = $\frac{1}{8}$ $\frac{1}{3}$÷ 2 = $\frac{1}{6}$