Addition

Year Group	Expectation	Methods/ resources	Vocabulary
Reception	Addition by putting two groups of objects together One more/ one less Counting on to least 20 Conservation of number	A range of pictorial and concrete representations of numbers. Beginning to use number lines Introduction of the 100 square Combining. Holding largest number in the head	Add, addition, altogether, more than, plus, total, number sentences, sum, total
1	Understand symbols + and = = means 'the same **value** as' Number bonds to 10 and 20 Add 1 to 2 digit numbers within 20 One step problems Count on and back in 2s 5s 10s across tens and below 0 Inverse; link to subtraction	A range of pictorial and concrete representation of numbers including the use of Numicon Formalise use of number lines Increasing familiarity of 100 square	In addition to the above: How many more than Difference
2 **(Milestone 1)**	Use of signs and symbols + and = = means 'the same as' Adding two 2 digit numbers. Secure number bonds to 20 and derive and use related facts to 100.	Use of number lines and 100 square to secure mental methods Partition addition Formal column addition	In addition to the above: calculate
3	Add numbers with up to 3 digits Solve problems involving addition Estimate	Partition addition Formal column addition	As above
4 **(Milestone 2)**	Add numbers with up to 4 digits Solve two step problems Estimate	Formal column addition	As above
5	Add numbers with more than 4 digits Solve multi-step problems Estimate	Formal column addition	As above
6 **(Milestone 3)**	Add numbers with more than 4 digits Solve multi-step problems Estimate	Formal column addition	As above

Subtraction

Year Group	Expectation	Methods/ resources	Vocabulary
Reception	One less than Counting back from 21	A range of pictorial and concrete representations of numbers. Beginning to use number lines Introduction of the 100 square Physically taking away of concrete items	Subtraction/ subtract Minus Less than Number sentences
1	Use and understand symbols including the = sign (which must be taught as equals and **'the same value as'**) Subtract 1 and 2 digits within 20 One step subtraction problems Recall and understand number bonds to 10	A range of pictorial and concrete representation of numbers including the use of Numicon Formalise use of number lines counting back and on Increasing familiarity of 100 square	In addition to the above: How many more than **Difference (a key piece of vocabulary to be understood and used by most children by the end of Year 1)**
2 **(Milestone 1)**	Use of signs and symbols - and = = means 'the same value as' Recall subtraction facts to 20 Subtract 2, 2 digit numbers Subtract 3, 1 digit numbers Use inverse to find missing numbers One step problems	Number lines counting on or back depending on the question. Informal paper methods eg partitioning. Column subtraction (supported with denes), without bridging for most children.	In addition to the above: How many more than Inverse
3	Subtraction of 2, 2 digit numbers, including bridging across whole 10s One step problems	Number lines counting on or back depending on the question. Particularly when finding change with money. Column subtraction including exchanging for some	As above
4 **(Milestone 2)**	Subtraction of 2, 3 digit numbers Two step problems where subtraction is one component	Number lines counting on or back depending on the question. Particularly when finding change with money. Column subtraction including exchanging	As above
5	Two step problems involving subtraction. Subtracting any numbers, including those requiring exchanging and decimals	Number lines counting on or back depending on the question. Particularly when finding change with money. Column subtraction including exchanging	As above
6 **(Milestone 3)**	Multi-step problems including subtraction Subtracting any numbers, including those requiring exchanging and decimals	Number lines counting on or back depending on the question. Particularly when finding change with money. Column subtraction including exchanging	As above

Division

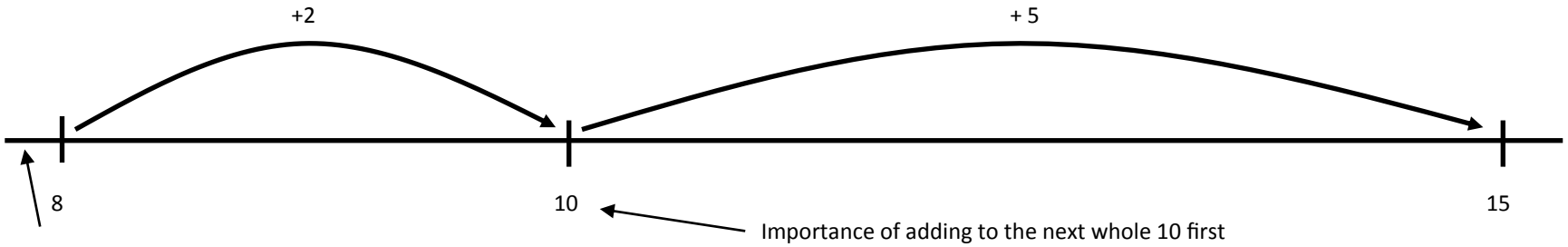
Year Group	Expectation	Methods/ resources	Vocabulary
Reception	Sharing equally/ fairly Splitting into two groups (This should not always be with equal numbers– children could begin to talk about having one 'left over')	Concrete objects Pictorial representation	Half, divide, group, share, groups of
1	Solving one step problems Begin to use mathematical symbols (give children access to remainders in context)	Concrete objects Pictorial representation Use of number beads and numberlines	Half, divide, group, share, groups of, Quarters, Remainders Left over How many times will ___ go into ___
2 **(Milestone 1)**	Recall and use division facts for 2, 5, 10 x tables Division is not commutative Establish link between division and multiplication Rounding up or down when remainders occur	As above plus: Use of own number lines	As above plus: Inverse
3	Consolidate from Milestone 1	As above	As above plus: Factors Multiples
4 **(Milestone 2)**	TU ÷ U HTU ÷ U Rounding up or down with remainders	As above	As above
5	Working towards Th H T U ÷ T U Proficient understanding of rounding with remainders. Use of formal contracted method	As above	As above
6 **(Milestone 3)**	As above	As above	As above

Multiplication

Year Group	Expectation	Methods/ resources	Vocabulary
Reception	Separate a group of objects and know that it is the same amount	Concrete objects Pictorial representation	Groups of Lots Multiply Times
1	Solving one step problems Begin to use mathematical symbols Doubling numbers	Concrete objects Pictorial representation Arrays Relate to repeated addition	*Lots of, groups of* *x, times, multiply, multiplied by* *repeated addition*
2 **(Milestone 1)**	Recall and use multiplication facts for 2, 5, 10 x tables– including recognising odd/even numbers. Solve problems in context Establish link between division and multiplication Establish that it can be done in any order (commutative)	As above:	As above plus: *multiple of*
3	Recall and use multiplication facts for the 3,4 and 8 x tables Calculate TU XU Solve missing number problems, scaling problems and problems in context.	As above Mental strategies as well as Use informal written methods– partitioning	As above plus: Product Multiples
4 **(Milestone 2)**	Recall multiplication facts up to 12x12. Multiplying 3 single digits Extend to TU/HTU x U Solve missing number problems, scaling problems and problems in context.	As above Grid method into formal written method	As above plus: Factors Common factors Factor pairs Common multiples
5	Th x U/TU Multiply decimal numbers Recognise and use square and cube numbers (including notation) Solve missing number problems, scaling problems and problems in context.	Formal written methods for long multiplication	As above plus: Prime factors Prime numbers
6 **(Milestone 3)**	As above	As above	As above

Addition

Example: 8 + 7 = 15



Number line extends beyond the smallest and greatest numbers

Partition addition

23 + 15

20 + 10 = 30

3 + 5 = 8

= 38

Partition the two numbers. Add the tens and units then combine. Can be done informally.

Formal column method

```
  5 7 3
+ 3 5 8
-------
  9 3 1
-------
  1 1
```

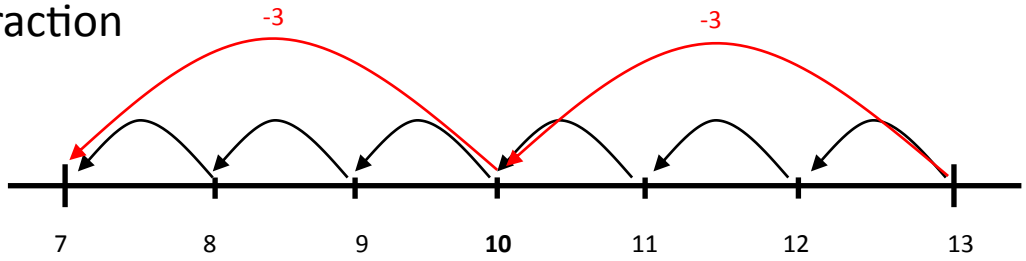
3 + 8 = 11

Carry the ‘one’

```
  6 7 . 5 0
+   8 . 7 8
-----------
  7 6 . 2 8
-----------
  1 1
```

Make sure the decimal points line up!

Subtraction

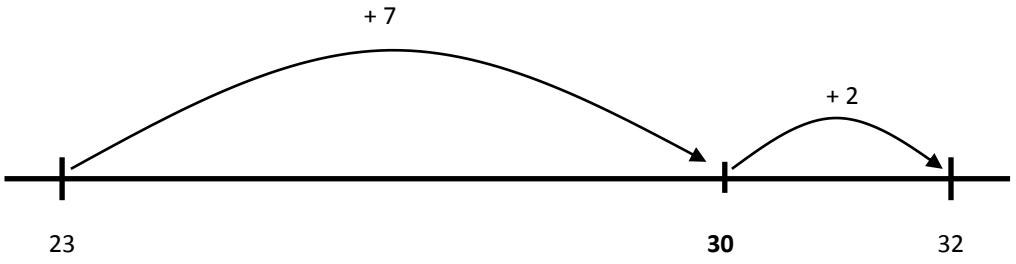


13 - 6 = 7

Number line use starting with **counting back** in ones using a line provided.

Developed to make bigger jumps to the next whole 10 (shown in red).

Strategy suitable for calculations such as 54— 8 and 203 — 9.



32— 23 = 9

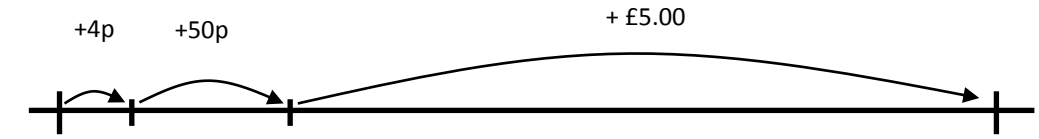
Note the importance of counting on to the next whole ten (and 100 with bigger numbers).

7 + 2 = 9

Develop to **'counting on'** from the smallest number to the biggest.

Key phrase: "What is the **difference** between…."

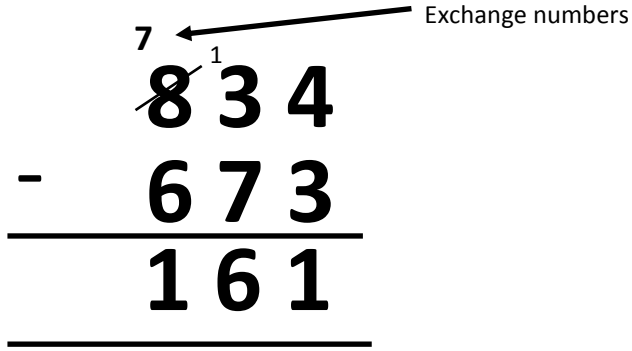
This can be developed to find the **difference** between any two numbers (such as 354—278) and is particularly useful when finding change when dealing with money (see below)



£5.00 + 50p + 4p = £5.54

If Steven pays £14.46 for a game, how much change will he get from £20.00?

Formal column subtraction



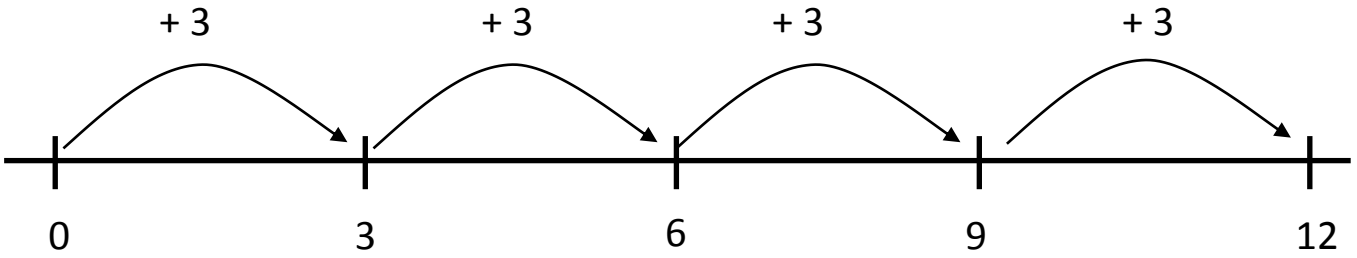
Multiplication

Grouping

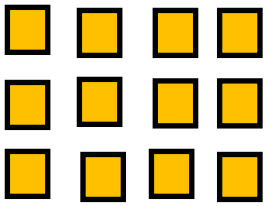
4 lots of 3 = 12

4 x 3 = 12

Related to repeated addition



Arrays



4 lots of 3 = 12

4 x 3 = 12

Informal written methods

13 x 4

10 x 4 = 40

3 x 4 = 12

40 + 12 = 52

Partition 13 into 10 and 3

Grid method

X	30	7
20	600	140 *
8	240	56

600
240
140
\+ 56
1036
1 1

It is crucial that the children have an understanding of multiplying by multiples of 10, 100 and 1000. They need to use the 'root' multiplication.

Eg: 20 x 7

2 x 7 = 14

20 x 7 = 140

Formal 'expanded' method.

This makes a clear link between grid method and the final contracted form. It may not be required for all children.

46
x 37
42 (7 x 6)
280 (7 x 40)
180 (30 x 6)
1200 (30 x 40)
1702
2

Formal 'compact' method.

46
x 37
322
~~4~~
1380
~~1~~
1702
1

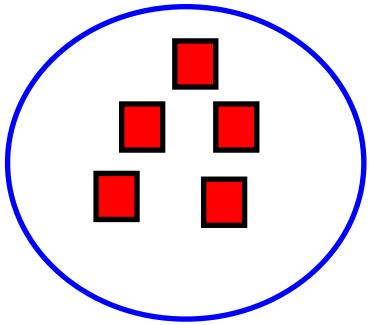
Make sure the children cross out the numbers they are carrying across

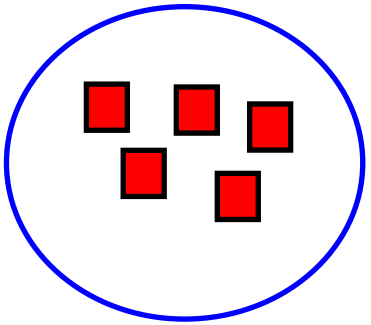
As we are multiplying by 30, use a 0 'place– holder'

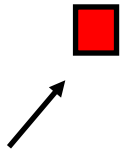
Division

Sharing equally/ fairly

Splitting into two groups

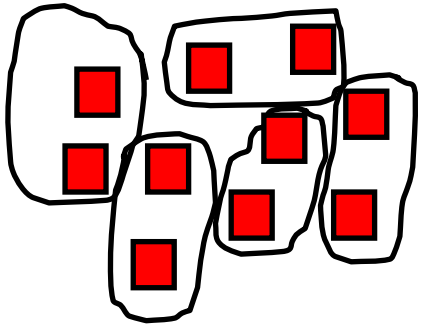






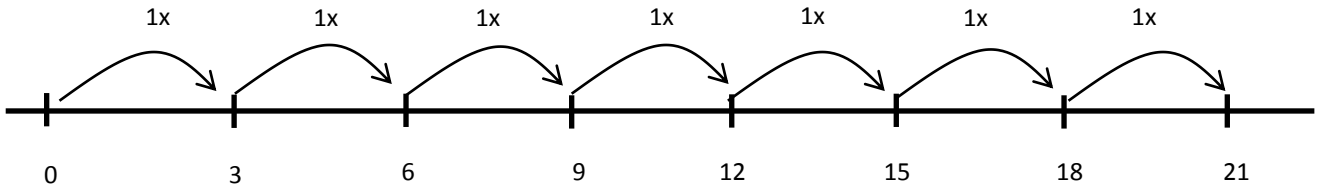
Even children at a young age should be exposed to remainders

Grouping eg How many times does 2 go into 10?



21 ÷ 3 = 7

How many times does 3 go into 21?



Numberline could be extended to include 'chunking'. Group lots into tens

Key language: **How many times does ____ go into ____?**

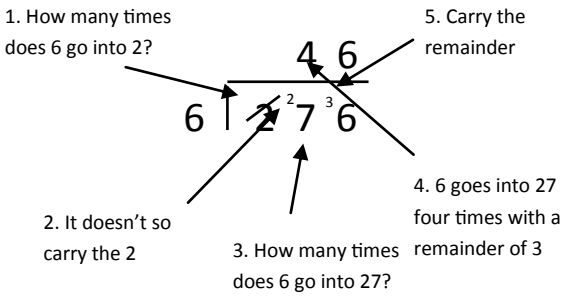
Formal expanded

(long division)

$276 \div 6 = 46$

$$
\begin{array}{r|l}
 & 46 \\
\hline
6 & 276 \\
 & -240 \quad (40 \times 6) \\
\hline
 & 36 \\
 & -36 \quad (6 \times 6) \\
\hline
 & 0
\end{array}
$$

Formal contracted



Dealing with remainders

Children should be used to dealing with remainders from the point at which they start playing with division. Where remainders occur in earlier years, children should be challenged to think about how they could deal with them. For example, if a sweet is left over after they have been shared at a party, what could they do with that cake?

By the end of Year 4, children should be adept at making decisions as to whether to round a remainder up or down. This will depend on the context but needs to be modelled and practised a lot.

In upper Key Stage 2 children need to be able to do this and turn remainders into fractions and decimals.

For example,

56 ÷ 5 = 11 r 1

This could be expressed as 11 1/5 and then related to its decimal equivalent ie 11.2

Larger divisors

Where divisors are larger, children should be encouraged to write the multiples down. For example, when tackling 2381 ÷ 13, the multiples of 13 should be written down next to the calculation to help the process. This strategy could also be used for children using smaller divisors who struggle with their knowledge of tables.