Skyswood Primary
&
Nursery School

Calculations Policy

March 2023
Review Date – March 2025

Skyswood Primary and Nursery School

Calculation Policy 2021

This policy document outlines the calculation methods agreed for Skyswood Primary School after consultation and reviewing research evidence. These methods are taught and used by all staff.

At Skyswood we teach calculation for understanding, and not just as a process that is to be remembered. The Calculation Policy clarifies progression in calculation with examples that are 'mathematically transparent', in other words the way the calculation works is clear and supports the development of mathematical concepts. We believe that building links between intuitive mental methods and written methods of calculating is crucial to the child's mathematical development.

Guidance to support the teaching of calculation at Skyswood

Many countries, and in particular those which are most successful at teaching number, delay the teaching of standard written methods. Delaying the introduction of column arithmetic helps pupils to develop sound mental strategies and develop 'number sense' - a feel for handling numbers and carrying out calculations.

We aim to ensure that by the end of Year 6 as many children as possible understand, and use successfully, compact written methods to carry out and record calculations they cannot do in their heads. Where appropriate a child may continue to use their more informal strategies as we believe this will be beneficial to them in terms of confidence and understanding. To help children develop mathematically we want them to be able to approach any calculation with flexible thinking and embedded mental methods.

At Skyswood we seek to:

- Promote the development of mental strategies.
- Give children a sense of success. If they understand what they are doing and it makes sense to them this raises self-esteem and give children confidence.
- Clarify their thinking and support their mathematical development.
- Encourage children to think about the size of the numbers involved instead of just operating on the digits.
- Allow children to explain their own methods so that they are involved in their own learning.
- Encourage informal methods which build on children's concept of number.

It is important that children approach any calculation by always asking themselves the following questions:

1. 'Can I do this in my head?'
2. 'Do I know the approximate size of the answer?'
3. 'If I can't do it wholly in my head, what do I need to write down in order to help me calculate the answer?'
4. 'Will the written method I know be helpful?'

Whenever appropriate, children should do a mental calculation.

Addition and Subtraction

Addition and subtraction are connected.

Part	Part
Whole	

Addition names the whole in terms of the parts and **subtraction** names a missing part of the whole.

Developing confidence in addition and subtraction

- Be able to recall number bonds to 10 and all addition pairs to 9 + 9.
- Recognise addition and subtraction as inverse operations.
- Understand place value and be able to partition numbers.
- Be able to add at least three single-digit numbers mentally.
- Be able to add multiples of 10 (such as 60 and 70) or of 100 (such as 600 and 700) using the related addition fact, 6 + 7, and their knowledge of place value.
- Be able to add and subtract any pair of two-digit numbers mentally.
- Be able to explain mental strategies orally and in writing.
- Be able to estimate answers to calculations confidently using rounding up or rounding down.
- Understand commutative (a + b = b + a) and associative ((a + b) + c = a + (b + c)) laws of addition.

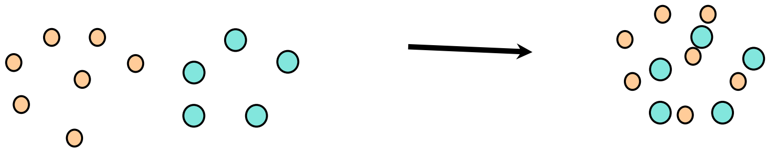
Progression in Addition

First Steps in Addition

Combining two sets

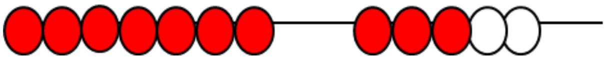
Putting together (using apparatus, e.g. counters, multilink etc.) two or more amounts or numbers to make a total

7 + 5 = 12



Count one set, then the other set. Combine the sets and count again. Starting at 1.

Counting along the bead bar, count out the 2 sets, then draw them together, count again. Starting at 1.

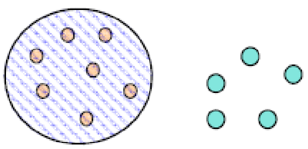


Combining two sets

Where one quantity is increased by some amount. Count on from the total of the first set, e.g. put 7 in your head and count on 5. Always start with the largest number.

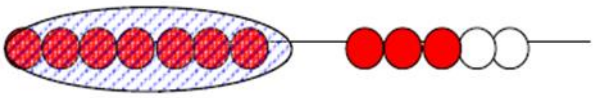
7 + 5 = 12

Counters:



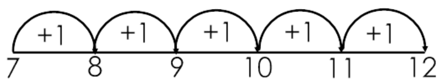
Start with 7, then count on 8, 9, 10, 11, 12

Bead strings:



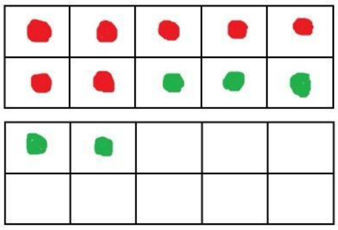
Make a set of 7 and a set of 5. Then count on from 7.

Counting on



Start with 7, then count on 8, 9, 10, 11, 12 (Addition is marked above the number line).

Lines and Dots



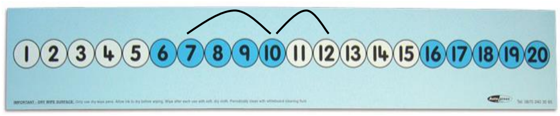
Draw your set of 7 dots, then change colour and draw in your second set of 5.

Bridging through 10s

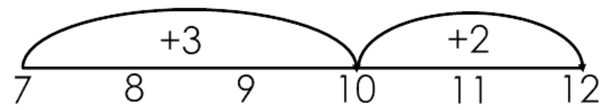
7 + 5 is partitioned into 7 + 3 + 2

'How many more to the next multiple of 10?' (The children should identify how their number bonds are being applied) and then 'if we have used 3 of the 5 to get to 10, how many more do we need to add on?

Number track:

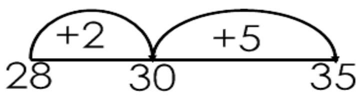


Number line



7 + 5 is partitioned into 7 + 3 + 2

28 + 7 is partitioned into 28 + 2 + 5



Addition Methods

Key mental strategies for addition

1. **Using doubles and near doubles** - e.g. knowing 5 + 5 = 10 makes it easy to calculate 5 + 6 = 11 and knowing 25 + 25 = 50 makes it easy to calculate 25 + 24 = 49
2. **Making jumps of 10** - the larger number is kept whole and jumps of 10 are added to it, e.g. 28 + 44 = 44 + 10 + 10 + 8
3. **Compensating to a 'friendly' number** – e.g. with a calculation like 98 + 37 we want the children to notice how close the 98 is to 100 and make use of that friendly number turning it into 100 + 35 which is much easier to solve
4. **Partitioning** – (as set out below) is a very useful written strategy and is also an accessible mental strategy

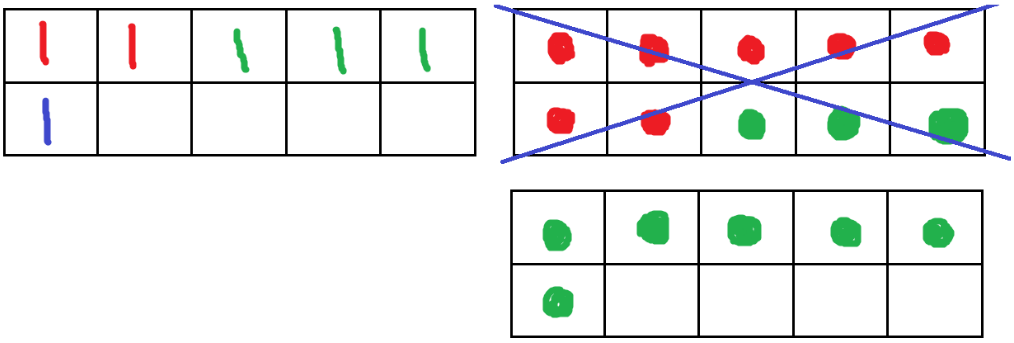
Partitioning for addition

Start with the largest part of the number so that the number is built up as you go along. Encourage the children to say the numbers out loud initially and then to 'speak' them internally (in their heads). Adults should verbalise the partitioning for addition process in a way similar to that set out in the 'dialogue' below.

Lines and Dots

27 + 39 = 66

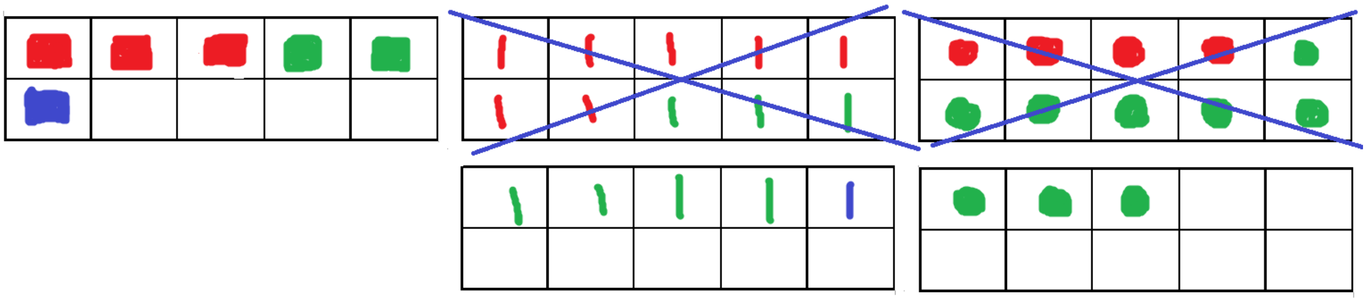
2 digit + 2 digit



Dialogue: 2 tens and 3 tens makes 5 tens (or 20 and 30 makes 50), 7 and 9 makes 16, 50 and 16 **makes** 66

374 + 279 = 653

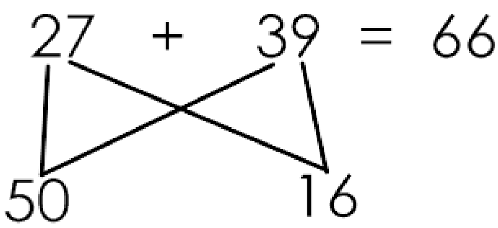
3 digit + 3 digit



Dialogue: 3 hundreds and 2 hundreds make 5 hundreds, 7 tens and 7 tens makes 14 tens which is 140, (or 70 and 70 makes 140), and 4 and 9 makes 13. 500 and 140 and 13 **makes** 653

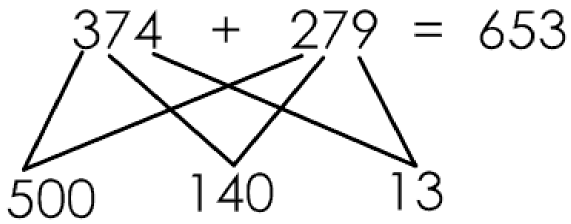
Bow Tie Method

2 digit + 2 digit



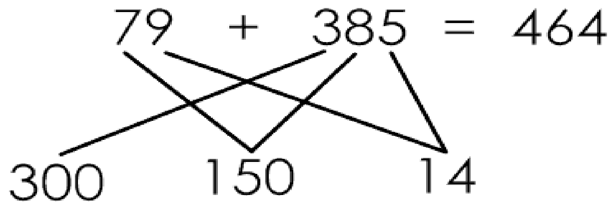
Dialogue: 2 tens and 3 tens makes 5 tens (or 20 and 30 makes 50), 7 and 9 makes 16, 50 and 16 **makes** 66

3 digit + 3 digit



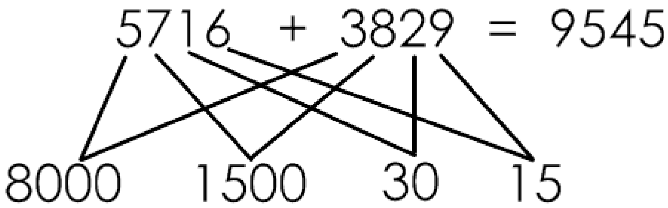
Dialogue: 3 hundreds and 2 hundreds make 5 hundreds, 7 tens and 7 tens makes 14 tens which is 140, (or 70 and 70 makes 140), and 4 and 9 makes 13. 500 and 140 and 13 **makes** 653

2 digit + 3 digit



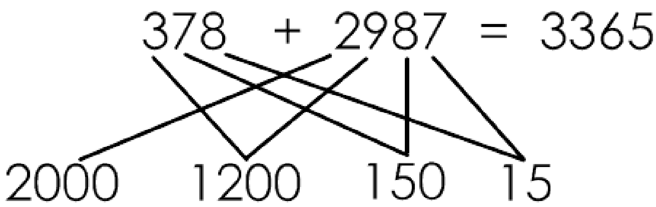
Dialogue: There are 3 hundreds. 7 tens and 8 tens makes 15 tens which is 150, (or 70 and 80 makes 150), and 9 and 5 makes 14. 300 and 150 and 14 **makes** 464

4 digit + 4 digit



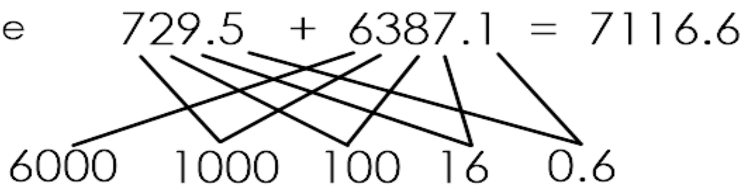
Dialogue: 5 thousands and 3 thousands make 8 thousands, 7 hundreds and 8 hundreds make 15 hundreds, (or 700 and 800 makes 1500), 1 ten and 2 tens makes 3 tens, (or 10 and 20 makes 30) and 6 and 9 makes 15. 8000 and 1500 and 30 and 15 makes 9545. (This might be broken down further- 8000 and 1500 makes 9500. 9500 and 30 and 15 **makes** 9545)

3 digit + 4 digit



Dialogue: There are 2 thousands. 3 hundreds and 9 hundreds makes 12 hundreds, (or 300 and 900 makes 1200), 7 tens and 8 tens makes 15 tens, (or 70 and 80 makes 150) and 8 and 7 makes 15. 2000 and 1200, and 150 and 15 makes 3365. (This might be broken down further- 2000 and 1200 makes 3200. 150 and 15 makes 165. 3200 and 165 **makes** 3365)

1 decimal place



Dialogue: There are 6 thousands. 7 hundreds and 3 hundreds makes 10 hundreds, (or 700 and 300 makes 1000), 2 tens and 8 tens makes 10 tens, (or 20 and 80 makes 100), 9 and 7 makes 16 and 5 tenths and 1 tenth makes 6 tenths. 6000 and 1000 and 100 and 16 and 0.6 **makes** 7116.6

NB: This method also applies to numbers with 2 or more decimal places

Formal written method: Column method

```
   648
+  379
  1027
   11
```

1) Start with the least significant digit, in this case the units.
2) Digits carried over should be placed under the answer line.

Dialogue: 8 and 9 is 17, that's 7 units and carry the ten under the line. 4 tens and 7 tens is 11 tens, and the ten carried across makes 12 tens (which is 120). 2 tens stay in the tens column (20) and the hundred is carried under the line. 6 hundreds and 3 hundreds is 9 hundreds, and the hundred carried across makes 10 hundred (which is 1000). So 648 + 379 = 1027.

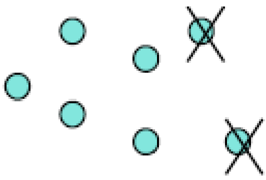
Progression in Subtraction

First Steps in Subtraction

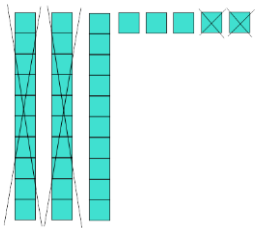
Taking away (separation model)

Where one quantity is taken away from another to calculate what is left.

7 – 2 = 5

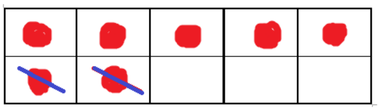


35 – 22 = 13

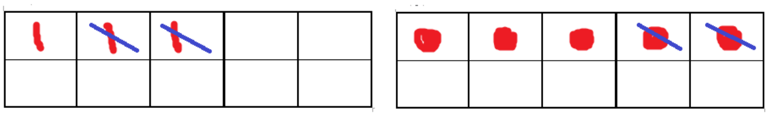


Lines and Dots

7 – 2 = 5



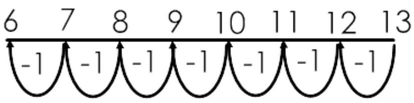
35 – 22 = 13



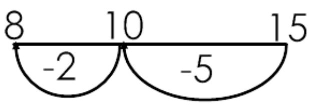
The empty number line – counting back

Steps in subtraction can be recorded on a number line. (Subtraction is marked below the number line).

13 – 7 = 6



15 – 7 = 8



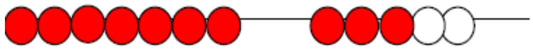
Subtraction Methods

Key mental strategies for subtraction

1. **Using doubles and near doubles** - e.g. knowing 25 and 25 make 50, makes it easy to calculate 52 - 25
2. **Making jumps of 10 backwards** - one number is kept whole and jumps of 10 are taken from it, e.g. 79 - 44 = 79 – 10 – 10 – 10 – 10 – 4 = 35
3. **Compensating to a friendly number** – e.g. with a calculation like 143 - 29 we want the children to notice how close the 29 is to 30 and make use of that friendly number turning it into 143 – 30 + 1 which is much easier to solve
4. **Finding the difference by counting on** - (as set out below) is a very useful written strategy and is also an accessible mental strategy

The empty number line counting-up method (finding the difference)

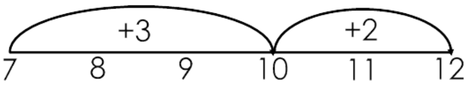
Stage 1

Bead string: 

12 – 7 becomes 7 + 3 + 2

Start with 7 beads on the bead string. Then ask, 'How many more to the next multiple of 10?' (Children should recognise how their number bonds are being applied). 'How many more to get to 12?'

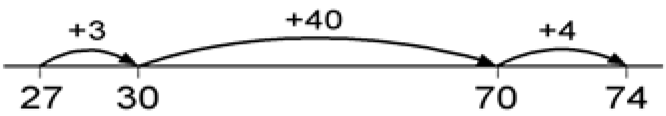
Number line



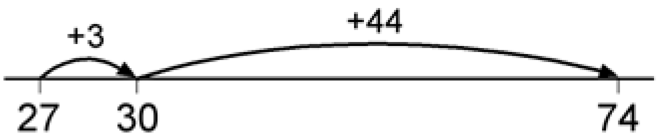
How far is it from 7 to 12? Start on 7. How many to the next multiple of 10? Then how many more to get to 12? Adding the jumps together gives you 5. So 12 – 7 = 5

Stage 2

74 - 27 =



4 + 40 + 3 = 47

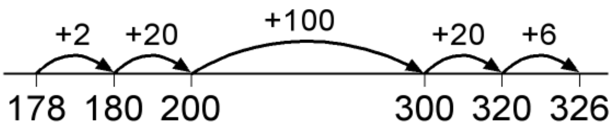


3 + 44 = 47

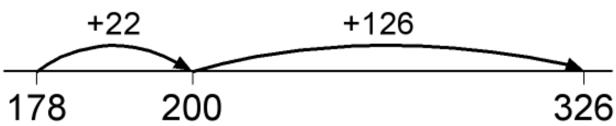
Stage 3

326 - 178 =

2 + 20 + 100 + 20 + 6 = 148

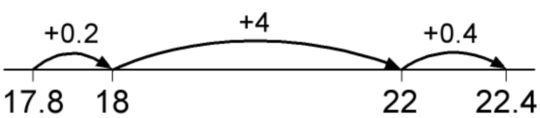


Where children have sound knowledge of pairs that total 100, the number of steps can be reduced further.



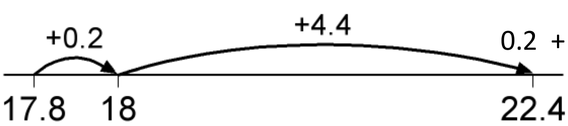
Stage 4

22.4 - 17.8 =



0.2 + 4 + 0.4 = 4.6

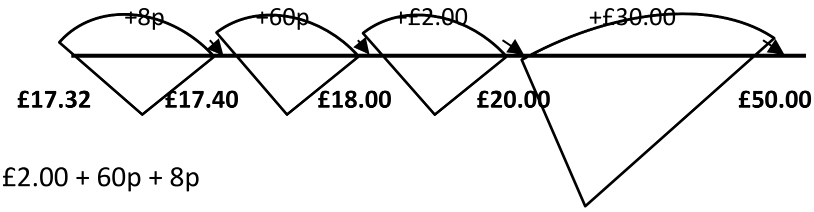
or



0.2 + 4.4 = 4.6

The Counting up Method: Additional Uses of a number line- finding change

How much change when starting with £50.00 and spending £17.32?

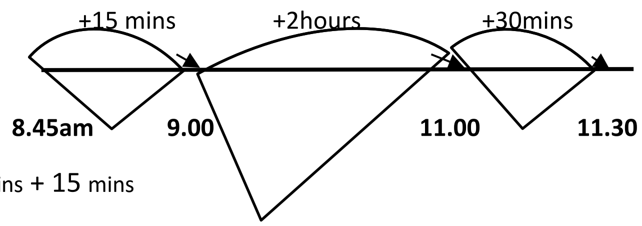


Change = £30.00 + £2.00 + 60p + 8p

= £32.68

The Counting up Method: Additional Uses of a number line - calculating time intervals

8.45 am ⇨ 11.30 am



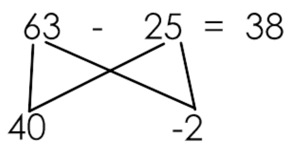
Time interval = 2 hours + 30 mins + 15 mins

= 2 hours 45 minutes

Partitioning for subtraction - Negative number method

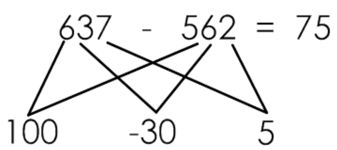
This is a surprisingly effective and accessible way of subtracting one number from another. It works for any pair of numbers. Children will need prior experience at counting beyond zero (in units, tens and hundreds) into negative numbers. Start with the largest part of the number so that the number is built up as you go along. Encourage the children to say the numbers out loud initially and then to 'speak' them internally (in their heads). Adults should verbalise the partitioning for subtraction process in a way similar to that set out in the 'dialogue' below.

2 digit - 2 digit

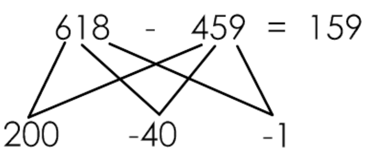


Dialogue: 60 subtract 20 is 40. 3 subtract 5 is negative/minus 2. 40 subtract 2 **makes** 38

3 digit - 3 digit



Dialogue: 600 subtract 500 is 100. 30 subtract 60 is negative/minus 30. 7 subtract 2 is 5. 100 subtract 30 is 70. 70 and 5 **makes** 75



Dialogue: 600 subtract 400 is 200. 10 subtract 50 is negative/minus 40. 8 subtract 9 is negative/minus 1. 200 subtract 40 is 160. 160 subtract 1 **makes** 159

'Same difference' method

In order to subtract using this method both numbers are increased or decreased by the same amount so that the difference between the numbers stays the same. This is so that we end up with a much more 'friendly' number to subtract.

364 - 179

Add 21 to both numbers to make a more 'friendly' number to subtract. 364 becomes 385 and 179 becomes 200.

385 – 200 = 185

939 - 734

Subtract 34 from both numbers to make a more 'friendly' number to subtract. 939 becomes 905 and 734 becomes 700.

905 – 700 = 205

Formal written method: Column method

```
 5 13  1
 6  4  8
- 3  7  9
 2  6  9
```

Dialogue: 8 units take away 9 units – need some more units, so take a ten from the tens column (leaving 3 tens or 30) and exchange it for ten units. Now it is 18 units take away 9 units, which is 9 units. Now look at the tens. 3 tens take away 7 tens – need some more tens, so take a hundred from the hundreds column (leaving 5 hundreds or 500) and exchange it for tens. Now it is 13 tens take away 7 tens, which is 6 tens. Now look at the hundreds. 5 hundreds take away 3 hundreds is 2 hundreds. So 648 – 379 = 269.

Multiplication and Division

Multiplication and division are connected.

Part	Part	Part	Part
Whole			

Both express the relationship between a number of equal parts and the whole.

<u>Developing confidence in multiplication and division</u>

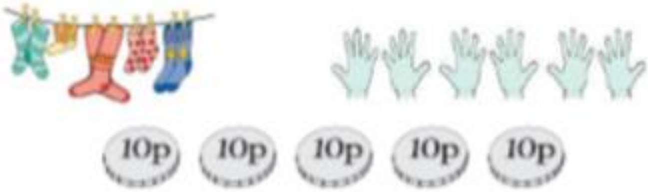
- Be able to recall multiplication and corresponding division facts for 2, 3, 4, 5 and 10 times tables
- Understand what happens when a number is multiplied by 0 or 1
- Understand 0 (zero) as a place holder
- Be able to multiply, and divide, two- and three-digit numbers mentally by 10 and 100, leading into decimal numbers
- Be able to double and halve two-digit numbers mentally
- Be able to use known multiplication facts to derive mentally, unknown multiplication facts
- Be able to explain mental strategies orally and in writing
- Understand commutative (a x b = b x a), distributive (a x (b + c) = (a x b) + (a x c)) and associative (a x (b x c) = (a x b) x c) laws of multiplication

Progression in Multiplication

First steps in Multiplication

Early experiences

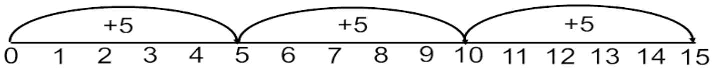
Children have real, practical experiences of handling equal groups of objects and counting in 2s, 10s and 5s. Children work on practical problem solving activities involving equal sets or groups.

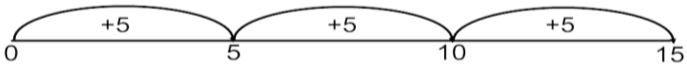


Repeated addition (repeated aggregation)

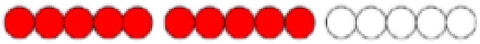
3 times 5 is 5 + 5 + 5 = 15 or 5 lots of 3 or 5 x 3

Children learn that repeated addition can be shown on a number line.





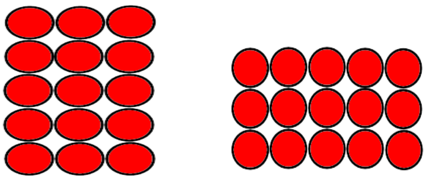
Children learn that repeated addition can be shown on a bead string.



Commutativity

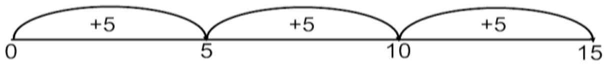
Children learn that 3 x 5 has the same total as 5 x 3.

This can be shown with arrays.

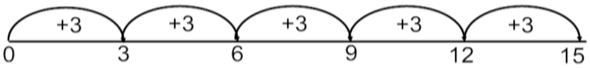


This can also be shown on the number line.

3 x 5 = 15



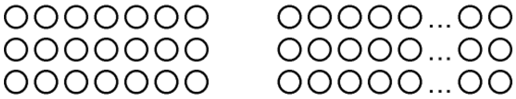
5 x 3 = 15



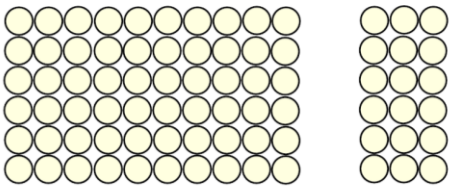
Mental multiplication using partitioning

Children can be introduced to arrays:

7 x 3 = (5 x 3) + (2 x 3)
= 15 + 6
= 21



7 x 3 5 x 3 2 x 3



10 x 6 3 x 6

13 x 6 = (10 x 6) + (3 x 6)
= 60 + 18
= 78

Informal recording might be:

43 x 6 = 258

240 18

40 x 6 is 240

3 x 6 is 18

240 + 18 = 258

The grid method (2 digit by 1 digit)

38 x 7 =

x	7
30	210
8	56

210 + 56 = 266

200 60 6

The grid method (2 digit by 2 digit)

56 x 27 =

x	20	7
50	1000	350
6	120	42

1350 + 162 = 1512

NB. When adding up the parts of the total to find the answer children should be encouraged to look for numbers that go together easily. For example, in the 3 digit by 2 digit example below (286 x 29) they might see that 4000 and 1800 go together easily (5800), 1600 and 120 also sum easily (1720) and 720 and 54 are also easily paired (774). Then the children should use partitioning addition methods to put these numbers together (in this case 5800 + 1720 + 774).

The grid method (3 digit by 2 digit)

286 x 29 =

x	20	9
200	4000	1800
80	1600	720
6	120	54

5800 + 1720 + 774 = 8294

The grid method – involving decimals

3.4 x 9 =

x	9
3	27
0.4	3.6

27 + 3.6 = 30.6

Doubling (multiplying by 2) using partitioning

Double 634 = 1268

634

1200 60 8

Dialogue: Double 600 is 1200. Double 30 is 60. Double 4 is 8. 1200 and 60 and 8 **makes** 1268

Formal written method – Short multiplication (3 digit by 1 digit)

```
   627
X    3
  1881
    2
```

Dialogue: 3 times 7 units is 21, that's 1 unit and carry the two tens under the line. 3 times 2 tens is 6 tens, and the 2 tens we carried across makes 8 tens. 3 times 6 hundreds is 18 hundreds, (which is 1800). So 627 x 3 = 1881.

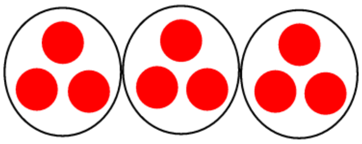
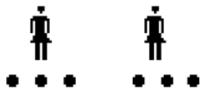
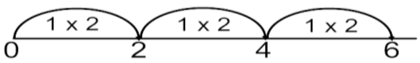
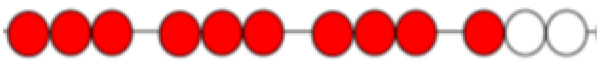
Formal written method – Long multiplication (3 digit by 2 digit)

```
     6 2 7
X      2 3
   1 8 8 1
       2
 1 2 5 4 0
     1
 1 4 4 2 1
  1 1
```

Dialogue: 3 times 7 units is 21, that's 1 unit and carry the two tens under the line. 3 times 2 tens is 6 tens, and the 2 tens we carried across makes 8 tens. 3 times 6 hundreds is 18 hundreds, (which is 1,800). Now we multiply the number by 20. 20 times seven – 2 times seven is 14, so 20 times 7 is 140. Record the 40 and carry the 1 hundred under the line. 20 times 20 is 4 hundred, and the hundred we carried across makes 5 hundreds. 20 times 600 is 12 thousands, (which is 12,000). Total the two answers (1,881 + 12,540 = 14,421). So 627 x 23 = 14,421

Progression in Division

First steps in Division

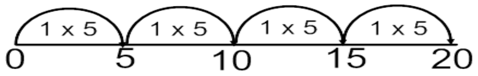
Comparing and sharing Children should be given the opportunity to: Solve real life problems in the classroom or in role play e.g. sharing 10 sweets between 2 bags. They should talk about, and record in their own way, how the problem was solved. Understand and share equal groups e.g. 9 beads are shared equally between 3 bags. 
Understand division as sharing and grouping Sharing 6 sweets are shared between 2 people. How many will they have each?  Grouping There are 6 sweets. How many people can have 2 each? (How many 2's are in 6?) Modelled on a number line $6 \div 2 = 3$    The bead string helps children with interpreting division calculations, recognising that 12 ÷ 3 can be seen as 'how many 3s make 12?' 

Grouping on a number line

How many 5's in 20?

I start at zero and count in 5s until I get to 20. That's 4 groups of 5.

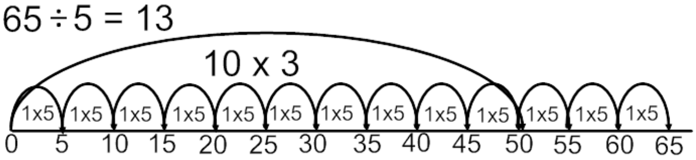
$20 \div 5 = 4$



Division by 1 digit - Chunking on a number line

How many 5's in 65?

$65 \div 5 = 13$



Useful Chunks

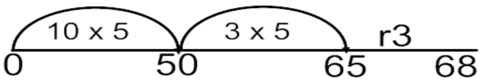
1 x 5 = 5
2 x 5 = 10
5 x 5 = 25
10 x 5 = 50

NB It is helpful for children to quickly write out a 'Useful Chunks' box before starting a division calculation. x1, x2, x5 and x10 are a good starting point (and easy to calculate). Children will quickly learn to work out which 'chunks' might be useful to them.

Division by 1 digit, with remainder - Chunking on a number line

How many 5's in 68?

$68 \div 5 = 13 \text{ r3}$



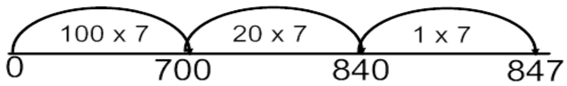
Useful Chunks

1 x 5 = 5
2 x 5 = 10
5 x 5 = 25
10 x 5 = 50
3 x 5 = 15

Division of a larger number by 1 digit- Chunking on a number line

How many 7's in 847?

$847 \div 7 = 121$



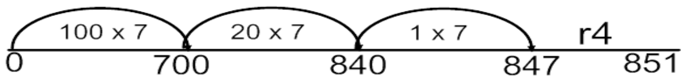
Useful Chunks

1 x 7 = 7
2 x 7 = 14
5 x 7 = 35
10 x 7 = 70
20 x 7 = 140
100 x 7 = 700

Division of a larger number by 1 digit, with remainder- Chunking on a number line

How many 7's in 851?

$851 \div 7 = 121 \text{ r4}$



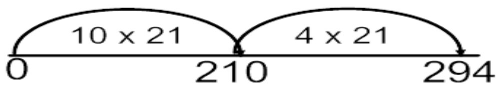
Useful Chunks

1 x 7 = 7
2 x 7 = 14
5 x 7 = 35
10 x 7 = 70
20 x 7 = 140
100 x 7 = 700

Division by 2 digit - Chunking on a number line

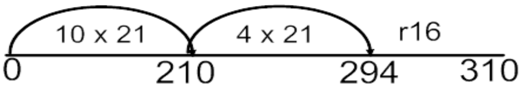
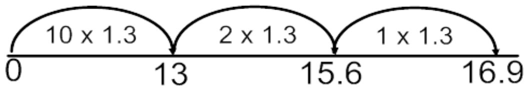
How many 21's in 294?

$294 \div 21 = 14$



Useful Chunks

1 x 21 = 21
2 x 21 = 42
5 x 21 = 105
10 x 21 = 210
4 x 21 = 84

Division by 2 digit, with remainder- Chunking on a number line	**Useful Chunks**
How many 21's in 310? 310 ÷ 21 = 14 r16 	1 x 21 = 21 2 x 21 = 42 5 x 21 = 105 10 x 21 = 210 4 x 21 = 84
Division involving decimals	**Useful Chunks**
How many 1.3's in 16.9? 16.9 ÷ 1.3 = 13 	1 x 1.3 = 1.3 2 x 1.3 = 2.6 5 x 1.3 = 6.5 10 x 21 = 13

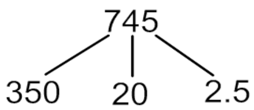
Chunking without a number line

As children become more confident with using chunking for division they may begin to write the multiplication chunks without the need for drawing a number line. This might look something like the examples below:

E.g. 271 ÷ 7	E.g. 732 ÷ 16	E.g. 42.1 ÷ 0.3
10 x 7 + 70 30 x 7 = 210 8 x 7 = 56 38 x 7 = 266 So, 271 ÷ 7 = 38 r 5 (or $38\frac{5}{7}$)	10 x 16 = 160 20 x 16 = 320 40 x 16 = 640 5 x 16 = 80 45 x 16 = 720 So, 732 ÷ 16 = 45 r 12 (or $45\frac{12}{16}$, or $45\frac{3}{4}$)	10 x 0.3 = 3 100 x 0.3 = 30 40 x 0.3 = 12 140 x 0.3 = 42 So, 42.1 ÷ 0.3 = $140\frac{1}{3}$

Halving (dividing by 2) using partitioning

Half of 745 is 372.5



Dialogue: Half of 700 is 350. Half of 40 is 20. Half of 5 is 2.5. 350 and 20 and 2.5 **makes** 372.5

Formal written method- Short division

847 ÷ 5

$$\begin{array}{r} 169\ r\ 2 \\ 5\overline{)\,8^{3}4^{4}7} \end{array}$$

Answer: 169 r 2 (or $169\frac{2}{5}$ or 169.4)

560 ÷ 24

$$\begin{array}{r} 23r8 \\ 24\overline{)\,56^{8}0} \end{array}$$

Answer: 23 r 8 (or $23\frac{8}{24}$, which simplifies to $23\frac{1}{3}$ $or\ 23.\dot{3}$)

Dialogue: 847 divided by 5. How many lots of 5 are there in 847? Divide the first number of the dividend by the divisor. In this case, 8 divided by 5 is 1 with a remainder of 3. Write the number 1, the quotient, on top of the division bar. Write the remainder above the first number of the dividend (write a small 3 to the top right of the number 8). Divide the number formed by the first remainder and the second number in the dividend by the divisor. The remainder is 3 and the second number of the dividend is 4, so the new number you'll be working with is 34. Now, divide 34 by 5. 34 divided by 5 is 6 with a remainder of 4 because 5 x 6 = 30. Write your quotient, 6, on the division bar to the right of the 1. Write the second remainder above the second number in the dividend (write a small 4 above and to the right of the number 4). Divide the number formed by the second remainder and the third number of the dividend by the divisor. The remainder is 4 and the third number of the dividend is 7, so the new number is 47. Now, divide 47 by 5. 47 divided by 5 is 9 with a remainder of 2 because 5 x 9 = 45.Write your quotient, 9, on the division bar to the right of the 6. Write the final remainder (r2) on the division bar. A remainder of 2 means we have 2 out of a group of 5 which is $\frac{2}{5}$. So the answer is 169, remainder 2 (or $169\frac{2}{5}$, $or\ 169.4$).

Formal written method- Long division	
273 ÷ 17 16r1 17) 273 - 170 10 x 17 10 x 17 = 170 103 - 102 6 x 17 5 x 17 = 85 1 6 x 17 = 102 Answer: 16 r 1 (or 16 $\frac{1}{17}$)	Dialogue: 273 divided by 17. How many lots of 17 are there in 273? 10 x 17 is 170. Take 10 lots of 17 away from 273 (explain the subtraction) this leaves us with 103. 5 x 17 is 85 but we can take a larger chunk away, 6 x 17 is 102. 103 take away 102 is 1. So we have a remainder of 1. We took away one chunk of 10 lots of 17 and one chunk of 6 lots of 17. A remainder of 1 means we have 1 out of group of 17 which is $\frac{1}{17}$. So the answer is 16, remainder 1 (or 16 $\frac{1}{17}$).

Appendix

A Progressive List of Addition and Subtraction Strategies

- Starting an addition calculation with the larger number (knowing that addition can be done in any order)
- Counting on and back in units
- Counting on and back in tens
- Looking for pairs that total 10
- Partitioning a two-digit number into a multiple of 10 and units
- Finding a small difference by counting up
- Identifying near doubles
- Adding 9 by adding 10 and adjusting by one
- Adding or subtracting 9 or 11 by adding or subtracting 10, and adjusting by one
- Adding or subtracting a near multiple of 10, and adjusting
- Using patterns of similar calculations
- Using the relationship between addition and subtraction
- Using place value
- Using known number facts
- Adding a single digit by bridging through 10
- Bridging through 10 or 20
- Subtracting a small amount by counting back from the larger number
- Counting on or back in units, tens and hundreds
- Adding groups of single digits by finding pairs that total 9, 10 or 11
- Bridging through a multiple of 10
- Finding a difference by counting up through the next multiple of 10, 100 or 1000
- Partitioning into thousands, hundreds, tens and units
- Looking for pairs that make 10 or a multiple of 10
- Adding or subtracting a near multiple of 100 or 1000 and adjusting
- Using partitioning to add or subtract pairs of decimal numbers

A Progressive List of Multiplication and Division Strategies

- Exploring and extending number sequences
- Counting on and back in 2's, 5's and 10's
- Using the relationship between multiplication and division
- Doubling or halving by partitioning
- Using the relationship between halving and doubling
- Using doubling, starting from known number facts
- Multiplying by 5 by multiplying by 10 and then halving
- Partitioning into tens and units
- Doubling or halving two-digit numbers by doubling or halving the tens first
- Multiplying by 4 by doubling and doubling again
- Multiplying by 3 by doubling and adding on the number
- Multiplying by 20 by multiplying by 10 and then doubling
- Multiplying by 8 by doubling the 4 x table
- Finding quarters by halving halves
- Multiplying by 9 by multiplying by 10 and adjusting
- Multiplying by 11 by multiplying by 10 and adjusting
- Multiplying by 10 and 100 by shifting the digits to the left (with reference to the decimal point)
- Dividing by 10 and 100 by shifting the digits to the right (with reference to the decimal point)
- Doubling or halving by dealing with the most significant digits first
- Multiplying by doubling one number and halving the other
- Multiplying by 50 by multiplying by 100 and then halving
- Multiplying by 25 by multiplying by 100, halving and then halving again
- Multiplying by 15 by multiplying by 10, halving and then adding the two answers
- Finding twentieths by halving tenths
- Finding eighths by halving quarters
- Using place value to multiply and divide by 10, 100 or 1000