Saint Paul's Catholic Primary School

Hyde

Calculation Policy

St. Pauls Catholic Primary School - Calculation Policy

Addition

Stage 1

+ = signs and missing numbers

Children need to understand the concept of equality before using the "=" sign. Calculations should be written either side of the equality sign so the sign is not just interpreted as "the answer".

2 = 1 + 1
2 + 3 = 4 + 1
3 = 3
2 + 2 + 2 = 4 + 2

Missing numbers need to be placed in all possible places.

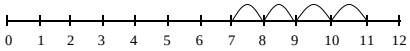
3 + 4 = △
3 + △ = 7

△ = 7
+ = □

Number lines

Use number lines to support the understanding of mental methods. Jumping in ones.

7 + 4



Stage 2

+ = signs and missing numbers

Continue using a range of equations as in stage 1 but with appropriate, larger numbers.
Extend to
14 + 5 = 10 + □
and
32 + □ + □ = 100 35 = 1 + □ + 5

Partition into tens and ones and recombine

12 + 23 = 10 + 2 + 20 + 3
= 30 + 5
= 35

Count on in tens and ones

23 + 12 = 23 + 10 + 2
= 33 + 2
= 35

Partitioning and bridging through 10.

The steps in addition often bridge through a multiple of 10

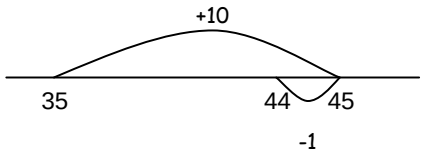
e.g.

Children should be able to partition the 7 to relate adding the 2 and then the 5.

8 + 7 = 15

Add 9 or 11 by adding 10 and adjusting by 1

e.g.
Add 9 by adding 10 and adjusting by 1
35 + 9 = 44



Stage 3

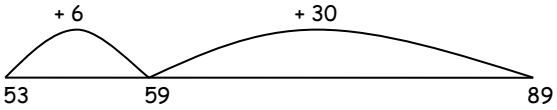
+ = signs and missing numbers

Continue using a range of equations as in stages 1 and 2 but with appropriate, larger numbers.

Partition into tens and ones

- Partition both numbers and recombine.
- Count on by partitioning the second number only e.g.

36 + 53 = 53 + 6 + 30
= 59 + 30
= 89



Add a near multiple of 10 to a two-digit number

Secure mental methods by using a number line to model the method. Continue as in stage 2 but with appropriate numbers
e.g. 35 + 19 is the same as 35 + 20 – 1.

Pencil and paper procedures

53 + 42 = 95 (no carrying)

1st	50 + 3	**then**	53	**onto**	53
	40 + 2		42		42
	90 + 5 = 95		5		95
			90		
			95		

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Addition

Stage 4

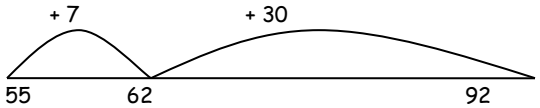
+ = signs and missing numbers

Continue using a range of equations as in stage 1 and 2 but with appropriate numbers.

Partition into tens and ones and recombine

Either partition both numbers and recombine or partition the second number only e.g.

55 + 37 = 55 + 7 + 30
= 62 + 30
= 92



Add the nearest multiple of 10, then adjust

Continue as in stage 2 and 3 but with appropriate numbers e.g. 63 + 29 is the same as 63 + 30 - 1

Pencil and paper procedures

Single carry- 367
+251
618
1

Double carry- 367
+185
552
1 1

Leading onto using the carry one instead of partitioning.

Stage 5

+ = signs and missing numbers

Continue using a range of equations as in stage 1 and 2 but with appropriate numbers.

Add or subtract the nearest multiple of 10 or 100, then adjust

Continue as in stages 2, 3 and 4 but with appropriate numbers e.g. 458 + 79 = is the same as 458 + 80 – 1.

Pencil and paper procedures

Extend to numbers with at least four digits
3587 + 675 = 4262

Treble carry- 3587
+ 675
4262
1 1 1

Extend to up to two places of decimals (same number of decimals places) first without carrying any numbers, then with.

72.8
+54.6
127.4
1 1

Stage 6

+ = signs and missing numbers

Continue using a range of equations as in stage 1 and 2 but with appropriate numbers.

Add the nearest multiple of 10, 100 or 1000, then adjust

Continue as in stages 2, 3, 4 and 5 but with appropriate numbers including extending to adding 0.9, 1.9, 2.9 etc

Pencil and paper procedures

Extend to numbers with any number of digits and decimals with 1, 2 and/or 3 decimal places and with a treble carry.
13.86 + 9.481 = 23.341

13.86
+ 9.481
23.341
1 1 1

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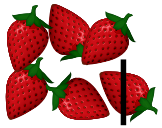
Subtraction

Stage 1

- = signs and missing numbers

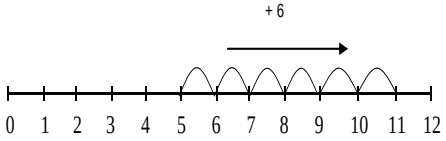
7 - 3 = □ □ = 7 - 3
7 - □ = 4 4 = □ - 3
□ - 3 = 4 4 = 7 - □
□ - ∇ = 4 4 = □ - ∇

- Understand subtraction as 'take away'



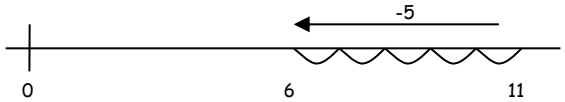
- Find a 'difference' by counting up;

I have saved 5p. The socks that I want to buy cost 11p. How much more do I need in order to buy the socks?



- Use practical and informal written methods to support the subtraction of a one-digit number from a one digit or two-digit number and a multiple of 10 from a two-digit number.

I have 11 toy cars. There are 5 cars too many to fit in the garage. How many cars fit in the garage?



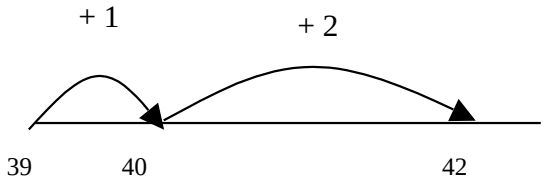
Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences
Recording by
- drawing jumps on prepared lines
- constructing own lines

Stage 2

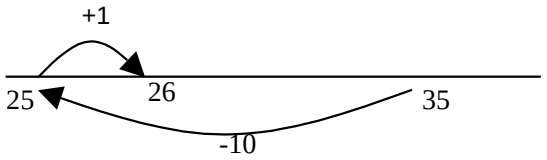
- = signs and missing numbers

Continue using a range of equations as in Stage 1 but with appropriate numbers.
Extend to 14 + 5 = 20 - □

Find a small difference by counting up
42 – 39 = 3



Subtract 9 or 11. Begin to add/subtract 19 or 21
35 – 9 = 26



Use known number facts and place value to subtract
(partition second number only)
37 – 12 = 37 – 2 = 35
35 – 10 = 25

Stage 3

- = signs and missing numbers

Continue using a range of equations as in Stage 1 and 2 but with appropriate numbers.

Find a small difference by counting up

Continue as in Stage 2 but with appropriate numbers
e.g. 102 – 97 = 5

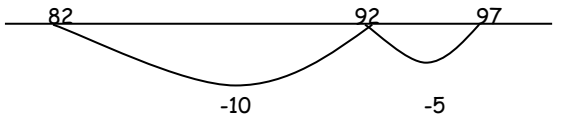
Subtract mentally a 'near multiple of 10' to or from a two-digit number

Continue as in Stage 2 but with appropriate numbers
e.g. 78 – 49 is the same as 78 – 50 + 1

Use known number facts and place value to subtract

Continue as in Stage 2 but with appropriate numbers
e.g.

97 – 15 = 82



With practice, children will need to record less information and decide whether to count back or forward. It is useful to ask children whether counting up or back is the more efficient for calculations such as 57 – 12, 86 – 77 or 43 – 28.

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Subtraction

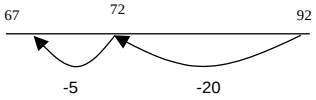
Stage 4

- = signs and missing numbers
Continue using a range of equations as in Stage 1 and 2 but with appropriate numbers.

Find a small difference by counting up
e.g. 5003 – 4996 = 7
This can be modelled on an empty number line (see complementary addition below). Children should be encouraged to use known number facts to reduce the number of steps.

Subtract the nearest multiple of 10, then adjust.
Continue as in Stage 2 and 3 but with appropriate numbers.

Use known number facts and place value to subtract
92 – 25 = 67



Pencil and paper procedures

No carry (TU-TU)
367
-251
116

No carry (HTU-HTU)
387
-173
214

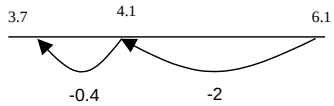
Stage 5

- = signs and missing numbers
Continue using a range of equations as in Stage 1 and 2 but with appropriate numbers.

Find a difference by counting up
e.g. 8006 – 2993 = 5013
This can be modelled on an empty number line (see complementary addition below).

Subtract the nearest multiple of 10 or 100, then adjust.
Continue as in Stage 2, 3 and 4 but with appropriate numbers.

Use known number facts and place value to subtract
6.1 – 2.4 = 3.7



Pencil and paper procedures

Decimals that line up
14.65
-12.41
2.24

Single Carry
2 16
~~3~~67
-271
96

Double Carry
2 15 12
~~3~~~~6~~2
-275
87

Stage 6

- = signs and missing numbers
Continue using a range of equations as in Stage 1 and 2 but with appropriate numbers.

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
Continue as in Stage 2, 3, 4 and 5 but with appropriate numbers.

Pencil and paper procedures

Subtractions that don't line up
5 11
2~~7~~~~6~~1
- 247
2514

Decimals that don't line up
15.96
- 7.62
8.34

Treble Carry (4 digits)
5 11 12 17
~~6~~~~2~~~~3~~7
-4379
1658

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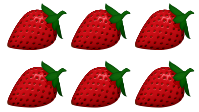
Multiplication

Stage 1

Multiplication is related to doubling and counting groups of the same size.



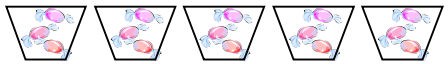
Looking at columns
2 + 2 + 2
3 groups of 2

Looking at rows
3 + 3
2 groups of 3

Counting using a variety of practical resources
Counting in 2s e.g. counting socks, shoes, animal's legs…
Counting in 5s e.g. counting fingers, fingers in gloves, toes…
Counting in 10s e.g. fingers, toes…

Pictures / marks

There are 3 sweets in one bag.
How many sweets are there in 5 bags?

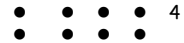


Stage 2

x = signs and missing numbers

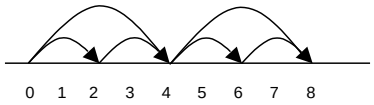
7 x 2 = □ □ = 2 x 7
7 x □ = 14 14 = □ x 7
□ x 2 = 14 14 = 2 x □
□ x ▽ = 14 14 = □ x ▽

Arrays and repeated addition



4 x 2 or 4 + 4

2 x 4 or 2 + 2 + 2 + 2



Doubling multiples of 5 up to 50

15 x 2 = 30

Partition
Children need to be secure with partitioning numbers into 10s and 1s and partitioning in different ways: 6 = 5 + 1 so
e.g. Double 6 is the same as double five add double one.

then

X	10	5	
2	20	10	= 30

Stage 3

x = signs and missing numbers
Continue using a range of equations as in Stage 2 but with appropriate numbers.

Arrays and repeated addition
Continue to understand multiplication as repeated addition and continue to use arrays (as in Stage 2).

Doubling multiples of 5 up to 50
35 x 2 = 70

Partition

X	30	5	
2	60	10	=70

Use known facts and place value to carry out simple

multiplications

Use the same method as above (partitioning), e.g.

32 x 3 = 96

x	30	2
3	90	6

= 96

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Multiplication

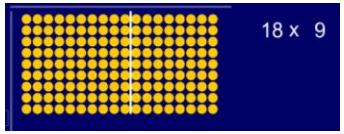
Stage 4

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers

Partition

Continue to use arrays:



18 x 9 = 162

18 x 9 = (10 x 9) + (8 x 9) = 162

OR

Use the grid method of multiplication (as below)

Pencil and paper procedures

Grid method

23 x 7 is approximately 20 x 10 = 200

x	20	3	
7	140	21	= 161

and

23
x 7
140
21
161

Stage 5

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers

Partition

47 x 6 = 282

47 x 6 = (40 x 6) + (7 x 6) = 282

OR

Use the grid method of multiplication (as below)

Pencil and paper procedures

Grid method

72 x 38 is approximately 70 x 40 = 2800

X	70	2
30	2100	60 = 2160
8	560	16 = 576
		2736

And

72
X38
2100
560
60
16
2736

Extend to simple decimals with one and two decimal place.

Stage 6

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers

Partition

87 x 6 = 522

87 x 6 = (80 x 6) + (7 x 6) = 522

Pencil and paper procedures

Long Multiplication

352
X 27
2464
7040
9504

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Division

Stage 1

Sharing
Requires secure counting skills
-see counting and understanding number strand
Develops importance of one-to-one correspondence
See appendix for additional information on x and ÷ and aspects of number

Sharing – 6 sweets are shared between 2 people. How many do they have each?

Practical activities involving sharing, distributing cards when playing a game, putting objects onto plates, into cups, hoops etc.

Grouping
Sorting objects into 2s / 3s/ 4s etc
How many pairs of socks are there?

There are 12 crocus bulbs. Plant 3 in each pot. How many pots are there?
Jo has 12 Lego wheels. How many cars can she make?

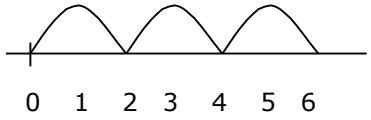
Stage 2

÷ = signs and missing numbers

6 ÷ 2 = □	□ = 6 ÷ 2
6 ÷ □ = 3	3 = 6 ÷ □
□ ÷ 2 = 3	3 = □ ÷ 2
□ ÷ ▽ = 3	3 = □ ÷ ▽

Grouping
Link to counting and understanding number strand
Count up to 100 objects by grouping them and counting in tens, fives or twos;…
Find one half, one quarter and three quarters of shapes and sets of objects
6 ÷ 2 can be modelled as:
There are 6 strawberries.
How many people can have 2 each? How many 2s make 6?

6 ÷ 2 can be modelled as:



In the context of money count forwards and backwards using 2p, 5p and 10p coins

Practical grouping e.g. in PE

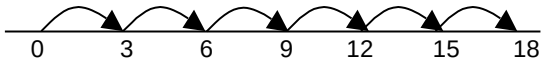
12 children get into teams of 4 to play a game. How many teams are there?

Stage 3

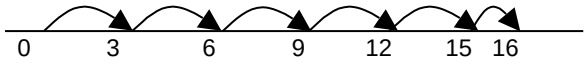
÷ = signs and missing numbers
Continue using a range of equations as in Stage 2 but with appropriate numbers.

Understand division as sharing and grouping
18 ÷ 3 can be modelled as:
Sharing – 18 shared between 3 (see Stage 1 diagram)

OR
Grouping - How many 3's make 18?



Remainders
16 ÷ 3 = 5 r1
Sharing - 16 shared between 3, how many left over?
Grouping – How many 3's make 16, how many left over?
e.g.



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Division

Stage 4

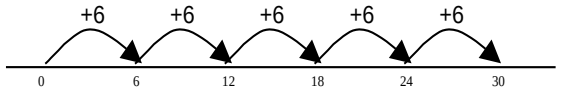
÷ = signs and missing numbers

Continue using a range of equations as in Stage 2 but with appropriate numbers.

Sharing and grouping

30 ÷ 6 can be modelled as:

grouping – groups of 6 placed on no. line and the number of groups counted e.g.



sharing – sharing among 6, the number given to each person

Remainders

41 ÷ 4 = 10 r1

41 = (10 x 4) + 1

Stage 5

÷ = signs and missing numbers

Continue using a range of equations as in Stage 2 but with appropriate numbers.

Sharing and grouping

Continue to understand division as both sharing and grouping (repeated subtraction).

Pencil and paper procedures

196 ÷ 6 is approximately just over 180 ÷ 6 = 30

Short division (HTU ÷ U)

196 ÷ 6

```
   32 r 4
6⟌196
```

Stage 6

÷ = signs and missing numbers

Continue using a range of equations as in Stage 2 but with appropriate numbers.

Sharing and grouping

Continue to understand division as both sharing and grouping (repeated subtraction).

Pencil and paper procedures

434 ÷ 14 is nearly 450 ÷ 15 = 30

Long division (HTU ÷ TU)

```
   31
14⟌434
 -42↓
  14
 -14
   0
```