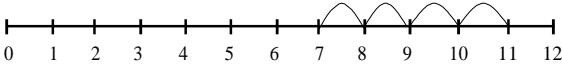
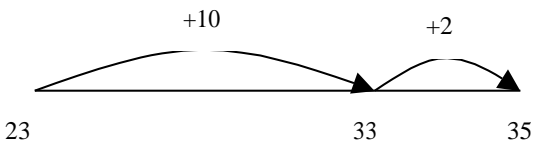
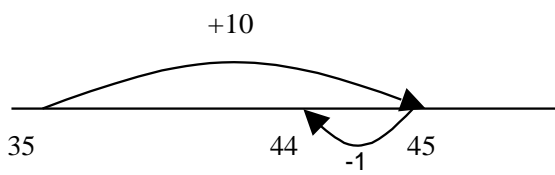
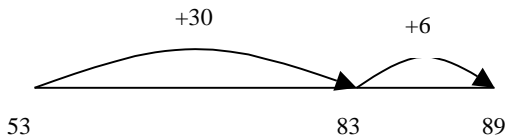
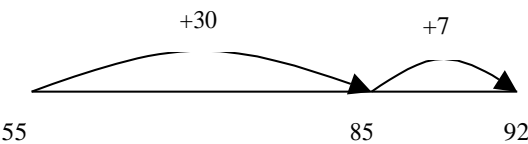


**Whole School Written Calculation Policy**  
**Pencil and paper procedures**  
**Key Stages 1 - 2**  
**Swinton Queen Primary School**

| Addition   |   |   |          |      |      |           |        |        |                 |       |     |  |                 |                   |  |       |       |
|--|---|---|----------|------|------|-----------|--------|--------|-----------------|-------|-----|--|-----------------|-------------------|--|-------|-------|
| Year 1   | Year 2  | Year 3  |          |      |      |           |        |        |                 |       |     |  |                 |                   |  |       |       |
| <p><b><u>+ = signs and missing numbers</u></b></p> <p> <math>3 + 4 =</math>                      <math>= 3 + 4</math><br/> <math>3 + = 7</math>                      <math>7 = + 4</math><br/> <math>+ 4 = 7</math>                      <math>7 = 3 +</math><br/> <math>+ \nabla = 7</math>                      <math>7 = + \nabla</math> </p> <p>Promoting covering up of operations and numbers.</p> <p><b><u>Number lines (numbered)</u></b></p> <p><math>7 + 4</math></p>  <p>Recording by - drawing jumps on prepared lines</p> <p>- constructing own lines</p> <p>(Teacher model number lines with missing numbers)</p> <p>(Teachers model jottings appropriate for larger numbers)</p> | <p><b><u>+ = signs and missing numbers</u></b></p> <p>Continue using a range of equations as in Year 1 but with appropriate, larger numbers.<br/>Extend to<br/><math>14 + 5 = 10 +</math><br/>and adding three numbers<br/><math>32 + + = 100</math> <math>35 = 1 + + 5</math></p> <p><b><u>Partition into tens and ones and recombine</u></b></p> <p><math>12 + 23 = 10 + 2 + 20 + 3</math><br/><math>= 30 + 5</math><br/><math>= 35</math></p> <p><b>refine to partitioning the second number only:</b></p> <p><math>23 + 12 = 23 + 10 + 2</math><br/><math>= 33 + 2</math><br/><math>= 35</math></p>  <p><math>23</math>                      <math>33</math>                      <math>35</math></p> <p><i>Add 9 or 11 by adding 10 and adjusting by 1</i><br/><math>35 + 9 = 44</math></p>  <p><math>35</math>                      <math>44</math>                      <math>45</math></p> <p><b>use a 100 square as a visual image to support adding near multiples of 10.</b></p> | <p><b><u>+ = signs and missing numbers</u></b></p> <p>Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.</p> <p><b><u>Partition into tens and ones and recombine</u></b></p> <p>Partition both numbers and recombine. Refine to partitioning the second number only e.g.<br/><math>36 + 53 = 53 + 30 + 6</math><br/><math>= 83 + 6</math><br/><math>= 89</math></p>  <p><math>53</math>                      <math>83</math>                      <math>89</math></p> <p><b><u>Add a near multiple of 10 to a two-digit number</u></b></p> <p>Continue as in Year 2 but with appropriate numbers e.g. <math>35 + 19</math> is the same as <math>35 + 20 - 1</math>.</p> <p><b><u>pencil and paper procedures</u></b></p> <p><math>83 + 42 = 125</math></p> <p><b><u>G&amp;T (when secure with other methods)</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right; padding-right: 20px;"><math>80 + 3</math></td> <td style="text-align: right; padding-right: 20px;"><math>83</math></td> <td style="text-align: right;"><math>83</math></td> </tr> <tr> <td style="text-align: right;"><math>+40 + 2</math></td> <td style="text-align: right;"><math>+ 42</math></td> <td style="text-align: right;"><math>+ 42</math></td> </tr> <tr> <td style="text-align: right;"><math>120 + 5 = 125</math></td> <td style="text-align: right;"><math>120</math></td> <td style="text-align: right;"><math>5</math></td> </tr> <tr> <td></td> <td style="text-align: right;"><math>\underline{5}</math></td> <td style="text-align: right;"><math>\underline{120}</math></td> </tr> <tr> <td></td> <td style="text-align: right;"><math>125</math></td> <td style="text-align: right;"><math>125</math></td> </tr> </table> | $80 + 3$ | $83$ | $83$ | $+40 + 2$ | $+ 42$ | $+ 42$ | $120 + 5 = 125$ | $120$ | $5$ |  | $\underline{5}$ | $\underline{120}$ |  | $125$ | $125$ |
| $80 + 3$   | $83$  | $83$  |          |      |      |           |        |        |                 |       |     |  |                 |                   |  |       |       |
| $+40 + 2$  | $+ 42$  | $+ 42$  |          |      |      |           |        |        |                 |       |     |  |                 |                   |  |       |       |
| $120 + 5 = 125$  | $120$   | $5$   |          |      |      |           |        |        |                 |       |     |  |                 |                   |  |       |       |
|  | $\underline{5}$   | $\underline{120}$   |          |      |      |           |        |        |                 |       |     |  |                 |                   |  |       |       |
|  | $125$   | $125$   |          |      |      |           |        |        |                 |       |     |  |                 |                   |  |       |       |

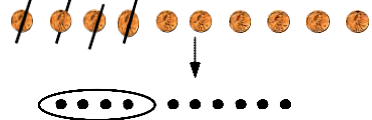
| Addition   |  |  |
|--|--|--|
| Year 4   | Year 5   | Year 6   |
| <p><b><u>+</u> = signs and missing numbers</b></p> <p>Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.</p> <p><b><u>Partition into tens and ones and recombine</u></b><br/>           Either partition both numbers and recombine or partition the second number only e.g.<br/> <math>55 + 37 = 55 + 30 + 7</math><br/> <math>= 85 + 7</math><br/> <math>= 92</math></p>  <p><b><u>Add the nearest multiple of 10, then adjust</u></b><br/>           Continue as in Year 2 and 3 but with appropriate numbers e.g. <math>63 + 29</math> is the same as <math>63 + 30 - 1</math></p> <p><b><u>Pencil and paper procedures</u></b><br/> <math>358 + 73 = 431</math></p> $\begin{array}{r} 300+50+8 \\ + 70+3 \\ \hline 300+120+11 = 431 \end{array}$ <p>Extend to decimals in the context of money</p> $\text{£ } 2.50 + \text{£ } 1.75 = \text{£ } 4.25$ <p>(Revert to expanded methods if the children experience any difficulty.)</p> | <p><b><u>+</u> = signs and missing numbers</b></p> <p>Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.</p> <p><b><u>Partition into hundreds, tens and ones and recombine</u></b><br/>           Either partition both numbers and recombine or partition the second number only e.g.<br/> <math>358 + 73 = 358 + 70 + 3</math><br/> <math>= 428 + 3</math><br/> <math>= 431</math></p> <p><b><u>Add or subtract the nearest multiple of 10 or 100, then adjust</u></b><br/>           Continue as in Year 2, 3 and 4 but with appropriate numbers e.g. <math>458 + 79 =</math> is the same as <math>458 + 80 - 1</math></p> <p><b><u>Pencil and paper procedures</u></b><br/> <b>Leading to formal method, showing numbers carried underneath for G&amp;T children.</b></p> $\begin{array}{r} 358 \\ + 73 \\ \hline 431 \\ 11 \end{array}$ <p>Extend to numbers with at least four digits</p> $3587 + 675 = 4262$ $\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$ <p>Revert to expanded methods if the children experience any difficulty.</p> <p>Extend to decimals (same number of decimal places) and adding several numbers (with different numbers of digits).</p> <p><i>Model negative numbers using a number line.</i></p> | <p><b><u>+</u> = signs and missing numbers</b></p> <p>Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.</p> <p><b><u>Partition into hundreds, tens, ones and decimal fractions and recombine</u></b><br/>           Either partition both numbers and recombine or partition the second number only e.g.<br/> <math>35.8 + 7.3 = 35.8 + 7 + 0.3</math><br/> <math>= 42.8 + 0.3</math><br/> <math>= 43.1</math></p> <p><b><u>Add the nearest multiple of 10, 100 or 1000, then adjust</u></b><br/>           Continue as in Year 2, 3, 4 and 5 but with appropriate numbers including extending to adding 0.9, 1.9, 2.9 etc</p> <p><b><u>Pencil and paper procedures</u></b><br/>           Extend to numbers with any number of digits and decimals with 1 and 2 decimal places.<br/> <math>124.9 + 117.25 = 242.15</math></p> $\begin{array}{r} 124.9 \\ + 117.25 \\ \hline 242.15 \\ 11 \end{array}$ <p>Revert to expanded methods if the children experience any difficulty.</p> <p>Extend to decimals (one and two decimal places).</p> |

## Subtraction

### Year 1

**Pictures / marks/ practically**

Sam spent 4p. What was his change from 10p?

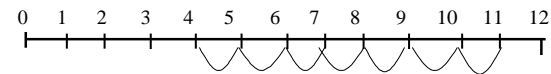


**- = signs and missing numbers**

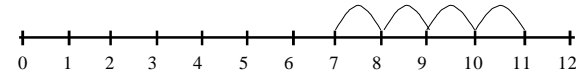
$$\begin{array}{l} 7 - 3 = \quad \quad = 7 - 3 \\ 7 - \quad = 4 \quad \quad 4 = \quad - 3 \\ - 3 = 4 \quad \quad 4 = 7 - \quad \\ - \nabla = 4 \quad \quad 4 = \quad - \nabla \end{array}$$

**Number lines (numbered)**

11 - 7  
(Counting back)



The difference between 7 and 11  
(Counting up)



Recording by - drawing jumps on prepared lines  
- constructing own lines

(Teachers model jottings appropriate for larger numbers)

### Year 2

**Continue to teach counting on and counting back as in Y1**

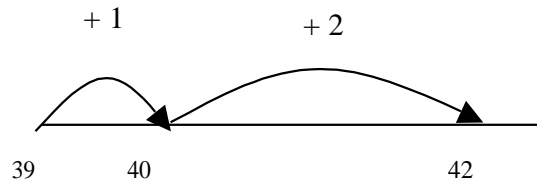
**- = signs and missing numbers**

Continue using a range of equations as in Year 1 but with appropriate numbers.

Extend to  $14 + 5 = 20 -$

Find a small difference by counting up

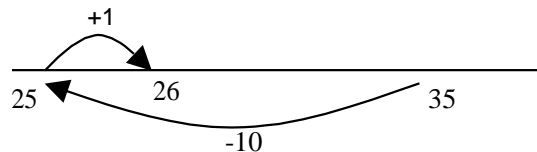
$$42 - 39 = 3$$



**Teach complimentary addition where numbers have a difference of less than 20 otherwise teach...**

Subtract 9 or 11. Begin to add/subtract 19 or 21

$$35 - 9 = 26$$



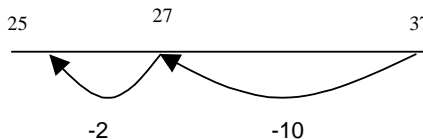
use

**100 square as a visual image to support understanding**

**Use known number facts and place value to subtract**

(partition second number only)

$$\begin{array}{l} 37 - 12 = 37 - 10 - 2 \\ = 27 - 2 \\ = 25 \end{array}$$



### Year 3

**- = signs and missing numbers**

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

**Find a small difference by counting up**

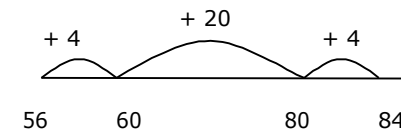
Continue as in Year 2 but with appropriate numbers  
e.g.  $102 - 97 = 5$

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

Continue as in Year 2 but with appropriate numbers  
e.g.  $78 - 49$  is the same as  $78 - 50 + 1$

**Pencil and paper procedures**

Complementary addition for small differences  
 $84 - 56 = 28$



## Subtraction

### Year 4

**Use professional judgement to decide which method is most appropriate for 2006/07 cohort**

**- = signs and missing numbers**

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

*Find a small difference by counting up*

e.g.  $5003 - 4996 = 7$

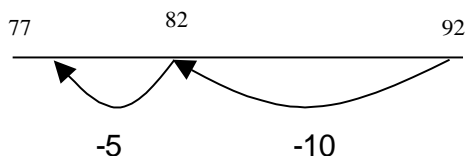
This can be modelled on an empty number line (see complementary addition below).

**Subtract the nearest multiple of 10, then adjust.**

Continue as in Year 2 and 3 but with appropriate numbers.

**Use known number facts and place value to subtract**

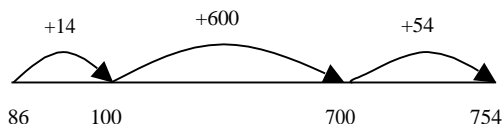
$92 - 15 = 67$



**Pencil and paper procedures**

Complementary addition

$754 - 86 = 668$



### Year 5

**Use professional judgement to decide which method is most appropriate for 2006/07 cohort**

- = signs and missing numbers

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

*Find a difference by counting up*

e.g.  $8006 - 2993 = 5013$

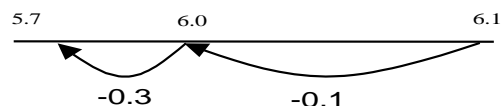
This can be modelled on an empty number line (see complementary addition below).

**Subtract the nearest multiple of 10 or 100, then adjust.**

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

**Use known number facts and place value to subtract**

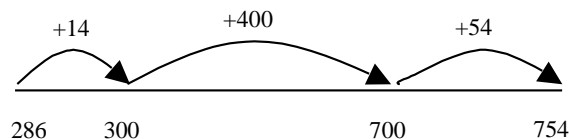
$6.1 - 0.4 = 5.7$



**Pencil and paper procedures**

Complementary addition

$754 - 286 = 468$



**When children are secure with these methods a standard written method (decomposition) can be introduced.**

### Year 6

**Use professional judgement to decide which method is most appropriate for 2006/07 cohort**

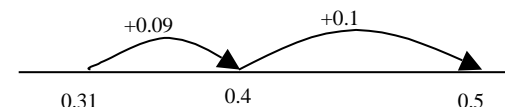
**- = signs and missing numbers**

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

*Find a difference by counting up*

e.g.  $0.5 - 0.31 = 0.19$

This can be modelled on an empty number line (see complementary addition below).



**Subtract the nearest multiple of 10, 100 or 1000, then adjust**

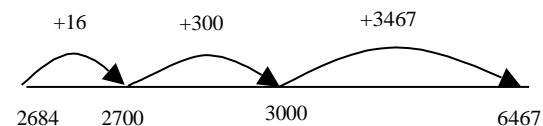
Continue as in Year 2, 3, 4 and 5 but with appropriate numbers.

Use known number facts and place value to subtract  
Continue as year 5

**Pencil and paper procedures**

Complementary addition

$6467 - 2684 = 3783$



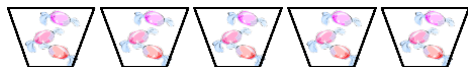
**(Decomposition for G&T children only when secure with above methods.)**

## Multiplication

### Year 1

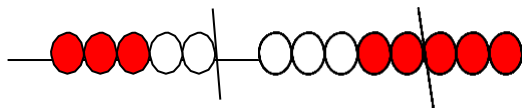
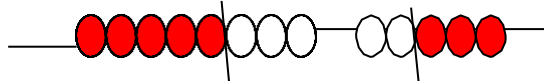
**Pictures /symbols/ practically**

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



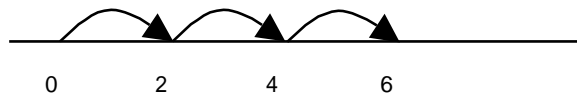
*(Recording on a number line modelled by the teacher when solving problems)*

Use of bead strings to model **groups of**.



Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups

On number lines count on or back in ones, twos, fives and tens and use this knowledge to derive the multiples of 2, 5 and 10 to the tenth multiple



Use number lines, models & images to support the recall of doubles of all numbers to at least 10

**Start to know facts for the 2,5 and 10 times tables**

### Year 2

**x = signs and missing numbers**

$$7 \times 2 = \quad = 2 \times 7$$

$$7 \times \quad = 14 \quad 14 = \quad \times 7$$

$$\quad \times 2 = 14 \quad 14 = 2 \times \quad$$

$$\quad \times \nabla = 14 \quad 14 = \quad \times \nabla$$

**Arrays and repeated addition**

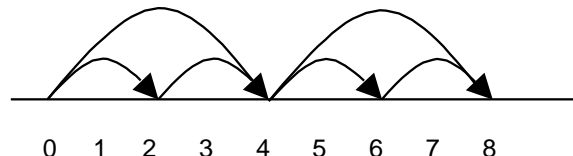
$$\begin{array}{cccc} \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet & \bullet \end{array} \quad 4 \times 2 \text{ or } 4 + 4$$

$$2 \times 4$$

or repeated addition

pictures and symbols

$$2 + 2 + 2 + 2$$



**Doubling multiples of 5 up to 50**

$$15 \times 2 = 30$$

**Partition**

~~$$15 \times 2$$~~

$$20 + 10 = 30$$

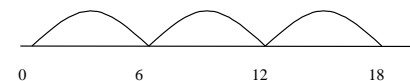
Know 2, 5, 10 times tables and corresponding division facts by heart consolidate through practical and written practice

### Year 3

**x = signs and missing numbers**

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

Number lines [grouping]  
 $6 \times 3$



*Arrays and repeated addition*

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

**Doubling multiples of 5 up to 50**

$$35 \times 2 = 70$$

Partition

$$\begin{array}{r|l|l} x & 30 & 5 \\ \hline 2 & 60 & 10 \end{array}$$

Use known facts and place value to carry out simple multiplications

Use the same method as above (partitioning), e.g.  $32 \times 3 = 96$

$$\begin{array}{r|l|l} x & 30 & 2 \\ \hline 3 & 90 & 6 \end{array}$$

Know 2, 3, 4, 5, 6, 10 times tables and corresponding division facts by heart consolidate through practical and written practice

## Multiplication

### Year 4

**x = signs and missing numbers**

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

**Be able to partition and record in number sentences**

$$23 \times 4 = 92$$

$$\begin{aligned} 23 \times 4 &= (20 \times 4) + (3 \times 4) \\ &= (80) + (12) \\ &= 92 \end{aligned}$$

and

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 |

|    |      |    |
|----|------|----|
| x  | 70   | 2  |
| 30 | 2100 | 60 |
| 8  | 560  | 16 |

Know all times tables and corresponding division facts to 10x 10 by heart consolidate through practical and written practice

### Year 5

**x = signs and missing numbers**

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

**Be able to partition and record in number sentences**

$$47 \times 6 = 92$$

$$\begin{aligned} 47 \times 6 &= (40 \times 6) + (7 \times 6) \\ &= (240) + (42) \\ &= 282 \end{aligned}$$

and

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 |
| 8  | 560  | 16 |

Extend to simple decimals with one decimal place.

**G&T when secure with grid method for whole numbers extend written strategies to:**

87

X6

42 (6 x 7)

480 (6 x 80)

**522 (units, then tens, hundreds etc)**

### Year 6

**x = signs and missing numbers**

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

**Be able to partition and record in number sentences**

$$87 \times 6 = 522$$

$$\begin{aligned} 87 \times 6 &= (80 \times 6) + (7 \times 6) \\ &= (480) + (42) \\ &= 522 \end{aligned}$$

and

Use the grid method of multiplication (as below)

**Pencil and paper procedures**

**Grid method**

372 x 24 is approximately 400 x 20 = 8000

|    |      |      |    |
|----|------|------|----|
| x  | 300  | 70   | 2  |
| 20 | 6000 | 1400 | 40 |
| 4  | 1200 | 280  | 8  |

Extend to decimals with up to two decimal places.

**G&T when secure with grid method for decimals and whole numbers extend written strategies to column methods**

87

X6

42 (6 x 7)

480 (6 x 80)

522 (units, then tens, hundreds etc)

**Progressing to:**

**More compact methods for HTUxU and TUxTU and HTUxTU**

## Division

### Year 1

**Pictures / marks/ practical**

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



### Year 2

**÷ = signs and missing numbers**

$$6 \div 2 = \quad = 6 \div 2$$

$$6 \div \quad = 3 \quad 3 = 6 \div \quad$$

$$\div 2 = 3 \quad 3 = \div 2$$

$$\div \nabla = 3 \quad 3 = \div \nabla$$

**Understand division as sharing and grouping**

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



$6 \div 2$  can be modelled as:

Grouping – There are 6 sweets. How many people can have 2 each? (How many 2's make 6?)



### Year 3

**÷ = signs and missing numbers**

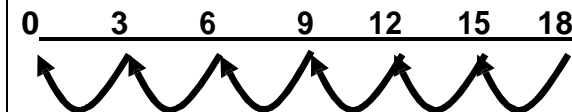
Continue using a range of equations as in Year 2 but with appropriate numbers.

**Understand division as sharing and grouping**

$18 \div 3$  can be modelled as:

Sharing – 18 shared between 3 (see Year 2 diagram)

Grouping - How many 3's make 18?



and

Grouping - How many 3's make 18?



***Remainders***

$16 \div 3 = 5 \text{ r}1$

Sharing - 16 shared between 3, how many left over?

Grouping – How many 3's make 16, how many left over?

e.g.





## Division

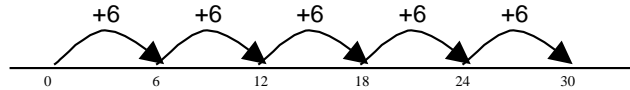
### Year 4

**÷ = signs and missing numbers**

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

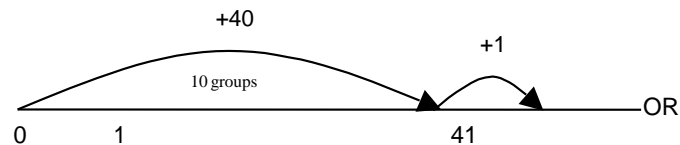
**Sharing and grouping**

$30 \div 6$  can be modelled as:  
grouping – groups of 6 counting on [or taken away] and the number of groups counted e.g.



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

Remainders  
 $41 \div 4 = 10 \text{ r}1$



OR  $41 = (10 \times 4) + 1$

**Pencil and paper procedures**

$72 \div 5$  lies between  $50 \div 5 = 10$  and  $100 \div 5 = 20$

50 (10 groups) or  $(10 \times 5)$   
20 (4 groups) or  $(4 \times 5)$   
70 (14 groups) or  $(4 \times 5)$

Answer : 14 remainder 2

### Year 5

**÷ = signs and missing numbers**

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

**Sharing and grouping**

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

**Remainders**

Quotients expressed as fractions or decimal fractions  
 $61 \div 4 = 15 \frac{1}{4}$  or 15.25



**Pencil and paper procedures**

$256 \div 7$  lies between  $210 \div 7 = 30$  and  $280 \div 7 = 40$

**Only when pupils are secure with all the above methods standard short division method may be taught in Y5 related to partitioning**

### Year 6

**Standard short division method to be taught in Y6 related to partitioning**

**÷ = signs and missing numbers**

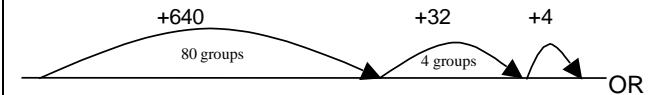
Continue using a range of equations as in Year 2 but with appropriate numbers.

**Sharing and grouping**

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

**Remainders**

Quotients expressed as fractions or decimal fractions  
 $676 \div 8 = 84.5$



**Pencil and paper procedures**

$977 \div 36$  is approximately  $1000 \div 40 = 25$

**Only when pupils are secure with all the above methods standard short division method may be taught in Y6 related to partitioning**

