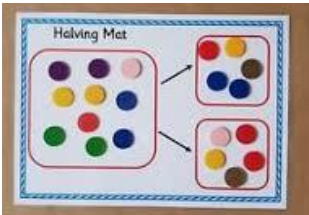# Calculation Policy – Progression in Calculations

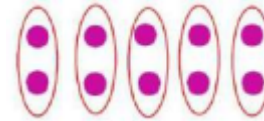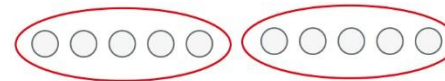| | | Progression in Calculations - Division | | |
|---|---|---|---|---|
| **Expected Year Group** | **Objectives** | **Concrete** | **Pictorial** | **Abstract** |
| EYFS & Year 1 | Solve problems including halving and sharing. | Children have the opportunity to physically cut objects, food or shapes in half.<br><br>Various maths resources used for children to share items into two equal groups. | Pictures and icons that encourage children to see the concept of halving in relation to subitising, addition and subtraction knowledge.<br><br>Half is... 1<br>Half is... 2 | If appropriate, use simple word problems or introduce the division symbol (for numbers up to 10).<br><br>Year 1 – partition a number and then double each part before recombining it back together.<br><br>16<br>10    6<br>x2    x2<br>20    12 |

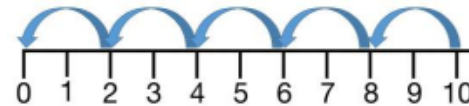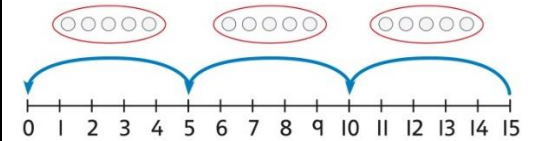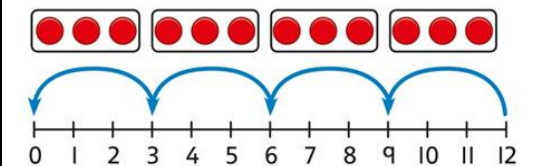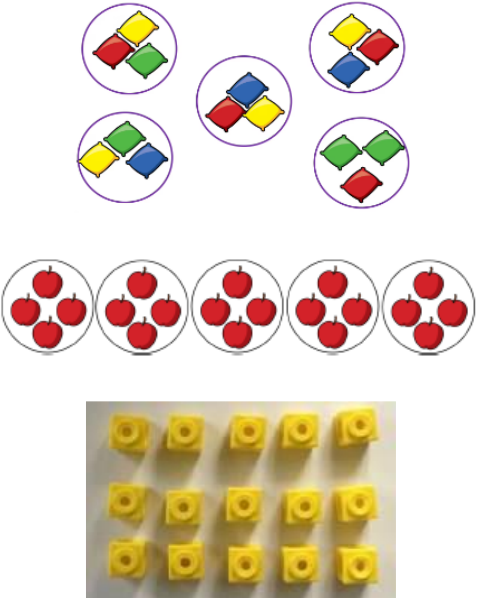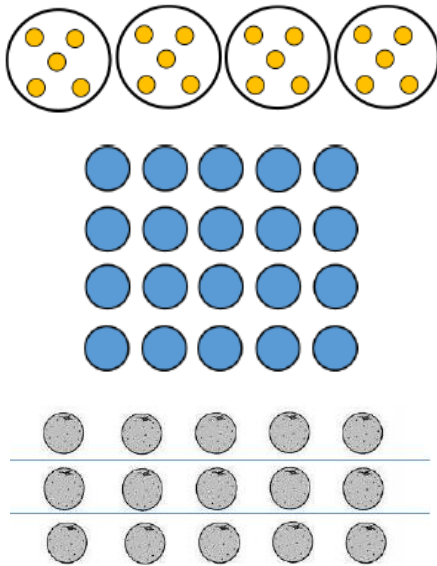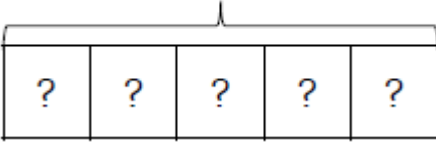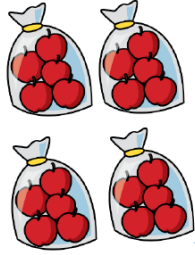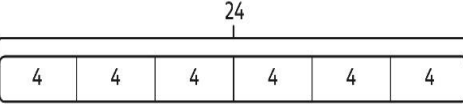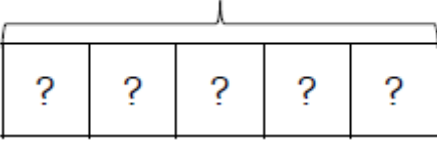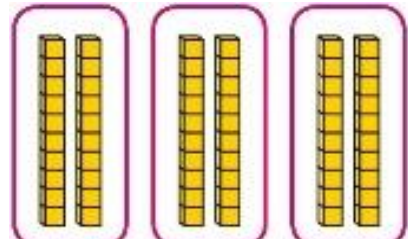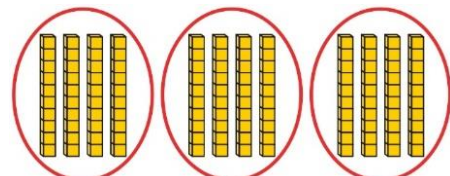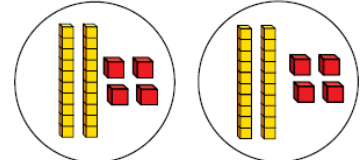| Year 1 & Year 2 | Making equal groups from a whole. | Sort a set people and objects into equal groups.  | Beginning to use arrays to represent groups which have been made.  Use a number line to show jumps in groups. The number of jumps equals the number of groups.  In Year 2, use pictorial representations to show the relationship between grouping and the division statements. $12 \div 3 = 4$  $12 \div 4 = 3$  $12 \div 6 = 2$  $12 \div 2 = 6$  | Children may be able to relate their arrays to their knowledge of counting in 2s, 5s or 10s.  Begin to record their divisions if appropriate. **If I divide 10 into 5 groups, there are 2 in each group.** In Year 2, children should relate division to repeated subtraction.  There are 4 groups now. Year 2 children are also introduced to the division symbol. **10 ÷ 5 = 2** |
|---|---|---|---|---|

| Year 1 & Year 2 | Share a set of objects into equal parts. | Using physical objects, share a set of objects into equal parts and work out how many are in each part.  | Drawings and arrays to represent sharing into equal parts. This may be related to fractions.  | Describe equal groups using words
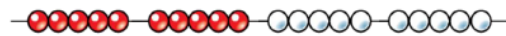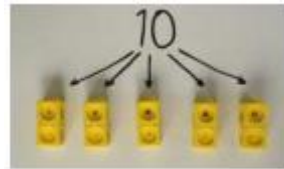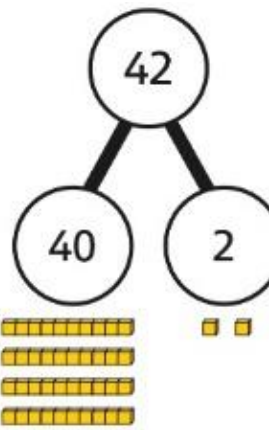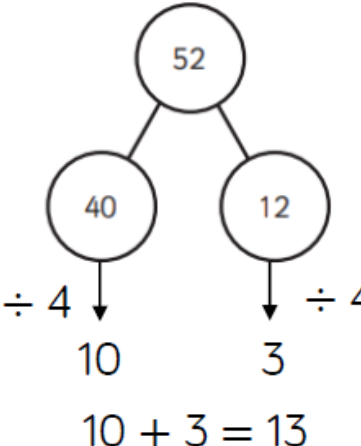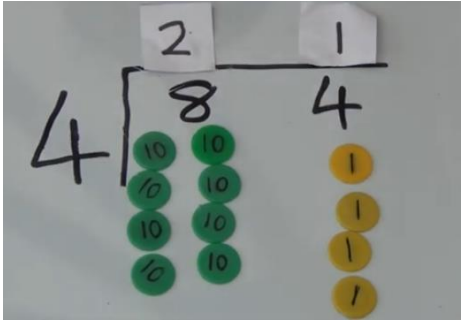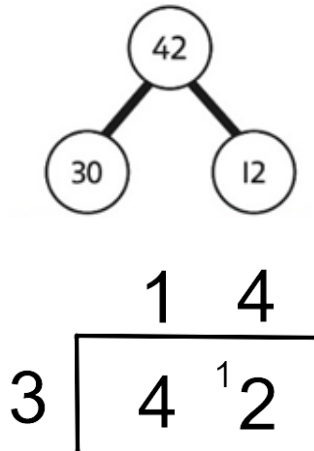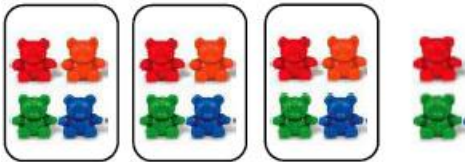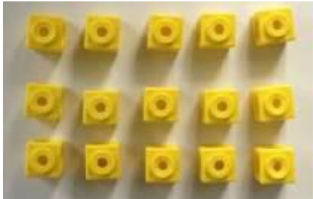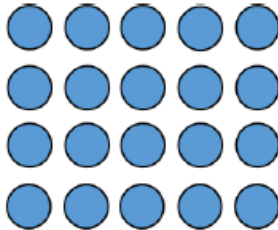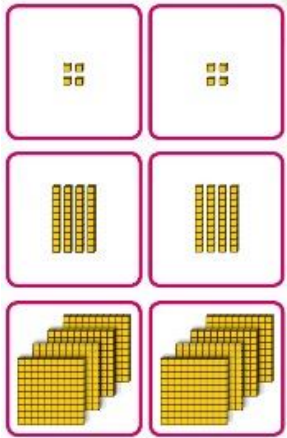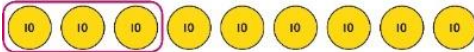
**10 shared into 2 equal groups gives 5 in each group.**

In Year 2, children can use a bar model to represent sharing.

20


Year 2 children are also introduced to the division symbol.

**20 ÷ 5 = 4** |
|---|---|---|---|---|
| Year 2 & Year 3 | Use known times-tables to solve divisions. | Use the grouping of objects to show the relationship between multiplication facts and division. 
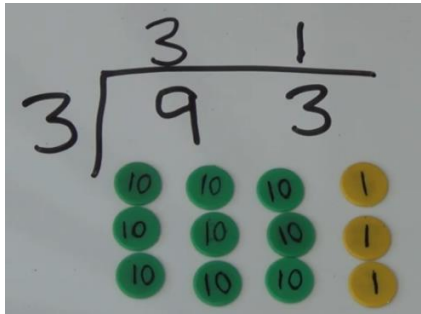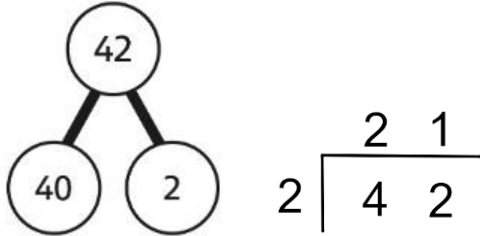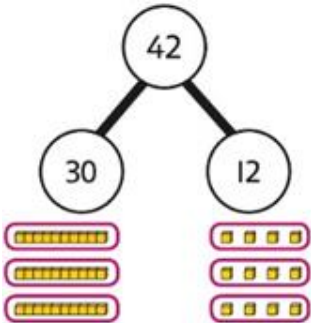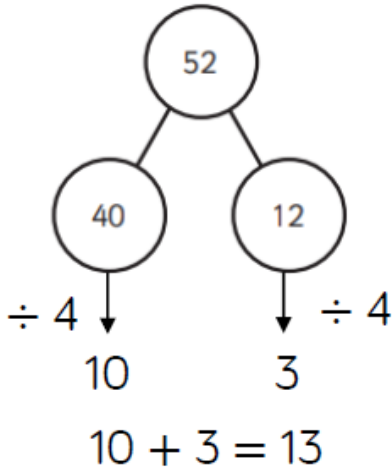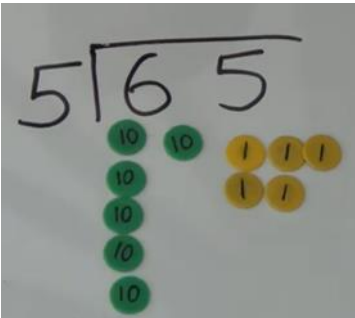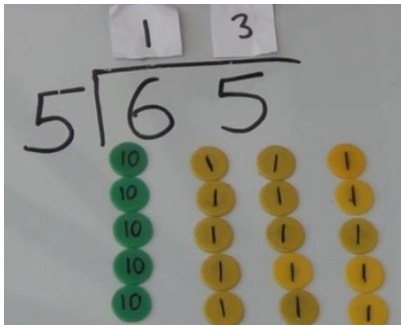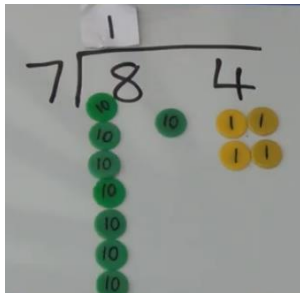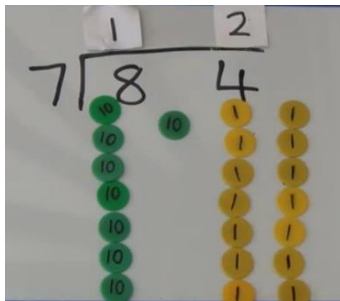
**4 groups of 5 apples is 20 apples in total.
20 divided by 4 is 5.**



**24 divided into 3 groups of 8.** | Use bar models to demonstrate the link between times-table knowledge and division.

24
| 4 | 4 | 4 | 4 | 4 | 4 |

**24 ÷ 6 = 4**

20
| ? | ? | ? | ? | ? |

**5 lots of 4 is 20 so 20 divided by 5 is 4.** | Make direct links between times-table knowledge and division.

**1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
4 x 5 = 20
5 x 5 = 25**

**I know that 3 groups of 5 makes 15 so I also know that 15 divided by 5 is 3.**

**3 × 5 = 15    so    15 ÷ 5 = 3** |

| Year 3 | Using known facts to divide multiples of 10 | Use place value equipment to show how we can use known facts to help us with questions involving multiples of 10.  **6 ones divided by 3 is 2 ones.** **6 ÷ 3 = 2**  **6 tens divided by 3 is 2 tens.** **60 ÷ 3 = 2** | Use pictorial representations (such as drawing dots and lines) to show how we can use known facts to help us with questions involving multiples of 10.  **I know that 12 ÷ 3 = 4.** **So, I know that 120 ÷ 3 = 40.** | Use times-tables knowledge to divide multiples of 10 by a single digit. **18 ÷ 3 = 6** **180 ÷ 3 = 60** **18 ÷ 6 = 3** **180 ÷ 6 = 30** |
|---|---|---|---|---|
| Year 3 | 2-digit number divided by 1-digit number (no remainder and no exchanging). | When dividing larger numbers, children need to use manipulatives that allow them to partition into tens and ones.  **48 ÷ 2 = 24** | Use part-whole models alongside place value equipment to partition and divide.  **40 ÷ 2 = 20** **2 ÷ 2 = 1** **So, 42 ÷ 2 = 21** | Use part-whole models to partition and divide.  ÷ 4     ÷ 4 10     3 10 + 3 = 13 |

| | | | | |
|---|---|---|---|---|
| | | Only if appropriate, begin to use the short division layout whilst using place value counters.<br><br> | Only if appropriate, begin to use the short division layout whilst using pictorial representations of place value counters rather than actual counters.<br><br> | Only if appropriate, begin to show the short division method alongside the part-whole model.<br><br> |
| Year 3 | 2-digit number divided by 1-digit number (with exchanging). | When dividing numbers involving an exchange, children will need to use flexible partitioning.<br><br><br><br>**I need to partition 42 differently to divide by 3 because 40 cannot be divided by 3 perfectly.**<br><br>**42 = 30 + 12**<br>**30 ÷ 3 = 10**<br>**12 ÷ 3 = 4**<br>**So, 42 ÷ 3 = 14** | Use part-whole models to flexibly partition and then divide.<br><br><br><br>$10 + 3 = 13$<br><br>**I need to partition 52 into two numbers which can each be divided by 4.** | Children flexibly partition in order to divide.<br><br>**96 ÷ 6 = ?**<br><br>**60 ÷ 6 = 10**<br>**36 ÷ 6 = 6**<br><br>**So, 96 ÷ 6 = 16** |

| | | | | |
|---|---|---|---|---|
| | | Only if appropriate, use Base 10 or place value counters to exchange one ten for ten ones.<br> | Only if appropriate, begin to use the short division layout whilst using pictorial representations of place value counters rather than actual counters.<br> | Only if appropriate, begin to show the short division method alongside the part-whole model.<br> |
| Year 3 | 2-digit number divided by 1-digit number (with remainders). | Use the grouping or sharing of objects or place value apparatus to demonstrate the concept of remainders.<br><br>**When I divide 14 by 3, there are 4 in each group but then I have 2 left over.**<br>**14 ÷ 3 = 4 remainder 2** | Use place value equipment (such as base 10) to demonstrate the concept of remainders.<br><br>**When I divide 29 by 2, I get 1 ten and 4 ones which is 14, however there is 1 one left over.**<br>**29 ÷ 2 = 14 remainder 1**<br>**29 ÷ 2 = 14 r1** | Use times-table knowledge or flexible partitioning to find the closest multiple and then deduce the remainder.<br>**42 ÷ 4 = ?**<br>**I know that 40 is a multiple of 4.**<br>**40 ÷ 4 = 10 which means there will be 2 remaining.**<br>**So, 42 ÷ 4 = 10r2**<br><br>**67 ÷ 5 = ?**<br>**67 = 50 + 17**<br>**50 ÷ 5 = 10**<br>**17 ÷ 5 = 3 remainder 2**<br>**67 ÷ 5 = 13 remainder 2** |

| Year 4 | Understanding the inverse relationship between multiplication and division. | Set out objects in arrays in order to show the link between multiplication and division facts.  **5 x 3 = 15** **3 x 5 = 15** **15 ÷ 3 = 5** **15 ÷ 5 = 3** | Use pictorial representations of arrays to show the link between multiplication and division facts.  **5 x 4 = 20** **4 x 5 = 20** **20 ÷ 4 = 5** **20 ÷ 5 = 4** | Use knowledge of times-table facts to show families of related facts. **If I know 5 x 7 = 35, I also know:** **7 × 5 = 35** **35 = 5 × 7** **35 = 7 × 5** **35 ÷ 5 = 7** **35 ÷ 7 = 5** **7 = 35 ÷ 5** **5 = 35 ÷ 7** |
|---|---|---|---|---|
| Year 4 | Dividing multiples of 10 and 100 by a single digit | Use place value equipment to show how we can use known facts to help us with questions involving multiples of 10 or 100.  **8 ÷ 2 = 4** **So, 80 ÷ 2 = 40** **Also, 800 ÷ 2 = 400** | Use pictorial representations (such as drawing dots and lines) to show how we can use known facts to help us with questions involving multiples of 10 or 100.  | Use times-tables knowledge to divide multiples of 10 or 100 by a single digit. **18 ÷ 3 = 6** **180 ÷ 3 = 60** **1800 ÷ 3 = 600** |

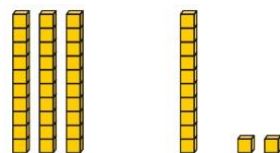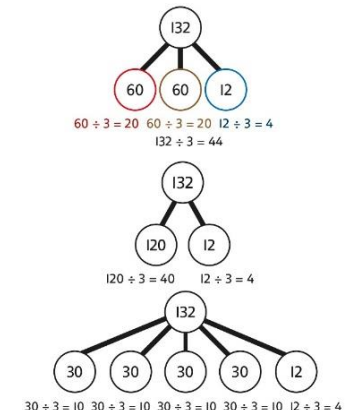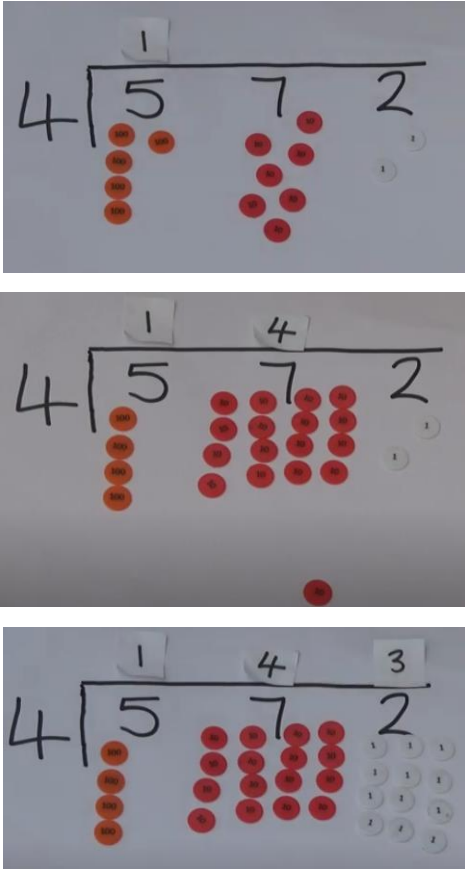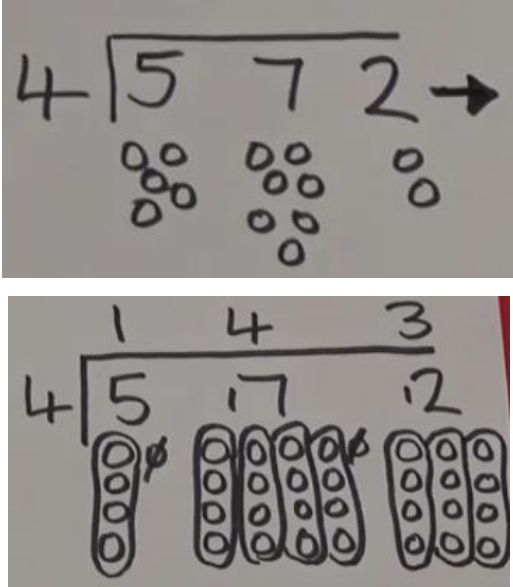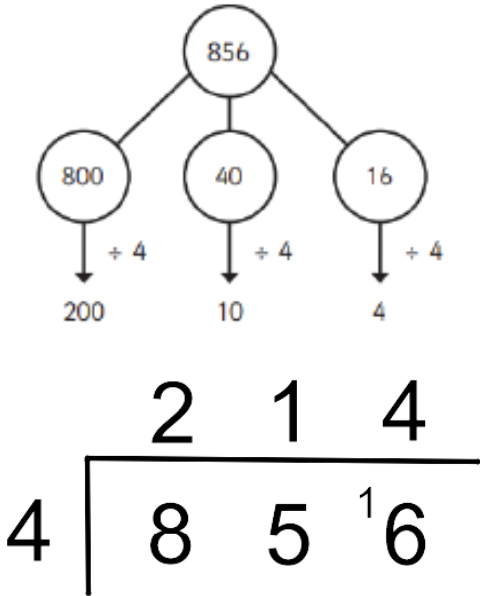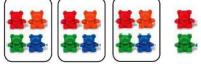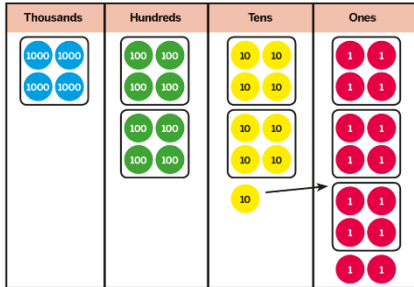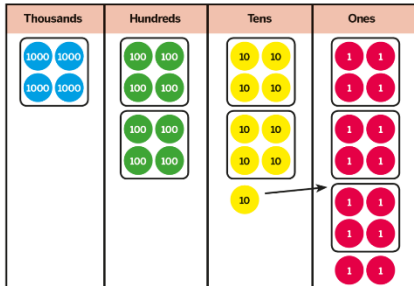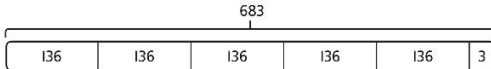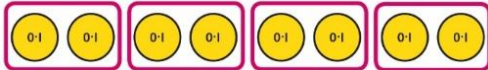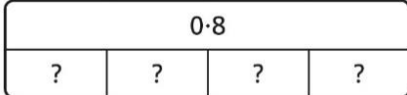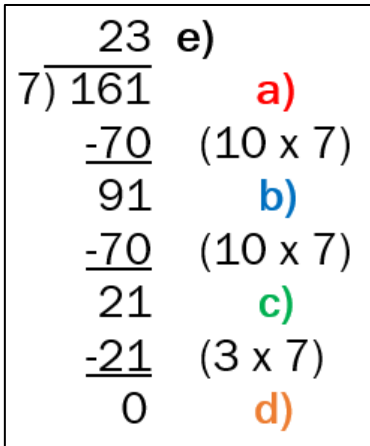| Year 4 | Dividing up to 3-digit numbers by a single digit | Use manipulatives to partition into hundreds, tens and ones. | Use part-whole models alongside place value equipment to partition and divide. | Make decisions about the most appropriate partitioning based on the division required. |
|---|---|---|---|---|
| | |  **844 ÷ 4 = 211** |  |  $72 \div 2 = 36$ $72 \div 3 = 24$ $72 \div 4 = 18$ $72 \div 6 = 12$ |
| | | If appropriate, use the short division layout whilst using place value counters.  | If appropriate, use the short division layout whilst using pictorial representations.  | If appropriate, show the short division method alongside the part-whole model.  |
| | | Use place value apparatus to demonstrate how to flexibly partition where required.  **42 ÷ 3 = ?** **If I split it into 30 and 12, I can divide by 3 more easily.** | Use part-whole models to flexibly partition (where needed) and divide.  | Demonstrate that different partitions can be used to complete the same division.  |

| | | If appropriate, use Base 10 or place value counters to exchange where required. | If appropriate, use the short division layout whilst using pictorial representations of place value counters. | If appropriate, show the short division method alongside the part-whole model. |
|---|---|---|---|---|
| | |    |   |   |
| Year 4 | Understanding remainders | *See Year 3: 2-digit number divided by 1-digit number (with remainders) but adjust for up to 3-digit numbers.*  | | |

| Year 5 | Dividing whole numbers by 10, 100 and 1,000 | Physically move counters on a place value grid to show this. | Use pictorial representations to visualise the movement between place value columns when dividing by 10, 100 and 1000. | Using the squares in their maths book to support moving the digits when dividing. |
|---|---|---|---|---|
| | | What number is represented in the place value chart?  If you divide the number by 10, where do the counters move to? What is the result of dividing the number by 10? If you divide the number by 100, where do the counters move to? What is the result of dividing the number by 100? |  The number shown on the place value chart is _____ . To divide by 10, move the digits ____ place to the _____ . One-tenth of this number is _____ . To divide by 100, move the digits ____ places to the _____ . One-hundredth of this number is _____ . To divide by 1000, move the digits ____ places to the _____ . One-thousandth of this number is _____ . | $34{,}100 \div 100 =$  |
| Year 5 | Dividing up to four digits by a single digit using short division | Place value counters can be used on a place value grid to support children to divide 4 digits by 1 digit.  | Use place value apparatus on a place value grid alongside short division.  | Use short division for up to 4-digit numbers divided by a single digit.  |

| Year 5 | Understanding remainders | *See Year 3: 2-digit number divided by 1-digit number (with remainders) but adjust for up to 4-digit numbers.* | Place value counters alongside the short division method. | Use bar models to represent divisions with remainders when problem solving. |
|---|---|---|---|---|
| | | | | 683 |
| | | | | 136 / 136 / 136 / 136 / 136 / 3 |
| Year 5 & Year 6 | Dividing decimals. | Use place value counters to demonstrate the dividing of decimals. | Use a bar model to represent the division of decimal numbers. | Use short division to divide decimals with up to 2 decimal places. |
| | | | 0·8 | $0 \cdot 5\ 3$ |
| | | | ? / ? / ? / ? | $8\,\overline{)4 \cdot {}^{4}2\ {}^{2}4}$ |
| Year 6 | Dividing by a single digit | *See Year 5: 'Dividing up to four digits by a single digit using short division' and 'Understanding Remainders'.* | You could introduce the children to the chunking method of division as a lead in to long division. | **a)** Remove ten lots of seven from 161. |
| | | | $\dfrac{23}{7)\,161}$  **e)** | **b)** Continue removing ten lots of seven until you can no longer do this (91 – 70 = 21). |
| | | | $-70$  (10 x 7)  **a)** | **c)** Once you reach a number whereby you can no longer take away ten lots of seven (21), divide this number by 7 (21 ÷ 7 = 3). |
| | | | $91$  **b)** | |
| | | | $-70$  (10 x 7) | **d)** Check that there are no remainders. |
| | | | $21$  **c)** | |
| | | | $-21$  (3 x 7) | **e)** Work out the number of groups of seven that you have subtracted. |
| | | | $0$  **d)** | **10 groups + 10 groups + 3 groups = 23** |

Place value headings: Thousands, Hundreds, Tens, Ones

Short division grid:
| | 1 | 2 | 2 | 3 | |
|---|---|---|---|---|---|
| 4 | 4 | 8 | 9 | ¹4 | r2 |

| Year 6 | Dividing by a 2-digit number using short division. | *When children begin to divide up to 4 digits by 2 digits, formal written methods become the most accurate as concrete and pictorial representations become less effective or efficient.* | Children can write out multiples to support their calculations. It is best to start by finding 10x the number and then halving this to find 5x the number as way-markers because these are usually unknown multiplication facts. | Children apply the skills learnt when dividing by a 1-digit number to dividing by 2-digit numbers. |
|---|---|---|---|---|

For the third column:

| 15 | 30 | 45 | 60 | 75 |
|---|---|---|---|---|
| 90 | 105 | 120 | 135 | 150 |

|  | 0 | 4 | 8 | 9 |
|---|---|---|---|---|
| 15 | 7 | 7 3 | 13 3 | 13 5 |

For the fourth column:

$$16 \overline{)1\,1\,1\,^{11}5\,^{3}2} = 72$$

16
32
48
64
**80**
96
112
128
144
**160**

| Year 6 | Dividing by a 2-digit number using long division. | Children need to create a memorable way to remember the steps needed for long division. | Bring down: | Divide: |
|---|---|---|---|---|

**STEPS**

| D | ÷ | Divide |
|---|---|---|
| M | × | Multiply |
| S | − | Subtract |
| B | ↓ | Bring down |

Examples:

Dad, Mom, Sister, Brother
Does McDonald's Sell Burgers?

Start by listing the multiples; remembering to find 10x and 5x first as a guide.

Bring down:

$$24 \overline{)13032}$$
$$-120\downarrow$$
$$103$$

Divide:

$$54$$
$$24 \overline{)13032}$$
$$-120\downarrow$$
$$103$$

Divide:

$$543$$
$$24 \overline{)13032}$$
$$-120\downarrow$$
$$103$$
$$-96\downarrow$$
$$72$$

| | | | |
|---|---|---|---|
| | 24 144<br>48 168<br>72 192<br>96 216<br>120 240<br><br>Divide:<br><br>5<br>24 ⟌ 13032<br><br>Multiply:<br><br>5<br>24 ⟌ 13032<br>- 120<br><br>Subtract:<br><br>5<br>24 ⟌ 13032<br>- 120<br>10 | Multiply:<br><br>54<br>24 ⟌ 13032<br>- 120↓<br>103<br>- 96<br><br>Subtract:<br><br>54<br>24 ⟌ 13032<br>- 120↓<br>103<br>- 96<br>7<br><br>Bring down:<br><br>54<br>24 ⟌ 13032<br>- 120↓<br>103<br>- 96↓<br>72 | Multiply:<br><br>543<br>24 ⟌ 13032<br>- 120↓<br>103<br>- 96↓<br>72<br>- 72<br><br>Subtract:<br><br>543<br>24 ⟌ 13032<br>- 120↓<br>103<br>- 96↓<br>72<br>- 72<br>00 |