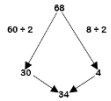
Division KS2

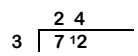
KS1	Noticing how counting in multiples if 2, 5 and 10 relates to the number of groups you have counted (introducing times tables) links to division. An understanding of the more you share between, the less each person will get (e.g., would you prefer to share these grapes between 2 people or 3 people? Why?) Secure understanding of grouping means you count the number of groups you have made. Whereas sharing means you count the number of objects in each group.	
Year	3	4
Layers of vocabulary **Appendix 1a** Beck's Tiers of Vocabulary **Appendix 1b:** Vocabulary book	**Basic to subject specific (Beck's Tiers):** share, share equally one each, two each, three each… group in pairs, threes… tens equal groups of ÷, divide, division, divided by, divided into left, left over, remainder, dividend, divisor **Instructional vocabulary:** calculate, work out, solve, investigate question, answer, check NFER Arithmetic	**Basic to subject specific (Beck's Tiers):** share, share equally one each, two each, three each… group in pairs, threes… tens equal groups of ÷, divide, division, divided by, divided into left, left over, remainder, dividend, divisor **Instructional vocabulary:** calculate, work out, solve, investigate, question, answer, check NFER Arithmetic
NC 2014	Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including 2 digit numbers times 1 digit numbers progressing to formal written methods.	Practise to become fluent in the formal written method of short division with exact answers.

Division KS2

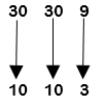
<table>
<tr><td>Developing declarative, procedural, conditional knowledge</td>
<td>Links to tables

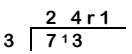
For example, use language of division linked to tables using counting stick
Using known facts
If 3 x 2 = 6, then 30 x 2 = 60, 60 ÷3 = 20 and
30 = 60 ÷ 2.
Partitioning strategy to halve
Halve 68
 

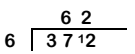
Rearranging the dividend to find multiples of the divisor.
48 ÷ 3 =
‘What do I know about the 3 x tables?’
“I know 3 x 10 = 30 and 3 x 6 = 18.”

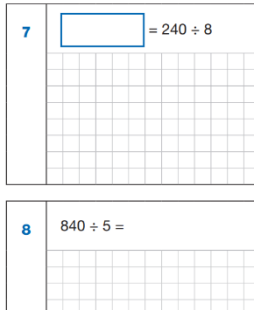
48 ÷ 3 = 16</td>
<td>Place value materials to represent calculations
Introduce the ‘bus stop’ bracket and vinculum notation.
Short division (72 = 60 + 12)
72 ÷ 3 =
 

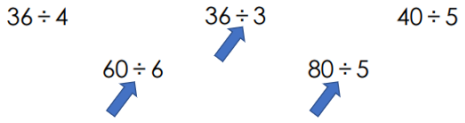
’72 divided by 3. 7 tens shared equally between 3 is 2 with a remainder of 1 ten. Exchange the 1 ten for 10 ones. I now have 12 ones which shared equally between 3 is 4. The answer is 24.”
Representing problems and conditional knowledge
Andy says, ‘I can use my three times table to work out 180 ÷ 3’. Explain what Andy could do to work out this calculation.</td>
<td>Links to tables

For example, use language of division linked to tables using counting stick
Using known facts
If 2 x 3 = 6 then 200 x 3 = 600 and 600 ÷3 = 200
Rearranging the dividend to find multiples of the divisor.
69÷ 3 =
‘What do I know about the 3 x tables?’
“I know 3 x 10 = 30 and 3 x 3 = 9.”
 

69 ÷ 3 = 23
 

Remainders can never be greater than the divisor.</td>
<td>Place value materials to represent calculations
Short division
372 ÷ 6 =
 

’372 divided by 6. 3 hundreds cannot be shared equally between 6, so exchange the hundreds for 30 tens. I now have 37 tens which shared equally between 6 is 6 with a remainder of 1 ten. Exchange the ten for 10 units. I now have 12 ones which shared equally between 6 is 2. The answer is 62.”
Representing problems and conditional knowledge
 

Which calculations give 2 digit quotients?
 
</td></tr>
<tr><td>Known facts</td><td colspan="2">Recall and use x and ÷ facts for the 3, 4 and 8 x tables</td><td colspan="2">Recall x and ÷ facts for x tables up to 12 x 12.</td></tr>
<tr><td rowspan="3">Essential knowledge</td><td>Review division facts (2 x, 5 x and 10 x tables)</td><td>Halve 2 digit numbers</td><td>Division facts (4x and 8x tables)</td><td>10x smaller</td></tr>
<tr><td>Division facts (4 x table)</td><td>Division facts (3 x table)</td><td>Division facts (3 x, 6 x and 12 x tables)</td><td>Halve larger numbers and decimals</td></tr>
<tr><td>Division facts (8 x table)</td><td>Division facts (6 x table)</td><td>Division facts (3 x and 9 x tables)</td><td>Division facts (11 x and 7 x tables)</td></tr>
<tr><td>Tests of divisibility</td><td>KS1: 2, 5, 10</td><td>Any number with a digit sum of a multiple of 3, will divide equally by 3</td><td>Any number with a digit sum of a multiple of 3, will divide equally by 3
KS1: 2, 5, 10</td><td>Any number with a digit sum of a multiple of 3 and is even will divide equally by 6</td></tr>
</table>

Division KS2

Year	5	6
Layers of vocabulary **Appendix 1a** Beck's Tiers of Vocabulary **Appendix 1b:** Vocabulary book	**Basic to subject specific (Beck's Tiers):** equal groups of divide, division, divided by, divided into remainder factor, quotient, divisible by inverse **Instructional vocabulary:** calculate, work out, solve, investigate question, answer, check same, different missing number/s number facts, number pairs, number bonds greatest value, least value NFER Arithmetic	**Basic to subject specific (Beck's Tiers):** equal groups of divide, division, divided by, divided into remainder factor, quotient, divisible by inverse, remainders as fractions or decimals **Instructional vocabulary:** calculate, work out, solve, investigate question, answer, check same, different missing number/s number facts, number pairs, number bonds greatest value, least value NFER Arithmetic
NC 2014	Divide numbers up to 4 digits by a 1 digit number using the formal written method of short division and interpret remainders appropriately for the context (as remainders, as fractions, as decimals or by rounding, e.g. 98 ÷ 4 = $\frac{98}{4}$ = 24 r2 = 24 ½= 24.5 ≈ 25). Solve problems involving multiplication and division including using knowledge of factors and multiples, squares and cubes. Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. Solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates.	Divide numbers up to 4 digits by a 2 digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate to the context. Divide numbers up to 4 digits by a 2 digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. Solve problems involving addition, subtraction, multiplication and division.

Division KS2

Developing declarative, procedural, conditional knowledge

Using known facts
If 6 ÷ 2 = 3 then 6000 ÷ 2 = 3000 and
6000 ÷ 20 = 300

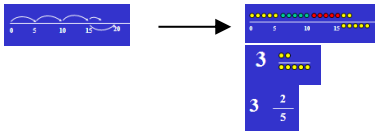
Place value materials to represent calculations

Short division
483 ÷ 7 =

```
      6  9 r1
7 | 4 ⁴8 ⁶4
```

"484 divided by 7. 4 hundreds cannot be shared equally between 7, so exchange the hundreds for 40 tens. I now have 48 tens which shared equally between 7 is 6 with a remainder of 6 tens. Exchange the 6 tens for 60 ones, we now have 64 ones. 64 shared equally between 7 equals 9 remainder 1. The answer is 69 r1."

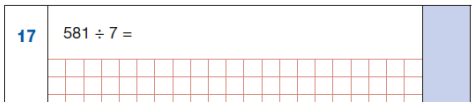
Interpreting remainders
17 ÷ 5
"What do I know? 17 is not a multiple of 5."



$3\frac{2}{5} = 3.4$

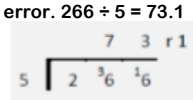
From knowledge of decimal/fraction equivalents or by converting $\frac{2}{5}$ into $\frac{4}{10}$.

Conditional knowledge



581 ÷ 7 could be calculated by the formal written method of short division or it could be calculated by rearranging the dividend, using known facts, into 560 and 21.

Representing problems
Correct the errors in the calculation below. Explain the error. 266 ÷ 5 = 73.1



Alan says that the solution to 186 ÷ 4 can be written as '46 remainder 2' or as '46.5'. Do you agree? Explain your answer.

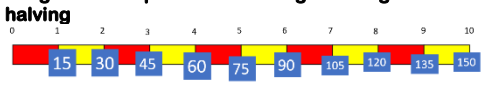
Using known facts
If 6 ÷ 2 = 3 then 6÷ 0.2 = 30 and
6 ÷ 0.02 = 300

Short division
97.6 ÷ 5 =

```
      1 9 . 5 2
5 | 9 ⁴7. ²6¹0
```

"97.6 divided by 5. 9 tens shared equally between 5 is 1 with a remainder of 4 tens. Exchange the ten for 10 ones. I now have 47 units which shared equally between 5 is 9 with a remainder of 2 ones. Exchange the 2 onesfor 20 tenths, we now have 26 tenths. 26 shared equally between 5 equals 5 with a remainder of 1 tenth. Extend the dividend with a 0 in the hundredth's column. Exchange the tenth for 10 hundredths. 10 shared equally between 5 equals 2. The answer is 19.52."

Long division – partial table using doubling and halving



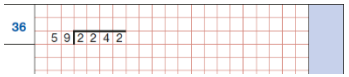
(thinking not generally recorded)
384 ÷ 16

1	16
2	32
4	64
5	80
8	128
10	160

"What do I know about the divisor?" Record partial tables.

```
      24
16 | 384
    -32↓
     64
    -64
      0
```

(38 tens ÷16 = 2 r6; 2 x 16 =32)
(bring the 4 down)
(64 units ÷ 16 =4)
(no remainder)



With questions of this type where the divisor is close to a number linked to the times tables, encourage the children to use known facts and adjustment to set up the partial tables.

		Adjust →	
1	60	-1	59
2	120	-2	118
4	240	-4	236
5	300	-5	295
8	480	-8	472
10	600	-10	590

Representing problems
Megan divides 500 by 8 and gets the answer 62r4. She re writes it as 62 r 1/2 . Is she right? Explain your answer.

Conditonal Knolwedge
Using factors to simplify long division

```
25) 815

    165
5)815

     35
5)165
```

Simplify the fractions for remainders

Known facts	Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Recall prime numbers up to 19		Identify common factors, common multiples and prime numbers	
Essential knowledge	Division facts (4 x and 8 x tables)	100, 1000 times smaller	Division facts up to 12 x 12	Halve larger numbers and decimals
	Division facts (3 x, 6 x and 12 x tables; 3 x and 9 x tables)	Partition to divide mentally	Apply place value to derive division facts, e.g. 12 ÷3 = 4 so 1.2 ÷3 = 0. 4	Partition to divide mentally including decimals
	Division facts (11 x and 7 x tables)	Halve larger numbers and decimals		
Tests of divisibility	Tests for 2,3,5,6 &10	Any number with a digit sum of a multiple of 9 will divide equally by 9	Tests for 2,3,5,6, 9 & 10	Any number where the last two digits are divisible by 4, will all divide by 4

Division KS2