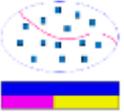
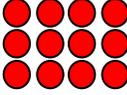
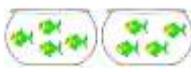
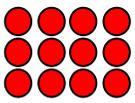


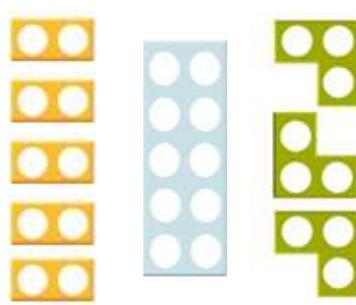
Progression in Teaching and Learning Division

A note about grouping and sharing in division: When asked to show a picture or tell a story for a division sentence, e.g. $8 \div 4$, most people give a sharing example (sweets model rather than fish model in image below). However, mathematically grouping can be more useful for various reasons: 1) It is the inverse of the multiplication structure, 2) chunking on a number line uses grouping 3) it is much easier to divide a number INTO halves than between halves. Children need to use both structures, so $8 \div 4$ should be routinely read as “8 divided/shared between 4 OR 8 divided into groups of 4” and children should practice saying and modelling both. The abstract “8 divided by 4” can be used once children have a solid understanding of grouping and sharing.

Year Group and Notes	Written Calculations	Models & Images / Manipulatives	Mental Calculations for fluency	Known Facts for fluency	Reasoning and Problem Solving	
<p>Foundation Stage Development Matters/ELGs</p>	<p>Informal jottings, mathematical mark making, problem solving, blank paper, pictures of known everyday objects to demonstrate understanding and process.</p>	<p>Concrete resources to model operation. Physically share and group amounts or use hoops to create grouping and sharing to help understand process of division.</p>	<p>Share objects into equal groups and count how many in each group</p>	<p>- Recognise some numerals of personal significance</p>	<p>Use of concrete, familiar objects to share and group e.g. farm animals, -Range of manipulatives to demonstrate e.g. Numicon, compare bears, mini cuddly toys -Incorporate problem solving word problems as part of everyday maths – using register numbers for groups, etc. NRICH http://nrich.maths.org/early-years Number Rhymes Maths Story Time – Teddy Bears Picnic (sharing sandwiches)</p>	
<p>Year 1 Practise grouping and sharing in realistic class contexts. Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher Count in multiples of twos, fives and tens</p>	<p> <u>A range of informal jottings to record their understanding of division</u></p> <p>Using arrays to solve division calculations:  $12 \div 4 = 3$  $12 \div 3 = 4$ Encourage children to make the link between x and \div when solving calculations. Focus on vocabulary – There are 3 groups of 4 etc.</p>	<p>Sharing 8 sweets shared between 4 chn </p> <p>Grouping 4 fish can live in 1 bowl. How many bowls do 8 fish need? </p> <p><u>Arrays</u> – linking grouping and sharing </p>	<p>-Use counting up in 2s 3s, 5s and 10s (using fingers to keep track of groups) Count on 100 square to help see patterns and see link between x and \div</p>	<p><u>Instant recall</u> - Halves of even numbers to 10 - count in multiples of 2s 5s and 10s (forward and backwards)</p>	<p>Making Links Here are 10 lego people If 2 people fit into the train carriage, how many carriages do we need? NRICH: Share Bears NRICH: Pairs of Legs</p>	
<p>Year 2 Count in steps of 2,3 and 5 from 0 and in tens from any number, forward or backward Calculate mathematical statements for multiplication and division with xtables and write them using x /and = signs Solve problems involving multiplication and division, using</p>	<p>4 <table border="1" data-bbox="459 1324 571 1380"> <tr> <td>12</td> </tr> </table> <u>Using bar tool to solve division calculations:</u></p>	12	<p><u>Numicon</u> Use of Numicon to compare – how many 2s weigh the same as a 10? How many 3s fit into a 10 shape? What is left over?</p>	<p>- Use counting up in 2s 3s, 5s and 10s (using fingers to keep track of groups) to start to derive division facts phrased as ‘how many groups of 3 in 12?’ Count on 100 square to help see patterns and see link between x and \div - Count in steps of 2,3 and</p>	<p><u>Instant recall</u> - Halves of even numbers to 20, incl recognising e.g. $14 \div 2$ as finding a half -count in multiples of 2s 3s 5s and 10s (forward and backwards) - recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and</p>	<p>Making links I have 30p in my pocket in 5p coins. How many coins do I have? Prove It Which four number sentences link these numbers? 3, 5, 15? Prove it.</p>
12						

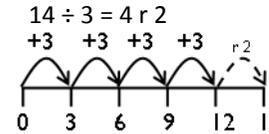
materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
 Lots of practice reading $8 \div 4$ as "8 divided/shared between 4 OR 8 divided into groups of 4"
 recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

$16 \div 4 =$



5 from 0 and in tens from any number, forward or backward
 - show that multiplication of two numbers can be done in any order (commutative) but that division cannot.

Repeated addition on a number line (more a mental method than a written method NB – not commutative)



even numbers

NRICH: [Lots of Lollies](#)
NRICH: [Lots of Biscuits!](#)
NRICH: [Doing and Undoing](#)

Year 3
 Write and calculate mathematical statements for \times and \div using the \times facts they know, including for 2digit numbers \times 1digit numbers, using mental and progressing to formal written calculations.
 Estimate the answer to a calculation and use the inverse operations to check the answers.
 Start to use vocab of factors/multiples Children should be comfortable with concept of factors by L4
 - Get children to visualise where 28 lies on e.g. a 5 tt counting stick, then identify how many groups of 5 can be made, plus remainder.

$9 \times 4 = 36$

Using arrays as a tool to visualise written calculations (including remainders)

Using mental knowledge and place value counters for larger numbers

$120 \div 3$ $1200 \div 3$

Arrays with remainders

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

Counting stick

$28 \div 5 = 5 \text{ r } 3$

Count from 0 in multiples of 4,8,50 and 100 (in addition to 2,5,10)
 Use half and half again for $\div 4$
 Divide whole numbers by 10/100 (whole number answers)
 Calculate div facts with remainders for 2, 3 4,8 5 and 10
 Write and calculate mathematical statements for \times and \div using the \times facts they know, including for 2digit numbers \times 1digit numbers, using mental and progressing to formal written calculations.
Jottings to support mental chunking e.g.
 $2000 \div 250$
 $2 \times 250 = 500$
 $4 \times 250 = 1000$
 $8 \times 250 = 2000$

Instant recall
 - Half of 30, 50, 70, 90
 - Recall and use multiplication and division facts for 3,4 and 8 times tables (in addition to 2,5,10) – link to fractions
 Begin to know division facts for 3, 4, 5 and 10 times table – link to fractions

Making links
 Cards come in packs of 4. How many packs do I need to buy to get 32 cards?

Prove It
 What goes in the missing box?

\times	?	?
4	80	12

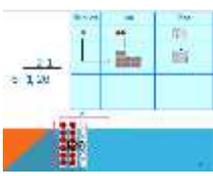
Prove it.

NRICH: [Fair Feast](#)
NRICH: [The Amazing Splitting Plant](#)

Year 4

- Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying 3 numbers together
- Estimate the answer to a calculation and use the inverse operations to check the answers
- Working out division facts with remainders is often neglected. Chn need lots of practice Rapid recall of tt facts asap. Essential prerequisite to formal written method

Short method for single digit division
Divide a 2 or 3 digit number by a single digit

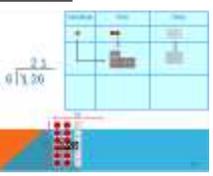


5 groups of
5, 3 left

$$4 \overline{) 159} \text{ r } 1$$

$$4 \overline{) 6237}$$

Use PV counters to introduce short division



- Count in multiples of 6,7,9,25 and 1000
- recognise and use factor pairs commutatively and in mental calculations
- Div numbers by 10 or 100
- Mental chunking for 'simple' calcs, e.g. Yoghurts cost 45p each; how many can I buy for £5?

$\begin{matrix} & \text{£}5.00 & = 11 \text{ yoghurts} \\ & \swarrow & \searrow \\ \text{£}4.50 = 10 & & 50\text{p left so I can buy} \\ \text{yoghurts} & & 1 \text{ more yoghurt} \end{matrix}$

Instant recall

- Multiplication and division facts for all tables to 12x12
- Half of 1, 3, 5, 7, 9 (and numbers ending in these digits)

Derived

- Quickly derive division facts for tts up to 12 x 12,
- Division facts with remainders for all tt
- Division facts & place value calculations such as 180 ÷ 3

Use a fact
63 ÷ 9 = 7
Use this fact to work out
126 ÷ 9 =
252 ÷ 7 =

Always, sometimes, never?
Is it always, sometimes or never true that an even number that is divisible by 3 is also divisible by 6.

NRICH: [The Remainders Game](#)
NRICH: [Pizza Portions](#)
NRICH: [Four Go](#)
NRICH: [Let Us Divide](#)

Year 5

- Identify multiples and factors, including finding all factor pairs and common factors of 2 numbers
- know and use the vocabulary of prime numbers, prime factors and composite numbers
- Establish whether a number up to 100 is prime
- Recognise and use square numbers and cube numbers (and notation)

Short method

- Divide numbers up to 4 digits by a one digit number using formal written method of short division and interpret remainders appropriately for the context
- Divide decimal numbers by a single digit, e.g. 31.62 ÷ 8
- Divide any 3 digit number by any 2 digit number

Short division

$$98 \div 7 \text{ becomes}$$

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

Answer: 14

$$432 \div 5 \text{ becomes}$$

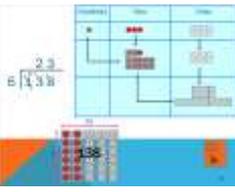
$$\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$$

Answer: 86 remainder 2

$$496 \div 11 \text{ becomes}$$

$$\begin{array}{r} 45 \text{ r } 1 \\ 11 \overline{) 496} \\ \underline{44} \\ 56 \\ \underline{55} \\ 1 \end{array}$$

Answer: 45 $\frac{1}{11}$



- Count forwards or backwards in steps of powers of 10 for any given number up to 1000000
- Multiply and divide decimals and whole numbers by 10, 100 and 1000
- Multiply a two digit number by a single digit, drawing on known facts

Instant recall
Recall all prime numbers up to 19
Recognise and use square numbers and cube numbers (and notation)

Derived

- Division facts & place value calculations such as 1.8 ÷ 3

Prove It
What goes in the missing box?

12 3 + 6 = 212

12 3 + 7 = 212

22 3 + 7 = 321 r 6

Size of an answer
The product of a two digit and three digit number is approximately 6500. What could the numbers be?

NRICH: [What's in the Box?](#)
NRICH: [Twenty Divided Into Six](#)
NRICH: [Curious Numbers](#)
NRICH: [Division Rules](#)
NRICH: [Would You Rather?](#)

Year 6

Use their knowledge of the order of operations to carry out calculations involving four operations .

- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- identify common factors, common multiples and prime numbers
- use common factors to simplify fractions; use common multiples to express fractions in the same denomination.

Divide numbers up to 4-digits by a 2-digit number using a formal written method of short division where appropriate for the context 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 decimals as appropriate for the context.

Long division

$$432 \div 15 \text{ becomes}$$

$$\begin{array}{r} 28 \text{ r } 12 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

$$432 \div 15 \text{ becomes}$$

$$\begin{array}{r} 28 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

15x20
15x8

$$\frac{12}{15} = \frac{4}{5}$$

- Perform mental calculations, including with mixed operation and large numbers
- Associate a fraction with division and calculate decimal fraction equivalents

Instant recall

Always, Sometimes, Never
Is it always, sometimes or never true that when you square an even number, the result is divisible by 4

Missing numbers
2.4 ÷ 0.3 = 1.25

Which number could be written in the box?

NRICH: [Pies](#)
NRICH: [Forgot the Numbers](#)
NRICH: [A Conversation Piece](#)
NRICH: [Divide It Out](#)

-calculate , estimate and compare volume of cubes and cuboids using standard units.

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