



Shotton Hall Primary School
Working together to
SHINE

Successful, Happy, Inspired and Nurtured towards Excellence

Reviewed and Amended: 21.09.18

Next review: September 2019

Ratified by the governing body on: 24th November 2017

Signed:

RRSA Links

Article 28 - Every child has the right to an education.

Article 29 - Education must develop every child's personality, talents and abilities to the full. It must encourage the child's respect for human rights, as well as respect for their parents, their own and other cultures and the environment.

The following strategies are used in the teaching of division in Maths. They are also supported by additional strategies which are suggested in the White Rose Teaching for Mastery documents.

PROGRESSION THROUGH CALCULATIONS FOR DIVISION

MENTAL CALCULATIONS

(ongoing)

These are a **selection** of mental calculation strategies:

Doubling and halving

Knowing that halving is dividing by 2

Deriving and recalling division facts

Tables should be taught everyday from Y2 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 2 2 times table
 5 times table
 10 times table

Year 3 2 times table
 3 times table
 4 times table
 5 times table
 6 times table
 10 times table

Year 4 Derive and recall division facts for all tables up to 12 x 12

Year 5 & 6 Derive and recall quickly division facts for all tables up to 12 x 12

Using and applying division facts

Children should be able to utilise their tables knowledge to derive other facts.

e.g. If I know $3 \times 7 = 21$, what else do I know?

$30 \times 7 = 210$, $300 \times 7 = 2100$, $3000 \times 7 = 21\ 000$, $0.3 \times 7 = 2.1$ etc

Dividing by 10 or 100

Knowing that the effect of dividing by 10 is a shift in the digits one place to the right.

Knowing that the effect of dividing by 100 is a shift in the digits two places to the right.

Use of factors

$$378 \div 21$$

$$378 \div 3 = 126$$

$$378 \div 21 = 18$$

$$126 \div 7 = 18$$

Use related facts

Given that $1.4 \times 1.1 = 1.54$

What is $1.54 \div 1.4$, or $1.54 \div 1.1$?

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

EARLY STAGES (EYFS)

Children will engage in a wide variety of songs and rhymes, games and activities.

In practical activities and through discussion they will begin to solve problems involving halving and sharing.

Share the apples between two people.



'Half of the apples for you and half of the apples for me.'

Y1

Statutory requirements

Pupils should be taught to:

solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

- Use **sharing** to answer division questions such as:

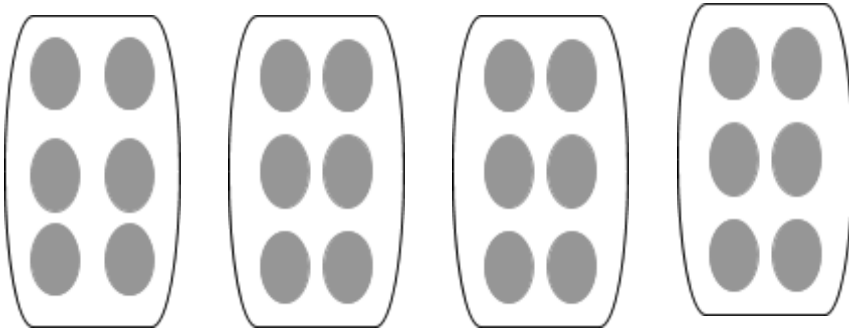
Share this bag of 12 counters into 3 pots.



- Experience **division as grouping**, such as:

24 eggs are packed in boxes of 6. How many boxes are needed?

Take 6 eggs and pack the first box. Continue until there are no eggs left. Then count how many boxes have been used, recording pictorially.



Y2

Statutory requirements

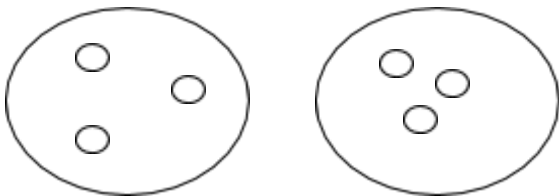
Pupils should be taught to:

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for division and write them using the division (\div) and equals ($=$) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

Children will develop their understanding of division and use jottings to support calculation

✓ Sharing equally

6 sweets shared between 2 people, how many do they each get?



$$6 \div 2 = 3$$

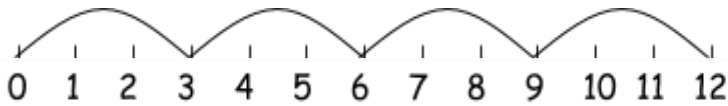
Experience divisions that give rise to **remainders**, such as, in a sharing context:

Three friends share 17 marbles equally. How many marbles does each friend get? How many marbles are left over?



✓ **Grouping using a number line**

$$12 \div 3 = 4$$



✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

$$26 \div 2 = \square$$

$$24 \div \triangle = 12$$

$$\square \div 10 = 8$$

Remember:

Year 3 to Year 6

To progress towards short division, children need to be able to:

- understand and use the vocabulary of division;
- partition two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways;
- recall multiplication and division facts for the tables used;
- recognise multiples of one-digit numbers and divide multiples of 10 or 100 by a single-digit number using their knowledge of division facts and place value;
- know how to find a remainder working mentally, e.g. find the remainder when 48 is divided by 5;
- understand and use multiplication and division as inverse operations.

Y3

Statutory requirements

Pupils should be taught to:

recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

write and calculate mathematical statements for division using mental and progressing to formal written methods

Ensure that the emphasis in Y3 is on grouping rather than sharing.

Children will continue to use number line if they need to. However, emphasis must be on moving towards a formal written method as quickly as possible. Please note, that mental calculation of multiplication and division facts are imperative at this stage.

Expanded layout for short division

Model this to support understanding the place value within the compact method but children are not expected to record this method. Record in compact form (short division)

Stage 1

TU \div U, no remainder and no carrying, e.g. $69 \div 3$

$$\begin{array}{r} 20 \quad 3 \\ \big] 60 \quad 9 \end{array}$$

$$69 \div 3 = 23$$

Stage 2

TU \div U, remainder but no carrying, e.g. $67 \div 3$

$$\begin{array}{r} 20 \quad 2 \text{ R } 1 \\ \big] 60 \quad 7 \end{array}$$

$$67 \div 3 = 22 \text{ R } 1$$

$$92 \div 4 = 23$$

Stage 3 (compact division)

TU \div U, no remainder and no carrying, e.g. $93 \div 3$

$$\begin{array}{r} \text{T U} \\ 3 \text{ 1} \\ \hline 9 \text{ 3} \end{array}$$

There are exactly 30 threes in 90 and 1 three in 3. The answer is 31.

✓ Using symbols to stand for unknown numbers to complete equations using inverse operations

$$26 \div 2 = \square$$

$$24 \div \triangle = 12$$

$$\square \div 10 = 8$$

Y4

Statutory requirements

- There are no formal statutory requirements linked to division in Year 4.

***Eventhough there are no formal written methods for division, it is imperative that it is still taught progressively in Year 4.**

Short division TU ÷ U and HTU ÷ U

Compact method of short division will be introduced (no remainders), with no 'carrying' at first, then with 'carrying'.

$$3 \overline{) 36}$$

$$6 \overline{) 966}$$

Then compact method will be used for division calculations involving remainders. Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example $62 \div 8$ is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each. How many can I buy?
Answer: 7 (the remaining 6p is not enough to buy another sweet)

Apples are packed into boxes of 8. There are 62 apples. How many boxes are needed?
Answer: 8 (the remaining 6 apples still need to be placed into a box)

Y5

Statutory requirements

Pupils should be taught to:

divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.

Continue to develop the short division method as follows:-

Extending the compact layout for short division

Order of difficulty of calculations:

- No remainder, no carrying, e.g. $844 \div 4$
- Remainder, no carrying, e.g. $486 \div 4$

3. No remainder, carrying from T to U, e.g. $860 \div 4$
4. No remainder, carrying from H to T, e.g. $928 \div 4$
5. No remainder, carrying from H to T and T to U, e.g. $984 \div 4$
6. Remainder and carrying, e.g. $743 \div 4$
7. Examples where consideration needs to be given to the placing of the quotient,

e.g. $387 \div 4$

$$\begin{array}{r} 096 \text{ r } 3 \\ 4 \overline{) 3827} \end{array}$$

Initially pupils should cross out the hundreds digit and carry it over to the tens as well as placing zero in the quotient.

8. Examples where there are zeros in the quotient, e.g. $818 \div 4$, $5609 \div 8$

$$\begin{array}{r} 204 \text{ r } 2 \\ 4 \overline{) 818} \end{array} \qquad \begin{array}{r} 0701 \text{ r } 1 \\ 8 \overline{) 5609} \end{array}$$

Emphasise zero as place holder.

9. Express remainders as fractions, e.g. $387 \div 4$

$$\begin{array}{r} 096 \frac{3}{4} \\ 4 \overline{) 3827} \end{array}$$

10. Decimals

11. Measures

12. Divide amounts of money,

e.g. Grandma emptied her money box. There was £12.46. She shared it equally between her five grandchildren. How much did they each get and how much was left over?

$$\begin{array}{r} 02.49 \text{ r } 1 \\ 5 \overline{) 12.46} \end{array}$$

Each child got £2.49 and there was 1p left over.

13. Varied contexts where the remainder is expressed as a whole number, or a fraction, or a decimal or where the quotient needs to be rounded up (e.g. 72 children are going camping. Each tent holds 5 children. How many tents do they need?), or down (The farmer has collected 91 eggs. Egg boxes each hold 6 eggs. How many boxes can he fill?).

Statutory requirements

Pupils should be taught to:

divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

Extend short division to decimals with up to two decimal places. Children should know that decimal points line up under each other.

Long division will be introduced when appropriate.

Short Division

98 ÷ 7 becomes

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

Answer: 14

432 ÷ 5 becomes

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

Answer: 86 remainder 2

496 ÷ 11 becomes

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

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

Long Division

432 ÷ 15 becomes

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{30} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Answer: 28.8

***Challenge with extended digits, decimal numbers, money and measures including remainders.**

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By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

- 1) they are not ready.**
- 2) they are not confident.**

Children should be encouraged to approximate their answers before calculating. Children should be encouraged to check their answers after calculation using an appropriate strategy.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.