WILLIAM BOOTH
PRIMARY & NURSERY SCHOOL

TRANSFORM
Teaching School Alliance
'Together we Achieve'

# Calculation policy for division

# Y1

TRANSFORM
Teaching School Alliance
'Together we Achieve'

| Revisit | NC objectives |
| --- | --- |
| Count up to 20<br>Count objects accurately<br>Write numbers | solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. |

Resources


TRANSFORM
Teaching School Alliance
'Together we Achieve'

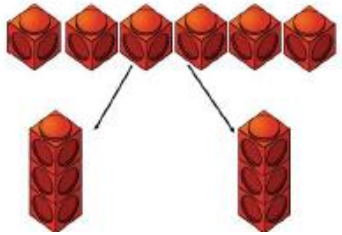
**NC Objective**: solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

**Small Step:** Understand division as sharing

**Vocabulary:** share, equal, how many, groups

Representations

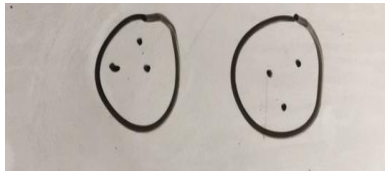
Share physical objects between different number of groups



Use cubes/counters to represent other object e.g. cookies

## Misconceptions

Children are not systematic when sharing into equal groups, using a 'one for you' approach; do not use the language of division to describe the process.



Draw pictures to represent physical objects

Abstract

$6 \div 2 = 3$

Bar model

TRANSFORM Teaching School Alliance 'Together we Achieve'

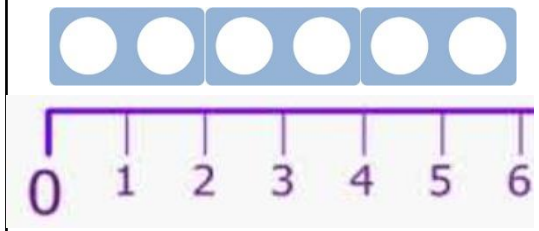
**NC Objective**: solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

**Small Step:** Understand division as grouping

**Vocabulary:** share, equal, how many, groups

Representations

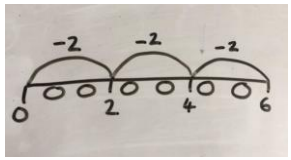
Children organise themselves in to groups of varying numbers

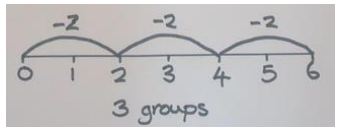


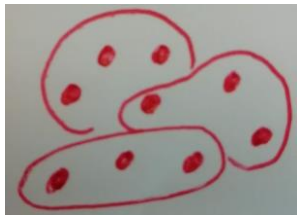

Numicon used in conjunction with number line

## Misconceptions

Children are not systematic when sharing into equal groups, using a 'one for you' approach; do not use the language of division to describe the process.



Picture of objects and children put in to groups of varying numbers. Alternatively, children draw 3 objects at a time a group together with a circle.

TRANSFORM
Teaching School Alliance
'Together we Achieve'

# Y2

TRANSFORM
Teaching School Alliance
'Together we Achieve'

| Revisit | NC objectives |
| --- | --- |
| Sharing physical objects into different groups<br>Count in multiples of 2,5 and 10<br>Write division as repeated subtraction | recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers<br>calculate mathematical statements for division within the multiplication tables and write them using division (÷) and equals (=) signs<br>show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot<br>solve problems involving division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. |

Resources

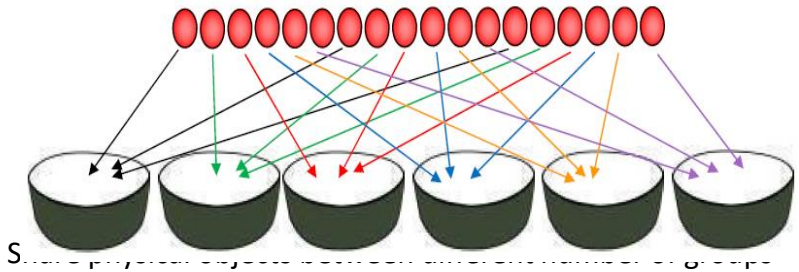

TRANSFORM
Teaching School Alliance
'Together we Achieve'

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

**Small Step:** Understand division as sharing – use same representations as in Y1

**Vocabulary:** share, equal, how many, groups

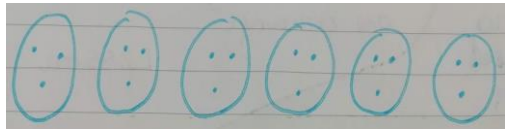
Representations



18 ÷ 6 = 3

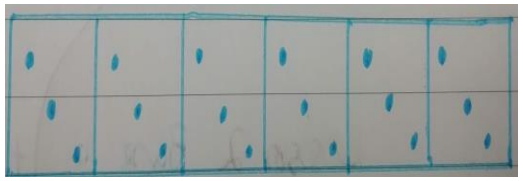
## Misconceptions

Children are not systematic when sharing into equal groups, using a 'one for you' approach; do not use the language of division to describe the process.



Draw pictures to represent physical objects

18 ÷ 6 = 3



Bar model

Children to draw their sharing, in loose groups first before moving on to a more structured model that resembles are bar model

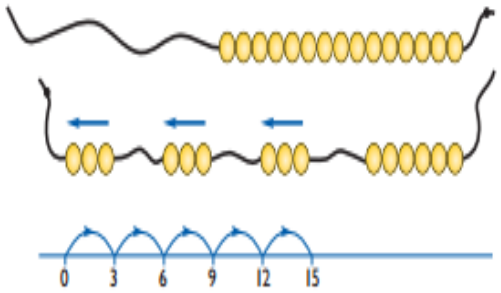
TRANSFORM
Teaching School Alliance
'Together we Achieve'

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

**Small Step:** Understand division as grouping

**Vocabulary:** groups of, equal groups of, divide, ÷, divided by, divided into

Representations

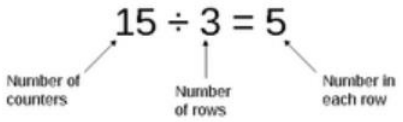


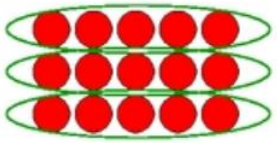

Group from zero in jumps of the divisor to find our 'how many groups of 3 are there in 15?'.

15 ÷ 3 = 5

## Misconceptions

Children do not use equal groups; do not use the language of division to describe the process.



| 24 | | | |
|---|---|---|---|
| 6 | 6 | 6 | 6 |

Children to use bar model when secure in times table facts

TRANSFORM
Teaching School Alliance
'Together we Achieve'

TRANSFORM
Teaching School Alliance
'Together we Achieve'

# Y3 and 4

Years 3 and 4 should continue to use the strategies introduced in Years 1 and 2 to ensure that by the end of Y4 children are secure with their conceptual understanding of division as sharing and division as grouping and can use both to answer division questions quickly for all facts with a divisor from 1-12

**N.B. Year 4 follow first three slides of year 5 but only for 2 and 3-digit numbers.**

# Y5

TRANSFORM
Teaching School Alliance
'Together we Achieve'

| Revisit | NC objectives |
| --- | --- |
| Division facts up to 12x12 | recall and use multiplication and division facts up to 12x12 |
| Conceptual understanding of division as sharing and division as grouping | write and calculate mathematical statements for division using the multiplication tables that they know, including for two and three-digit numbers divided by one-digit numbers, using mental and progressing to formal written methods |
| Divide numbers up to 3 digits by a 1-digit number using the formal written method of short division | solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects |

Resources

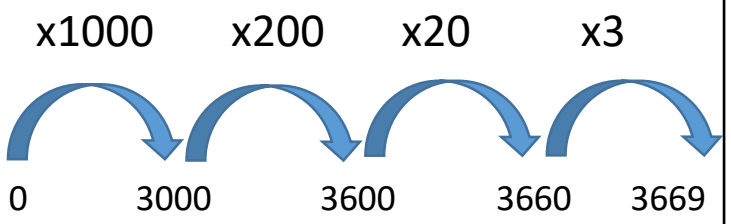

TRANSFORM
Teaching School Alliance
'Together we Achieve'

**NC Objective**: 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

**Small Step:** Divide 4 digit by 1 digit with no remainders in any column e.g. 3669 ÷ 3

**Vocabulary:** lots of, groups of multiple of, once, twice, three times… ten times…times as (big, long, wide… and so on) array row, column, double, halve, share, share equally

Representations




$$3\overline{)3669} = 1223$$

| Th | H | T | O |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

Both physically manipulate and draw place value tables

**Misconceptions**

Children are introduced to formal written methods before fully understand the concept, becomes a test of their memory to remember the 'rule', and have no strategies to rely upon when they are 'stuck'. Problems with place value can cause difficulties with written work.

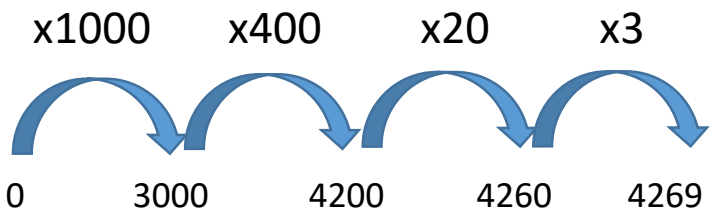
TRANSFORM
Teaching School Alliance
'Together we Achieve'

**NC Objective**: 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

**Small Step:** Divide 4 digit by 1 digit with remainders in one column e.g. 4269 ÷ 3

**Vocabulary:** lots of, groups of multiple of, once, twice, three times… ten times…times as (big, long, wide… and so on) array row, column, double, halve, share, share equally

Representations




$$3\overline{)4^{1}269} \quad 1423$$

| Th | H | T | O |
|---|---|---|---|
| ● | ●●● | ●● | ●●● |
| ● | ●●● | ●● | ●●● |
| ● | ●●● | ●● | ●●● |

Both physically manipulate and draw place value tables

**Misconceptions**

Pupils are introduced to written method before fully understanding the concept of grouping or 'chunking'. Need more concrete examples.

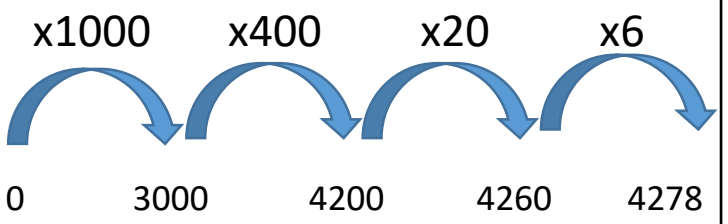
TRANSFORM
Teaching School Alliance
'Together we Achieve'

**NC Objective**: 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

**Small Step:** Divide 4 digit by 1 digit with remainders in two columns e.g. 4269 ÷ 3

**Vocabulary:** lots of, groups of multiple of, once, twice, three times… ten times…times as (big, long, wide… and so on) array row, column, double, halve, share, share equally

Representations




$$\begin{array}{r} 1426 \\ 3\overline{)\,4^{1}27^{1}8} \end{array}$$

| Th | H | T | O |
|---|---|---|---|
| ● | ● ● ● | ● ● | ● ● ● ● |
| ● | ● ● ● | ● ● | ● ● ● ● |
| ● | ● ● ● | ● ● | ● ● ● ● |

Both physically manipulate and draw place value tables

**Misconceptions**

Pupils are introduced to written method before fully understanding the concept of grouping or 'chunking'. Need more concrete examples.

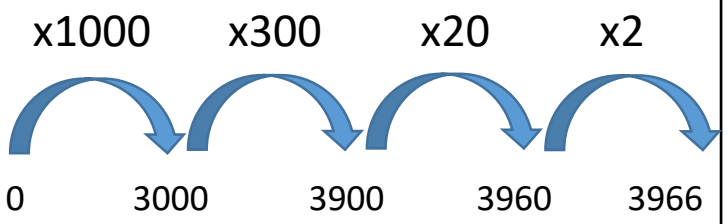
TRANSFORM
Teaching School Alliance
'Together we Achieve'

**NC Objective**: 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

**Small Step:** Divide 4 digit by 1 digit with remainders in final column and interpret remainder

**Vocabulary:** lots of, groups of multiple of, once, twice, three times… ten times…times as (big, long, wide… and so on) array row, column double, halve share, share equally

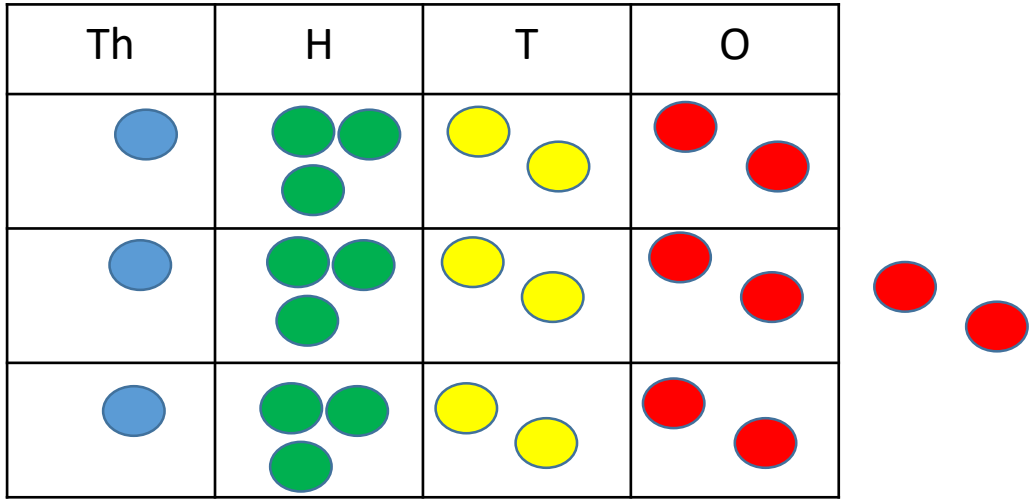
Representations




$$3\overline{)3968} = 1322r2$$

**Misconceptions**

When dealing with remainders, pupils have little understanding of what the remainder actually represents. Further this will show in their inability to represent as a fraction or a decimal.




Both physically manipulate and draw place value tables

TRANSFORM
Teaching School Alliance
'Together we Achieve'

# Y6

TRANSFORM
Teaching School Alliance
'Together we Achieve'

| Revisit | NC objectives |
| --- | --- |
| Partitioning numbers – including decimals<br>Division facts up to 12x12<br>Division by 10,100 and 1000<br>Short division for dividing by 1-digit numbers<br>Fact families, e.g. 56÷8=7 so 5600÷8=700 | •multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication<br><br>•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<br><br>•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 |

Resources


TRANSFORM
Teaching School Alliance
'Together we Achieve'

**NC Objective**: 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

**Small Step:** Dividing a 4-digit number by a 2-digit where answer is 2 or 3 digits

**Vocabulary:** lots of, groups of multiple of, once, twice, three times… ten times…times as (big, long, wide… and so on) array row, column double, halve share, share equally

Representations

Use of the comfort blanket for division, e.g. for 3132 ÷ 27:
Children will start writing out their 27 times tables to the point where they need to. In this question, they will stop at 54 because they are seeing how many 27s go into 31.
They will then carry the amount that is left over to the next column.
The comfort blanket will then be required up until 162 (six lots of 27).

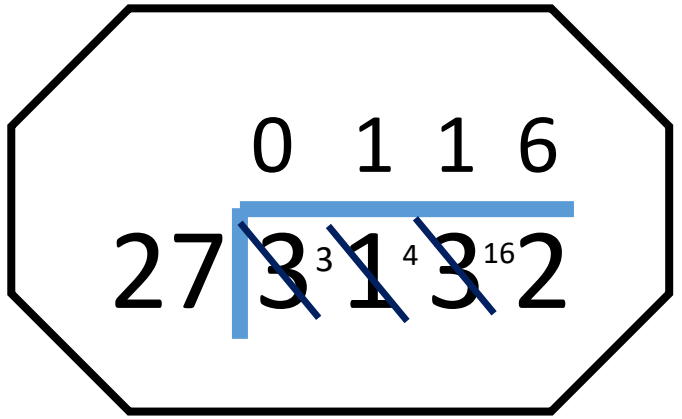
Common errors

Children not writing out comfort blanket accurately, e.g. through not using column method to add lots of 27.

Children carrying incorrect amounts, e.g. not carrying over 4 after taking one lot of 27 from 31. This is particularly true when dividing by larger 2-digit numbers.

**Misconceptions**

Children are introduced to the idea of long division before they fully understand the idea of chunking/repeated subtraction




C.B
27
54
81
108
135
162

TRANSFORM
Teaching School Alliance
'Together we Achieve'

| | |
|---|---|
| **NC Objective**: 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 | **Small Step:** Dividing a 4-digit number by a 2-digit remainder in final column in order to interpret in context |
| **Vocabulary:** lots of, groups of multiple of, once, twice, three times… ten times…times as (big, long, wide… and so on) array row, column double, halve share, share equally | |
| Follow previous strategies that include remainders. However, it is important to teach the children how to interpret the remainder and represent as fraction and decimal as appropriate. | **Misconceptions**<br>Children are introduced to the idea of long division before they fully understand the idea of chunking/repeated subtraction |
| | |

TRANSFORM
Teaching School Alliance
'Together we Achieve'