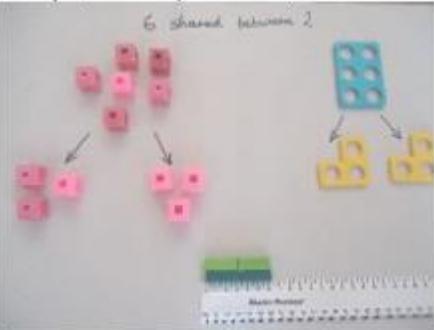
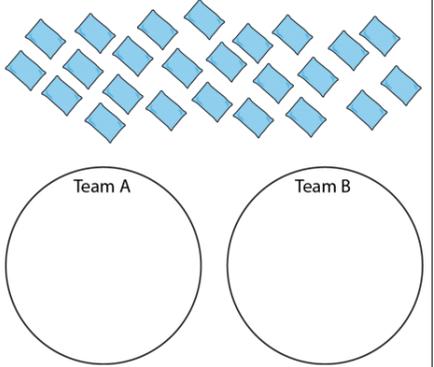
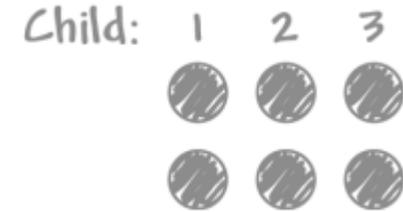
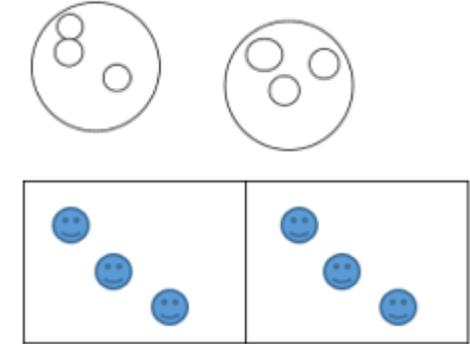


Maths Calculation Policy – Division

This document shows the progression in the models, pictures and calculations we used to support teaching division at Stottesdon C of E Primary School.

Division-

Key language which should be used: share, group, divide, divided by, half, is equal to, is the same as, split into equal groups of, shared into ___ groups.

Concrete	Pictorial	Abstract		
<p>Division as sharing (Many concrete objects can be used e.g. children and hoops, teddy bears, cakes and plates etc.)</p>  <p><i>There are twenty-four bean bags. If they are shared equally between two teams, how many bean bags does each team get?</i></p> 	<p>Children draw pictures to represent the concrete when solving a problem.</p> <p>E.g. Six sweets are shared equally between 3 children.</p> <p>Child: 1 2 3</p>  <p>This can also be done in circles or in a bar model so that all four operations have a similar structure and links can be made between the two.</p> 	<p>$6 \div 2 = 3$</p> <table border="1" data-bbox="1473 384 2130 427"> <tr> <td>3</td> <td>3</td> </tr> </table> <p>Six shared equally between two children is?</p> <p>Six divided equally between two children is?</p>	3	3
3	3			

Division as grouping

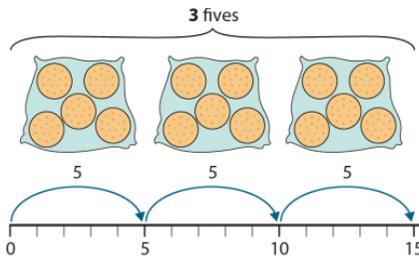
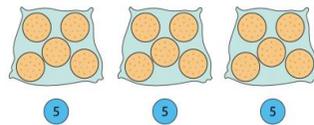
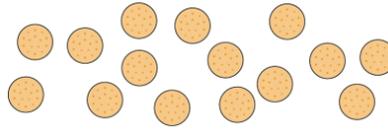
This can have an additive structure (additive grouping).

$$6 \div 2$$



Drawing pictures to represent the maths story.

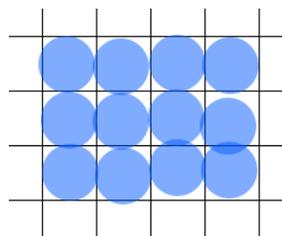
There are fifteen biscuits. If I put them into bags of five, how many bags will I need?



$$5 + 5 + 5 = 15$$
$$15 \div 5 = 3$$

Drawing numberline alongside pictures.

Linking to inverse through arrays



$$12 \div 3 = 4 \quad 12 \div 3 = 4$$
$$4 \times _ = 12 \quad _ \times 3 = 12$$

Recording the abstract to match the pictures in the story.

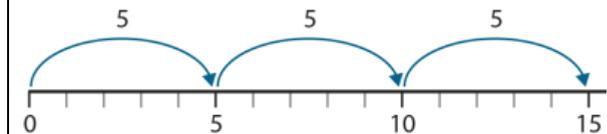
There are fifteen biscuits. If I put them into bags of five, how many bags will I need?

$$15 \div 5$$

- 'One bag of five is five.'
 - 'Two bags of five are ten.'
 - 'Three bags of five are fifteen.'

 - 'Fifteen is divided into groups of five. There are three groups.'
- $$15 \div 5 = 3$$
- 'Fifteen divided into groups of five is equal to three.'
 - 'So, we need three bags.'

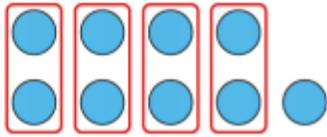
Abstract number line on its own.



$$5 + 5 + 5 = 15$$
$$15 \div 5 = 3$$

2 digit divided by 1 digit with remainders

Using concrete equipment to show remainders.

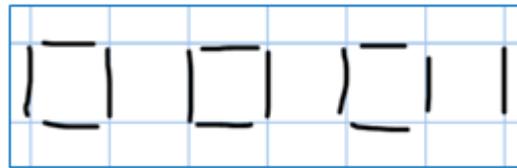
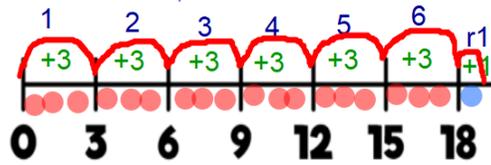


Use of lollipop sticks to form wholes

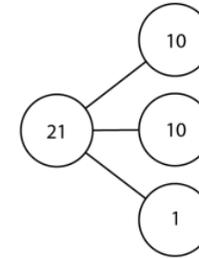


Using additive grouping on a numberline, with pictures.

$$19 \div 3 = 6 \text{ remainder } 1$$

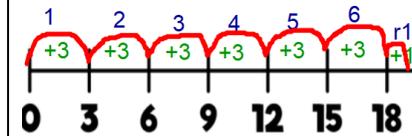


Use of the part whole and bar model to show the abstract concept and solve problems.



17			
5	5	5	2

Additive grouping on a numberline using abstract numbers. $19 \div 3 =$



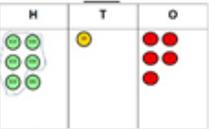
Using the bus stop method for trickier division that is not easily solved through known facts.

Using grouping and counters. Key language for grouping - How many groups of X can we make with X hundreds. This can also be done using sharing.

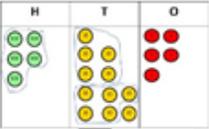
$$615 \div 5$$



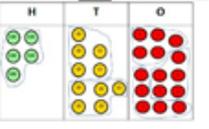
Step 1: make 615



Step 2: Circle your groups of 5



Step 3: Exchange 1H for 10T and circle groups of 5



Step 4: exchange 1T for 10ones and circles groups of 5

The concrete model can be represented pictorially until the children no longer need to do this.

$$\begin{array}{r} 123 \\ 5 \overline{) 615} \end{array}$$

Through the use of the bus stop method remainders need to be interpreted as fractions

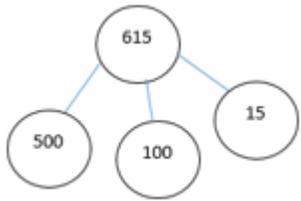
$$\begin{array}{r} 07\frac{2}{8} \\ 8 \overline{) 58} \end{array} \quad \begin{array}{l} 2 \div 8 \\ 7 \text{ and } \frac{2}{8} \end{array}$$

And decimals.

$$\begin{array}{r} 07.125 \\ 8 \overline{) 57.125} \end{array}$$

Fluency variation, different ways to ask children to solve division calculations. Children are encouraged to choose the most efficient way to solve each problem.

Using the part whole model below, how can you divide 615 by 5 without using the 'bus stop' method.



Balancing problems

$48 \div \underline{\quad} = 12 = \underline{\quad} \div 5$

$715 \div \underline{\quad} = 143$

I have £615 and share it equally between five bank accounts. How much will be in each account.

615 pupils need to be put into 5 groups. How many will be in each group?

Function machine

6	$\div 10 =$	
74		
8.3		

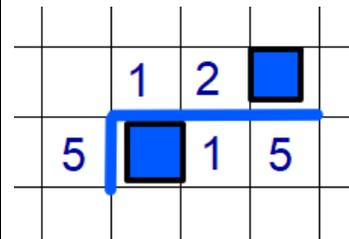
$$5 \overline{)615}$$

$615 \div 5 =$

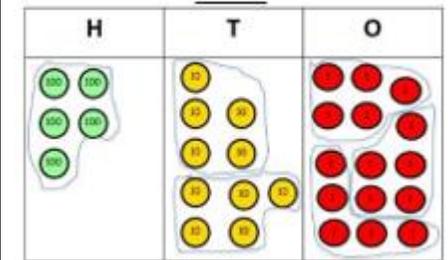
$\underline{\quad} = 615 \div 5$

How many fives go into 615?

Missing number problems

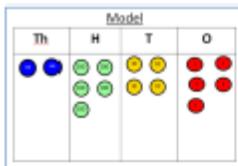


What's the calculation?
What's the answer?



Long Division

Concrete

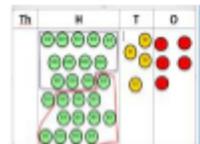


$$\begin{array}{r} 0212 \\ 12 \overline{)2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

$2544 \div 12$
How many groups of 12 thousands do we have? None



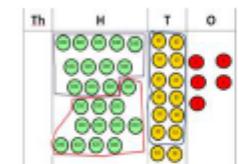
Exchange 2 thousand for 20 hundreds.



$$\begin{array}{r} 02 \\ 12 \overline{)2544} \\ \underline{24} \\ 1 \end{array}$$

How many groups of 12 are in 25 hundreds? 2 groups. Circle them.

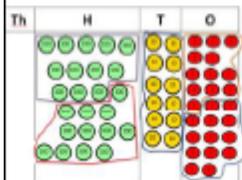
We have grouped 24 hundreds so can take them off and we are left with one.



$$\begin{array}{r} 021 \\ 12 \overline{)2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 2 \end{array}$$

Exchange the one hundred for ten tens so now we have 14 tens. How many

groups of 12 are in 14? 1 remainder 2.



Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2

Pictorial

Children to represent the counters pictorially and record the subtractions beneath.

Abstract

$$12 \overline{)2544}^0$$

Step one- exchange 2 thousand for 20 hundreds so we now have 25 hundreds.

$$12 \overline{)2544}^{02}$$

Step two- How many groups of 12 can I make with 25 hundreds? The 24 shows the hundreds we have grouped. The one is how many hundreds we have left.

$$12 \overline{)2544}^{021}$$

Exchange the one hundred for 10 tens. How many groups of 12 can I make with 14 tens? The 14 shows how many tens I have, the 12 is how many I grouped and the 2 is how many tens I have left.

$$12 \overline{)2544}^{0212}$$

Exchange the 2 tens for 20 ones. The 24 is how many ones I have grouped and the 0 is what I have left.