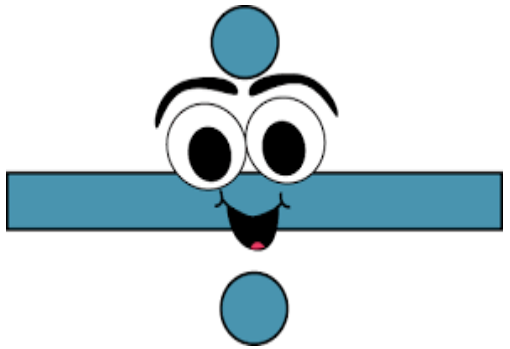
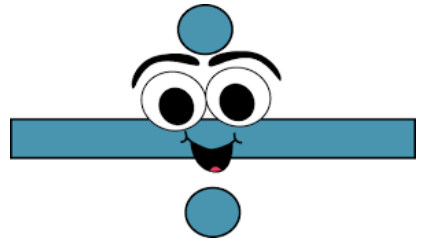
Maths Learning Cafe

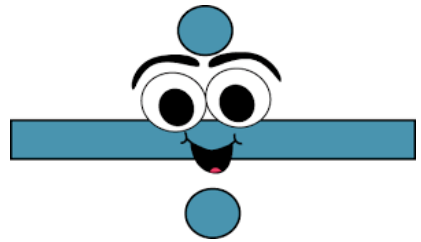
Division



Of the four operations, division is the most troublesome for young students. Full understanding of division tends to lag well behind the other operations.



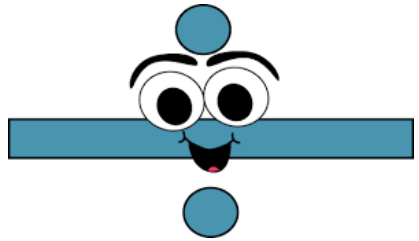
For many children opportunities to explore the concept with concrete materials are restricted well before they perceive the relationships between division and the other operations.

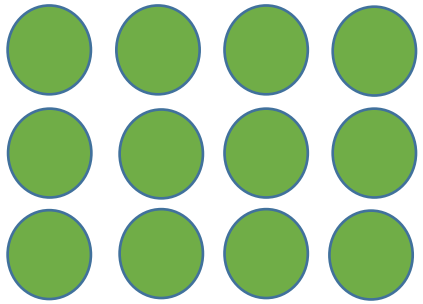


One such relationship, the inverse relationship between division and multiplication, can be effectively illustrated using arrays.

The 56+ Club is based on this inverse relationship

You can help!

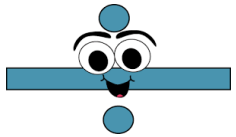


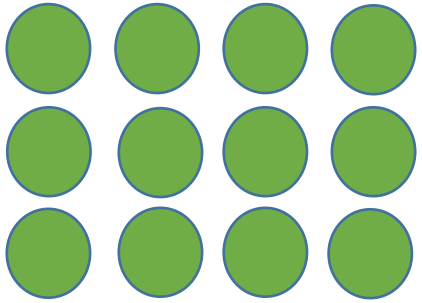


For example; 3×5=15 or 3 rows of 5 make 15, can be represented by this array.

Looking at the array differently reveals the inverse, that is 15÷3=5 or 15 put into 3 rows makes 5 columns - or 5 in each row.

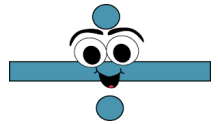
Language plays an important role in being able to express the mathematical relationships and the physical array supports this aspect of understanding by giving the children a concrete image to talk about.





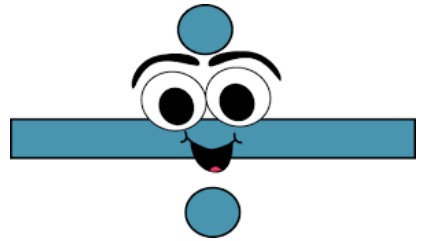
Placing the mathematics into a real-life context through word problems can facilitate both understanding of the relationship and its expression through words.

For example, "The gardener planted 3 rows of 5 seeds. How many seeds did she plant?" poses quite a different problem to "The gardener planted 15 seeds in 3 equal rows. How many seeds in each row?" yet both these word problems can be modelled using the same array.



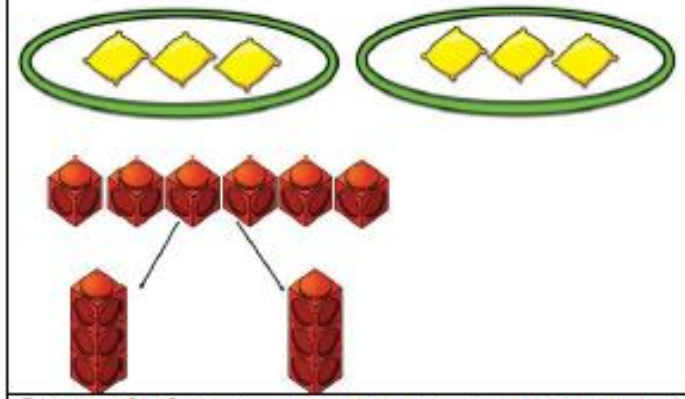
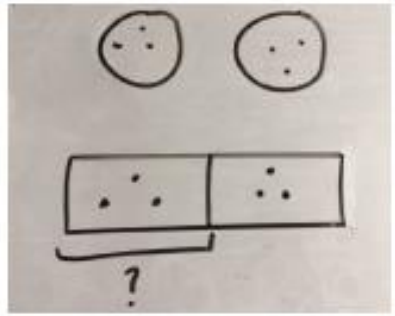
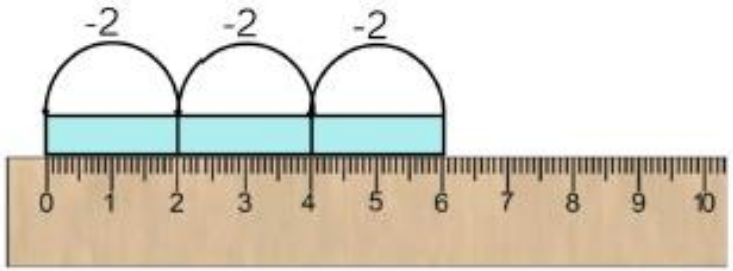
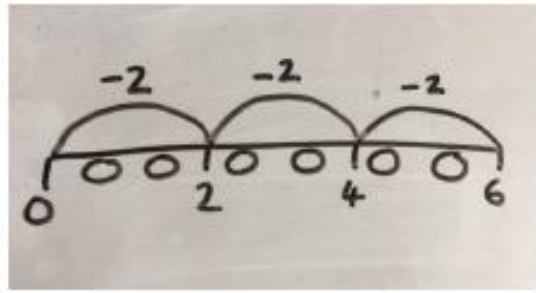
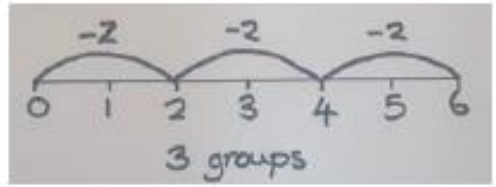
Coldfair Green Primary School Calculation Policy

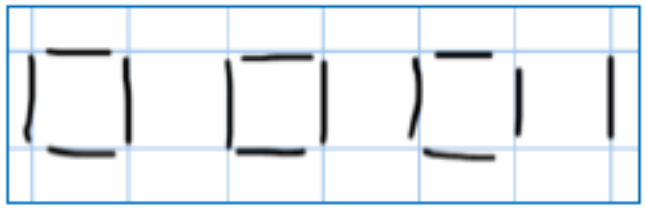
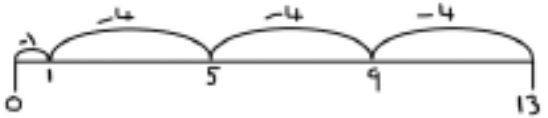
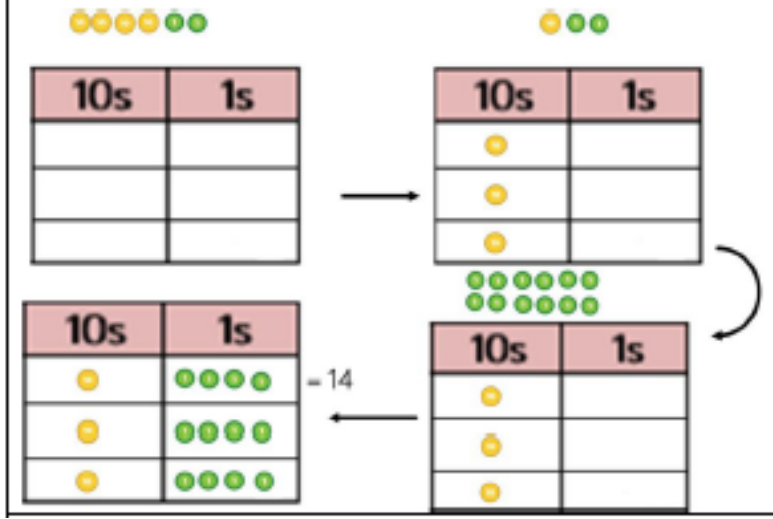
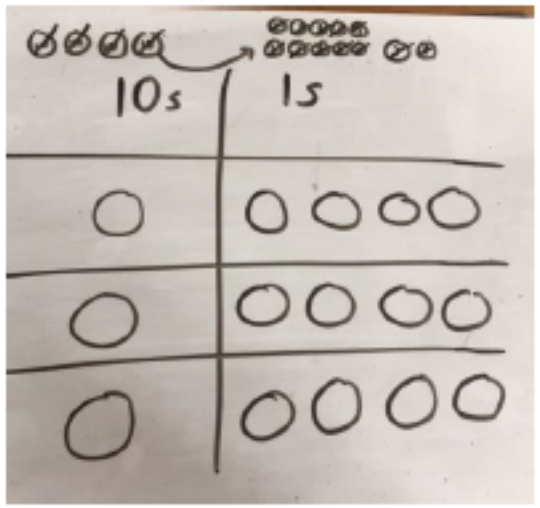
http://coldfairgreenprimaryschool.org/



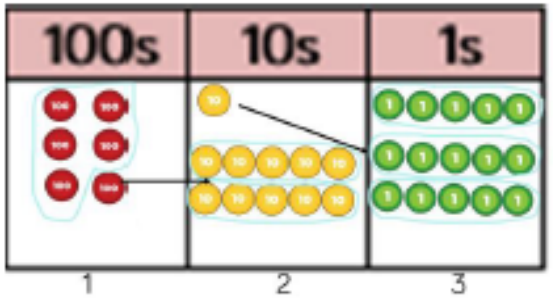
Calculation policy: Division

Key language: share, group, divide, divided by, half.

Concrete	Pictorial	Abstract
Sharing using a range of objects. 6 ÷ 2 	Represent the sharing pictorially. 	6 ÷ 2 = 3  Children should also be encouraged to use their 2 times tables facts.
Repeated subtraction using Cuisenaire rods above a ruler. 6 ÷ 2  3 groups of 2	Children to represent repeated subtraction pictorially. 	Abstract number line to represent the equal groups that have been subtracted. 

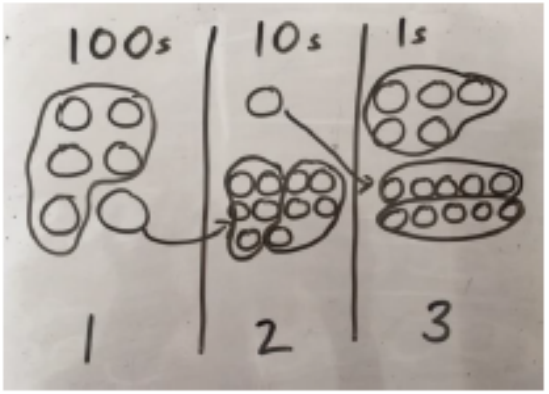
2d ÷ 1d with remainders using lollipop sticks. Cuisenaire rods, above a ruler can also be used. 13 ÷ 4 Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.  There are 3 whole squares, with 1 left over.	Children to represent the lollipop sticks pictorially.  There are 3 whole squares, with 1 left over.	13 ÷ 4 = 3 remainder 1 Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line. '3 groups of 4, with 1 left over' 
Sharing using place value counters. 42 ÷ 3 = 14 	Children to represent the place value counters pictorially. 	Children to be able to make sense of the place value counters and write calculations to show the process. 42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14

Short division using place value counters to group.
615 ÷ 5



1. Make 615 with place value counters.
2. How many groups of 5 hundreds can you make with 6 hundred counters?
3. Exchange 1 hundred for 10 tens.
4. How many groups of 5 tens can you make with 11 ten counters?
5. Exchange 1 ten for 10 ones.
6. How many groups of 5 ones can you make with 15 ones?

Represent the place value counters pictorially.

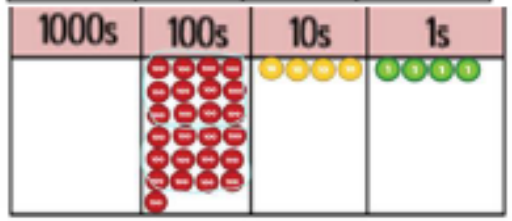


Children to the calculation using the short division scaffold.

$$5\overline{)615}$$

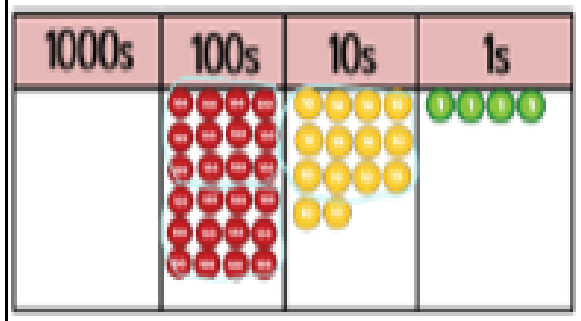
Long division using place value counters
2544 ÷ 12

We can't group 2 thousands into groups of 12 so will exchange them.



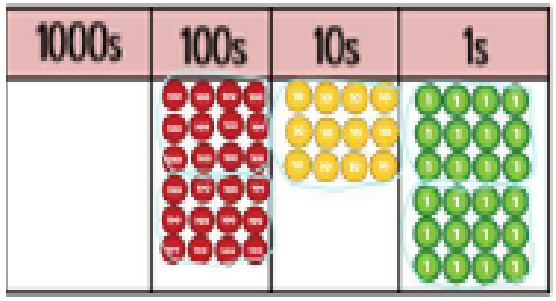
We can group 24 hundreds into groups of 12 which leaves with 1 hundred.

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



After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens.

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

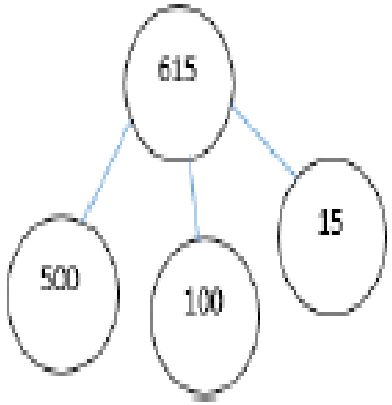


After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 group of 12, which leaves no remainder.

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

Conceptual variation; different ways to ask children to solve 615 ÷ 5

Using the part whole model below, how can you divide 615 by 5 without using short division?



I have £615 and share it equally between 5 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?

$$5\overline{)615}$$

615 ÷ 5 =

□ = 615 ÷ 5

What is the calculation?
What is the answer?