WHITCHURCH
COMBINED SCHOOL

Multiplication and Division

A guide for parents

The initial methods taught within multiplication and division often feel “alien” to many parents. If you remember back to our addition and subtraction evening the main focus all the way through the school is an understanding of place value and the size of a number. This holds true for multiplication and division and why you will see the children partitioning numbers in order to complete calculations

Times tables

A sound knowledge of all the tables and the related division facts is essential for the children to feel comfortable with numbers. Once they know their tables they begin to recognise numbers; see patterns and relationships between numbers much more readily, which gives them an enormous level of confidence.

Remember they only have to learn half of their tables to know them all and children love this element of “cheating”, when in fact it just reinforces the link between numbers and their factors.

Let them into a secret

Once you know the 2 times table, which is only double the 1 times, then the 4 times is easy because you just double the 2 times. Then you can double the 4 times to get the 8 times. The 3 times doubles to the 6 times and 12 times, the ten times can be halved to give 5 times and so on. This uses the knowledge children are developing through addition and subtraction and makes important connections for them.

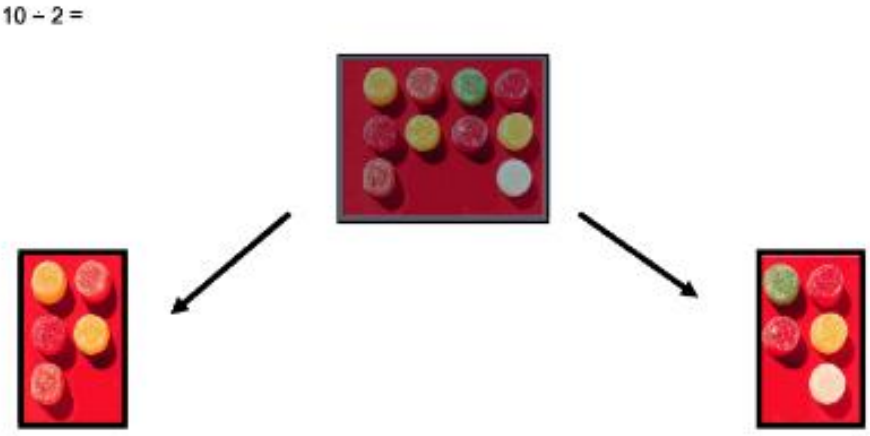
It’s also possible that you weren’t told that you knew your **division tables**. If you were shown that division was the opposite of multiplication you will understand that knowing 3x4=12 or 4x3=12 also means you know 12÷4=3 and 12÷3=4. So knowing one number fact, like 3x4=12, immediately means we know at least four.

Fun Multiplication games

http://www.familylearning.org.uk/multiplication_games.html

Reception

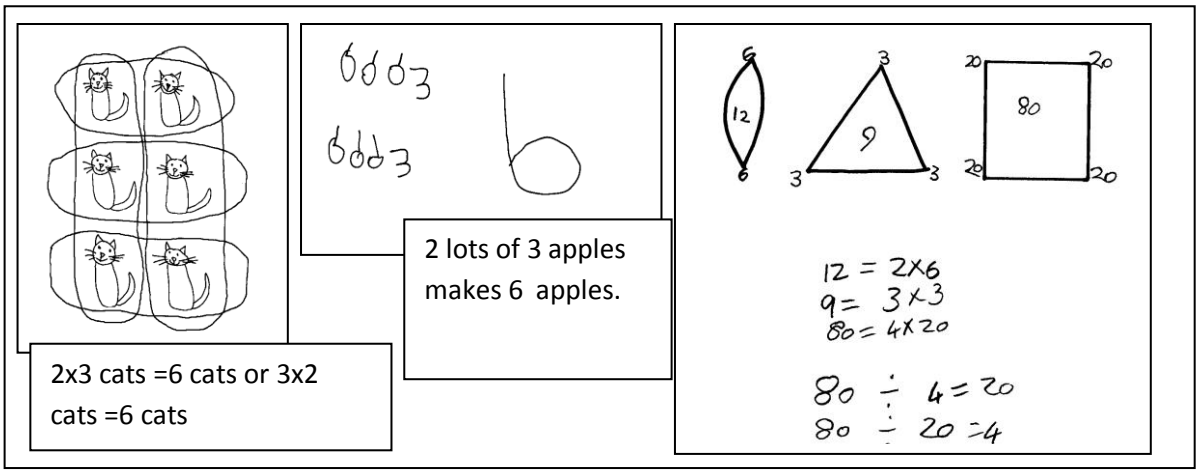
The early practical work children do in this area will introduce them to the ideas of multiplication and division. They will gain experience of doubling and sharing. Children will understand equal groups and share items out in play and problem solving



Year 1

Multiplication

In year 1 the children will be counting in different patterns; helped to see how multiplication is repeated addition.Begin recording to demonstrate how they have done something and to show that they've understood what is happening.



Division

Children carry out practical tasks that involve sharing objects into equal groups to solve problems. They will count in 2s and 10s and later in 5s.

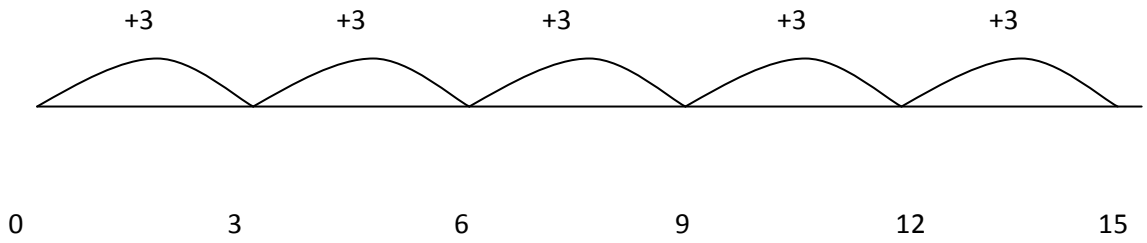
Year 2

Multiplication

- Understand multiplication as repeated addition
- Know by heart the multiplication and division facts for the 10, 5 and 2 tables

In Year 2 they build on the recorded work in Year 1 and then progress to recording the repeated addition on a number line.

3 x 5 = 3 + 3 + 3 + 3 + 3



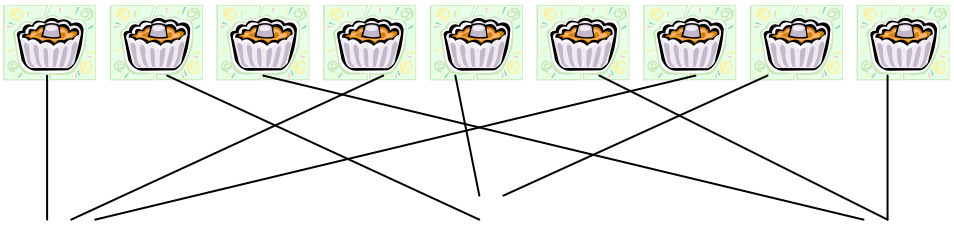
So, 3 x 5 = 15

Division

In year two the children are introduced to the division sign ÷ and that it can mean sharing or grouping. The word problems below demonstrate a sharing and a grouping problem.

Sharing

The tray had 9 cakes in and they were shared out between Jamie, Kelly and Tony. Each child had the same number of cakes. How many did they have each?



So, 9 ÷ 3 = 3

Grouping

The apples need putting into bags with 5 apples in each bag. Julie has 15 apples. How many bags will she need?

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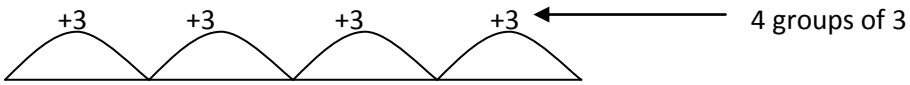
So, 15 ÷ 5 = 3

There is more of a focus on the grouping concept as this leads into the methods for working out division calculations later in the school and it shows how division is the inverse of multiplication. Once the children have had practical experience of grouping they will begin to work out how many groups of a number there are using a number line.

12 ÷ 3



0 3 6 9 12

So, 12 ÷ 3 = 4

Year 3

Multiplication

- Mental methods using partitioning 38x7=(30x8)+(8x7)
- Introduction of grid layout to show expanded working out

The end of year expectation is that children know from memory the multiplication facts in the 2,3,4,5,6,8 and 10 times tables and can derive the associated division facts

In year 3 the children will begin to use expanded methods to help them deal with calculations that they can't do in their heads. At this stage it will mostly involve multiplying and dividing 2 digit numbers by a single digit (32 x6 or 72÷4).

The expanded method for multiplying is often called the grid method. It uses the mental skills and the knowledge children have been learning and will help most children to move, with understanding, to the 'compact' method you may know.

This chart shows 'the grid method'. You can see, as with addition and subtraction expanded methods, it uses knowledge of number facts and the idea of splitting a number into its parts (place value) to help understanding of the process.

How many sweets do I need for 24 party bags if each is to have 6 sweets?

x	20	4	
6	120	24	= 144 sweets

You will see the 24 has been split into 20 and 4, each has been multiplied by 6 mentally and the two numbers added to give the final total. Many children will eventually develop the ability to do this kind of calculation totally in their heads.

Here is a slightly more difficult example.

How much does it cost if I buy 9 books at 72p each?

x	70	2	
9	630	18	= 648

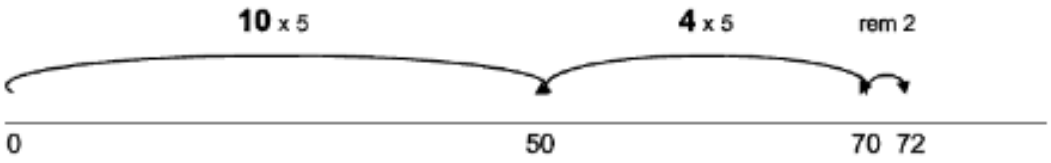
It costs 648p or £6.48

Division

The expanded method for division is often called 'chunking' and really just involves partitioning the number into helpful 'chunks' related to the number you are dividing by (divisor) or counting on/taking away chunks of the same size until you run out. It uses the fact that division is repeated subtraction of the same size group. So 20÷4=5 involves subtracting 4s from 20 until it's been used up or counting on in fours until you reach 20. You can do this 5 times.

72 ÷ 5 =

To solve this, children may jump in *multiples* of 5 using knowledge of the 5 times tables:



The answer is therefore 10 + 4 = 14 remainder 2

Here is a more difficult example showing how larger chunks are used to speed up the process. Again this method uses and builds on the ideas explained earlier.

72 pears are packed in boxes of 6. How many boxes would there be?

First partition the 72 into chunks related to multiples of the divisor

72 = 60 + 12

then divide each part by 6

60 ÷ 6 = 10

12 ÷ 6 = 2

then add the 10 and the 2 to get 12

Year 4

Multiplication

- Grid method extended to bigger numbers
- The end of year expectation is that children know from memory the multiplication facts in the 2,3,4,5,6,7,8,9 and 10 times tables and can derive the associated division facts

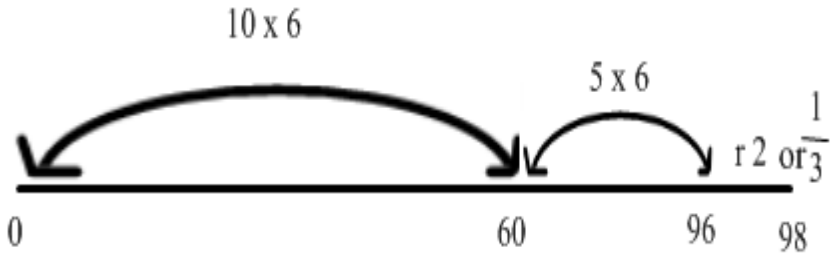
To calculate 56 X 27 using the grid method allows children to calculate in manageable chunks and keep a sense of place value.

x	50	6	
20	1000	120	1120
7	350	42	392
			1512

Division

Year 4 develops the chunking method in year3 and the children move on to showing remainders in a variety of ways.

Eg. 98÷ 6 (how many 6s in 98?)



As the children become more confident at using the number line for division, they can move on to vertical chunking (in effect turning the number line on its side).

In this method the child takes away 'chunks' of the number we are dividing by until we can go no further. The size of the chunks will grow as the child becomes more confident with their tables; as the chunks get larger the length of the calculation shortens.

	7	2	pears	
-	6	0	that's **10** x 6	or**10** boxes
	1	2	left	
-	1	2	that's **2** x 6	or **2** boxes
		0	left	= **12** boxes

Year 5

Multiplication

- Grid method extended to bigger numbers and decimals
- Introduction of vertical format linked to grid method
- Most children will be expected to multiply 3 digits x 1 digit and 3 digits x 2 digits using a written method.

How many hours are there in the year 2013?

This means we have to do 365x24…a calculation you may find quite hard. Here it is expanded and using lots of mental skills…but none of them difficult.

x	300	60	5	
20	6000	1200	100	= 7300
4	1200	240	20	= 1460

So 20x365= 7300

4x365= 1460

giving a total of 8760 hours with no difficult calculation to do.

When they are confident children can progress onto a compact multiplication method.

```
  38
 x7
 56
210
266
```

Children should describe what they do by referring to the actual values of the digits in the columns. For example, the first step in 38 × 7 is eight times seven and then 'thirty multiplied by seven', not 'three times seven', although the relationship 3 × 7 can be discussed.

Division

In year 5 the children tackle more complex division involving dividing 3 digit numbers by a 1 digit number and 3 digit numbers by a 2 digit number. With division, as with all calculation, it's important to think about what the actual problem is asking when you come to give an answer. This is shown up in the second example of expanded division or chunking involving buses for a school trip

458 stickers are shared between 3 children. How many does each get?

4 5 8	
__ 3 0 0	that's **100** x3
1 5 8	left
__ 1 5 0	that's **50** x3
8	left
__ 6	that's **2** x3
2	left over

So each gets **100+50+2** or 152 stickers with 2 left over.

458 ÷ 3 = 152 remainder 2

432 children and adults are going on a school trip. If each bus takes 30 people how many are needed?

	4	3	2	people going
−	3	0	0	that's **10** x30
	1	3	2	left
−	1	2	0	that's **4** x30
		1	2	left

or**10** buses
or **4** buses
1 bus

So we see that the calculation would result in

$432 \div 30 = 14$ remainder 12

This is not a good answer for this question because the 12 people left over would need another bus or they couldn't go!

So we see that 15 buses are needed…or some cars.

Year 6

Multiplication

- Consolidation of grid method
- Contracted vertical multiplication

Once the children are confident and accurate in multiplying using the compact method it can be further reduced, with digits recorded below the line.
However, if after practice, children cannot use the compact method without making errors, they should return to the expanded format of the grid method .

The recording is reduced further, with carry digits recorded below the line.
38 x7 =

38

x 7

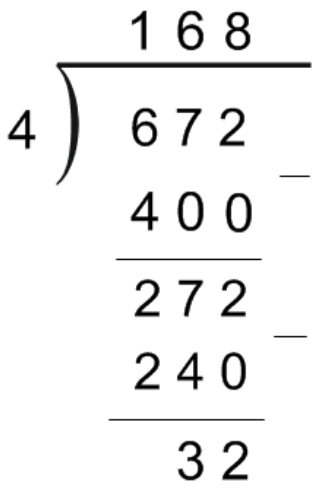
266

5

Division

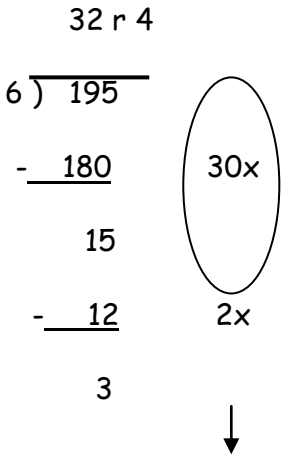
As with multiplication, the children should continue to use the method that enables them to tackle more complex questions accurately .As their confidence grows they will naturally use short division on a regular basis.

Short division HTU ÷ U



In year 6 the children would be expected to show answers with decimal and fraction remainders.

195 ÷ 6



Answer : 32 remainder 3 or 32 $\frac{1}{2}$ or 32.5

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