



## Oakmeadow Primary School Calculation Policy

### Division

#### Year 3

##### Basic to subject specific (Beck's Tiers):

group in pairs, 3s ... 10s etc, equal groups of, divide,  $\div$ , divided by, divided into, remainder, inverse, divisor, dividend quotient.



##### Generalisations

- Noticing how counting in multiples of 2, 5 and 10 relates to the number of groups you have counted (introducing times tables)
- An understanding of the more you share between, the less each person will get (e.g. would you prefer to share these grapes between 2 people or 3 people? Why?)
- Secure understanding of grouping means you count the number of groups you have made. Whereas sharing means you count the number of objects in each group.
- Inverses and related facts – develop fluency in finding related multiplication and division facts.
- Develop the knowledge that the inverse relationship can be used as a checking method.

##### Some Key Questions

How many 10s can you subtract from 60?

I think of a number and double it. My answer is 8. What was my number?

If  $12 \times 2 = 24$ , what is  $24 \div 2$ ?

Questions in the context of money and measures (e.g. how many 10p coins do I need to have 60p? How many 100ml cups will I need to reach 600ml?) Questions in the context of money and measures that involve remainders (e.g. How many lengths of 10cm can I cut from 81cm of string? You have £54. How many £10 teddies can you buy?)

What is the missing number?  $17 = 5 \times 3 + \underline{\quad}$   
 $\underline{\quad} = 2 \times 8 + 1$

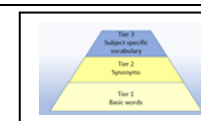
**NC 2014:** Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.

#### Year 4

##### Basic to subject specific (Beck's Tiers):

see years 1-3

divide, divided by, divisible by, divided into, share between, groups of, factor, factor pair, multiple, times as (big, long, wide ...etc), equals, remainder, quotient, divisor, inverse.



##### Generalisations

- True or false? Dividing by 10 is the same as dividing by 2 and then dividing by 5. Can you find any more rules like this?
- Is it sometimes, always or never true that  $\square \div \Delta = \Delta \div \square$ ?
- Inverses and deriving facts. 'Know one, get lots free!' e.g.:  $2 \times 3 = 6$ , so  $3 \times 2 = 6$ ,  $6 \div 2 = 3$ ,  $60 \div 20 = 3$ ,  $600 \div 3 = 200$  etc.
- Sometimes, always, never true questions about multiples and divisibility. (When looking at the examples on this page, remember that they may not be 'always true'!) E.g.:

Multiples of 5 end in 0 or 5.

The digital root of a multiple of 3 will be 3, 6 or 9.

The sum of 4 even numbers is divisible by 4.

**NC 2014 :** Use place value, known and derived facts to multiply and divide mentally, including: dividing by 1;  
 Recognise and use factor pairs and commutativity in mental calculations.



## Oakmeadow Primary School Calculation Policy

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.

### **Mental Strategies**

Children should count regularly, on and back, in steps of 3, 4 and 8. Children are encouraged to use what they know about known times table facts to work out other times tables.

This then helps them to make new connections (e.g. through doubling they make connections between the 2, 4 and 8 times tables).

Children will make use multiplication and division facts they know to make links with other facts.

$$3 \times 2 = 6, 6 \div 3 = 2, 2 = 6 \div 3$$

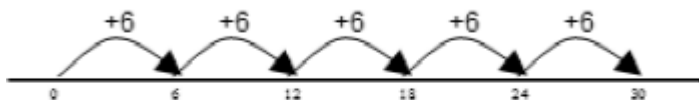
$$30 \times 2 = 60, 60 \div 3 = 20, 2 = 60 \div 30$$

They should be given opportunities to solve grouping and sharing problems practically (including where there is a remainder but the answer needs to be given as a whole number) e.g. Pencils are sold in packs of 10. How many packs will I need to buy for 24 children?

Grouping

How many 6's are in 30?

$30 \div 6$  can be modelled as:



Becoming more efficient using a numberline

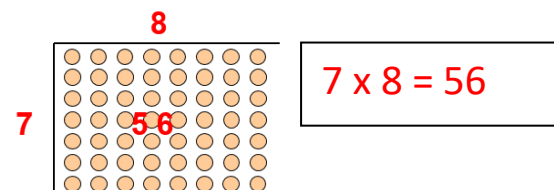
### **Mental Strategies**

Children should experience regular counting on and back from different numbers in multiples of 6, 7, 9, 25 and 1000.

Children should learn the multiplication facts to  $12 \times 12$ .

### **Towards a formal written method**

Alongside pictorial representations and the use of models and images, children should progress onto short division using a bus stop method.



Place value counters can be used to support children apply their knowledge of grouping. Reference should be made to the value of each digit in the dividend.

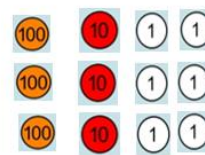
### **Each digit as a multiple of the divisor**

'How many groups of 3 are there in the hundreds column?'

'How many groups of 3 are there in the tens column?'

'How many groups of 3 are there in the units/ones column?'

$$\begin{array}{r} 112 \\ 3 \overline{) 336} \\ \underline{336} \\ 0 \end{array}$$





## Oakmeadow Primary School Calculation Policy

Children need to be able to partition the dividend in different ways.

$$48 \div 4 = 12$$



### Remainders

$$49 \div 4 = 12 \text{ r}1$$



Sharing – 49 shared between 4. How many left over?  
Grouping – How many 4s make 49. How many are left over?

### Rearranging the dividend.

Use denaries to build dividends that can be rearranged into multiples of the divisor.

$$48 \div 3 =$$

'What do I know about 3 x tables?'

"I know  $3 \times 10 = 30$ ."

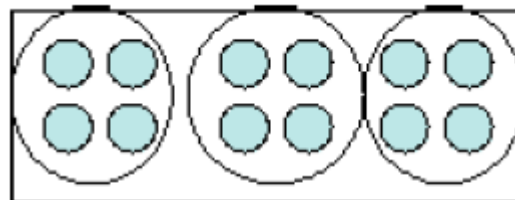
$$\begin{array}{r} 30 \\ \downarrow \\ 10 \end{array} \quad \begin{array}{r} 18 \\ \downarrow \\ 6 \end{array}$$

$$48 \div 3 = 16$$

$$10 \times 3 = 30$$

$$6 \times 3 = 18$$

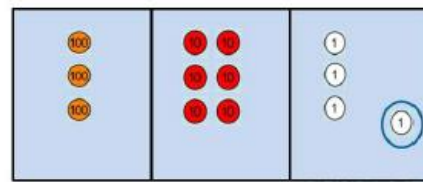
Children can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.



Encourage them to move towards counting in multiples to divide more efficiently.

$$364 \div 3 =$$

$$\begin{array}{r} 121 \text{ rem } 1 \\ 3 \overline{) 364} \end{array}$$



When children have conceptual understanding and fluency using the bus stop method without remainders, they can then progress onto 'carrying' their remainder across to the next digit.

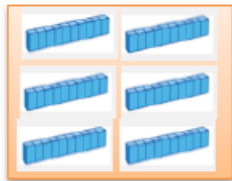
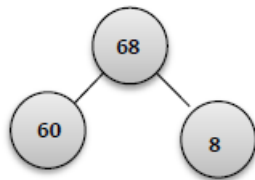
Short division to be modelled for understanding using place value counters as shown below. Calculations with 2 and 3-digit dividends. Language of grouping to be used.



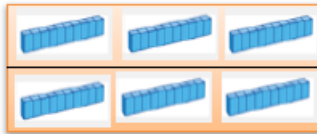
# Oakmeadow Primary School Calculation Policy



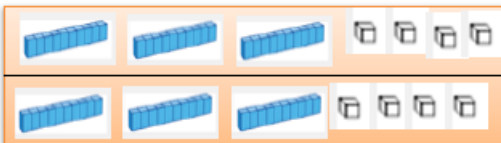
$$68 \div 2 =$$



$$6 \text{ tens} \div 2 = 30$$

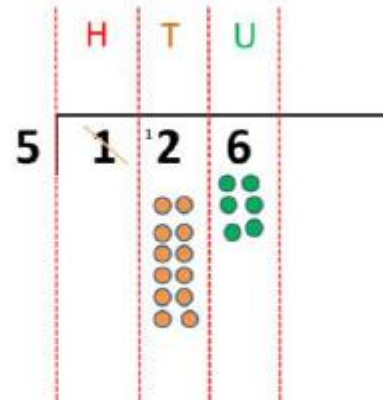


$$8 \text{ ones} \div 2 =$$



34

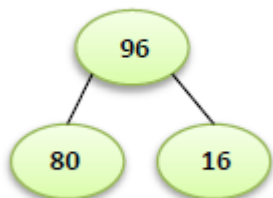
$$68 \div 2 = 30 + 4 = 34$$





## Oakmeadow Primary School Calculation Policy

$$96 \div 8 = 12$$



$$8 \text{ tens} \div 8 = 1 \text{ ten}$$

$$16 \text{ ones} \div 8 = 2 \text{ ones}$$

Children should be given the opportunity to further develop understanding of division (sharing) to be used to find a fraction of a quantity or measure.

|                     |                                                                             |                        |                                                                             |                                    |
|---------------------|-----------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------|------------------------------------|
| Known facts         | Recall and use $\times$ and $\div$ facts for the 3, 4 and 8 $\times$ tables |                        | Recall $\times$ and $\div$ facts for $\times$ tables up to $12 \times 12$ . |                                    |
| Essential knowledge | Review 2x, 5x and 10x                                                       | Double 2 digit numbers | 4x and 8x tables                                                            | 10x bigger                         |
|                     | 4x table                                                                    | 3x table               | 3x, 6x and 12x tables                                                       | Double larger numbers and decimals |
|                     | 8 x table                                                                   | 6x table               | 3x and 9x tables                                                            | 11x and 7x tables                  |