

Templefield Lower School



KS1 Maths Workshop

Helping our children to achieve and enjoy
maths.

Aims

- To give children the chance to **explore** ways of finding an answer, and being able to **explain** why it works
- To give them the **key skills** needed to solve **real world** problems and examples
- To provide opportunities to **apply** these skills in practical situations

Developing understanding

- Prompting thinking & questioning
- Providing opportunities to manipulate, experience and see (use of resources and CPA – concrete , pictorial, abstract)
- Develop thinking through investigation
- Reasoning and making connections
- Engaging in talk
- Enabling learning through drawing attention to.
- Encouraging children to make links and generalise

White Rose

Year 1 Overview of Maths

	1	2	3	4	5	6	7	8	9	10	11	12
AUTUMN	NUMBER PLACE VALUE (WITHIN 10)					NUMBER ADDITION AND SUBTRACTION (WITHIN 10)					GEOMETRY - SHAPE	CONSOLIDATION
SPRING	NUMBER PLACE VALUE (WITHIN 20)			NUMBER – ADDITION AND SUBTRACTION (WITHIN 20)			NUMBER PLACE VALUE (WITHIN 50)		MEASUREMENT LENGTH AND HEIGHT		MEASUREMENT MASS AND VOLUME	
SUMMER	NUMBER MULTIPLICATION AND DIVISION			NUMBER FRACTIONS		GEOMETRY POSITION AND DIRECTION	NUMBER PLACE VALUE (WITHIN 100)		MEASUREMENT (MONEY)	MEASUREMENT TIME		CONSOLIDATION

White Rose

Year 2 Maths overview

	1	2	3	4	5	6	7	8	9	10	11	12
AUTUMN	NUMBER PLACE VALUE				NUMBER ADDITION AND SUBTRACTION					GEOMETRY SHAPE		
SPRING	MEASUREMENT MONEY	NUMBER MULTIPLICATION AND DIVISION				MEASUREMENT LENGTH	MEASUREMENT MASS, CAPACITY, TEMPERATURE		NUMBER FRACTIONS			
SUMMER	MEASUREMENT TIME	STATISTICS DATA	GEOMETRY POSITION AND DIRECTION	REVISION	SATS	CONSOLIDATION		PROBLEM SOLVING	CONSOLIDATION			

NUMBER EARLY LEARNING GOAL

Children at the expected level of development will:

- **Have a deep understanding of number to 10, including the composition of each number;**
- **Subitise (recognise quantities without counting) up to 5.**
- **Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.**

KS1 Mental Arithmetic

The emphasis in KS1 is on mental arithmetic **BUT** based on practical activities. Useful things to practise at home include:

- Doubles and halves
- Bonds of 10, 20 and 100
- Adding 2 small numbers
- Adding or subtracting
- Using different vocabulary



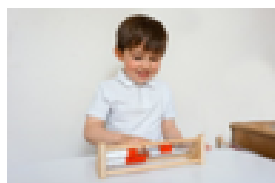
Mastering number sessions

- Mastering Number is designed to help children in EYFS, Year 1 and Year 2 to embed good number sense including fluency and flexibility with number facts
- <https://wymathshub.co.uk/work-groups/early-years-primary-projects/mastering-number-2/>
- It's important for children to be able automatically recall number facts

Mastering Number sessions

- Subitise – instantly recognising the amount
- Composition of number – (Numberblocks in reception, what a number can be made from)
- Variation – arrangements and compositions of numbers in different ways
- Representation and structure – how we can represent numbers concrete and pictorially
- Mathematical talk – use of stem sentences

Mastering Number – School Overview at Templefield Lower



At Templefield Lower School, we are actively participating in the NCETM's Mastering Number Work Group through our local Enigma Reception teacher leader: Hannah Bollow,
Year 1 teacher leader: Dawn Drake
Year 2 teacher leader: Ann Coward
Maths subject leader: Carol Smithers

Over time, through participating in Mastering Number sessions, our children will:

- Develop fluency in calculation and a flexibility with number that exemplifies good number sense.
- Be able to clearly communicate their mathematical ideas.
- Make good progress towards the Early Learning Goals and Key Stage 1 year group expectations.
- Demonstrate a willingness to 'have a go.'

Features of Mastering Number sessions:

Our Mastering Number sessions...

- Are inclusive with all children securing learning linked to the same concepts in an interactive and engaging manner.
- Are about accessible learning which enables all children to have a firm understanding.
- Enable all children to develop number sense and secure core knowledge. This is similar to supporting pupils with phonics knowledge!

For all of our children to develop depth in understanding, we want them to...

- Become mathematically observant.
- Look for relationships between numbers.
- Explain their mathematical thinking.

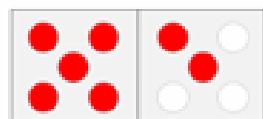
What you will see in some of our Mastering Number sessions:

- Activities which are accessible and enable all children to become more confident and competent.
- Children being supported to acquire key facts and skills they can use efficiently, including in their other maths learning and/or lessons.
- Quick finishers working on related/connected facts rather than additional 'challenge' activities. This does not mean that our children are not challenged! They are focussed on the key learning.



Don't count.

Say the amount.



7 is made of 5 and 2



Principles underpinning Mastering Number at our school:

- Developing fluency makes more children better able to access the maths learning in their main lessons.
We do this by making connections between Mastering Number sessions and main lessons.
- Developing children's mindsets to look for mathematical relationships supports them with being able to make connections.
We do this by drawing pupils' attention to the relationships between numbers, so that they can also connect them with prior learning where it has taken place.
- Building confidence enables more children to make progress.
We do this by focussing on enabling all pupils to really understand small steps in learning.

Our Mastering Number sessions are organised with particular impacts in mind:

- A daily input of 10-15 minutes in addition to and to complement daily maths lessons – four times a week – to children in Year 1 and Year 2.
- Adults drawing children's attention to intended aspects of learning, including in relation to particular mathematical structures.
This enables us to ensure children think deeply about the mathematics they are using.
- Adults scaffolding learning, including through use of different manipulatives, to help children secure understanding.
This enables pupils to develop a more secure understanding of core mathematical structures. Seeing the same concept alongside different manipulatives and pictorial representations often leads to children making their own connections, thus deepening understanding.
- Conceptual variation – transferring understanding of the same mathematical concept through use of different contexts.
When children transfer their learning through use of well thought out contexts that are varied, they become confident and make connections in learning.
- Linking the action and the thought – manipulatives secure understanding but are then visualised over time.
When children have enough experience of using manipulatives and seeing pictorial representations, they then begin to visualise them.



Written Methods



for larger numbers, or too many numbers to deal with mentally

When?

Why?

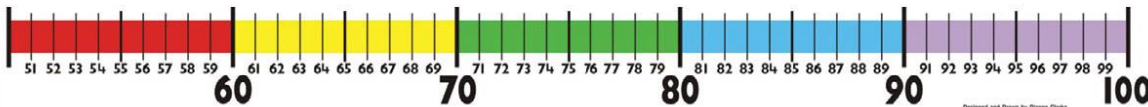
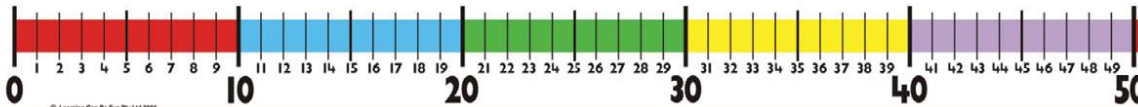
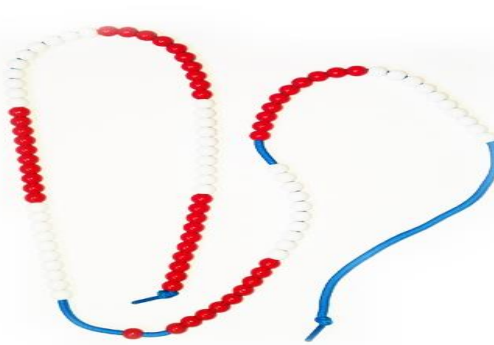
What?

How?

Where?

We will attempt to touch on as many written methods as we can in the time we have. Please stay at the end and ask if you are unsure or have any further questions.

Concrete resources to support understanding



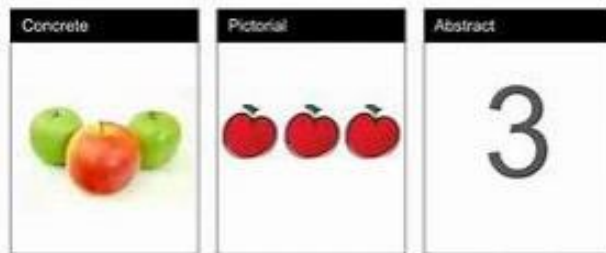
100 Square

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Concrete – Pictorial -Abstract

- Concrete - a 'hands on approach' using real objects such as apples, bears, dinosaurs, counters, discs, cubes etc.
- Pictorial - relating practical experiences to representations.
- Abstract - the symbolic stage - representing problems using mathematical notation.





Addition

Plus

- Counting on using objects
- Counting on using number line / tracks
- Counting on using a hundred square
- Blank number line (bridging)
- Partitioning

All together

Sum

More than

Total

Subtraction



- Counting back using objects
- Counting back using a number line
- Counting back using a hundred square
- Blank number line
- Partitioning

MINUS

SUBTRACT

LESS THAN

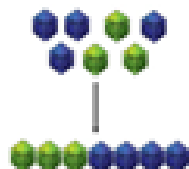
TAKE AWAY

FEWER THAN

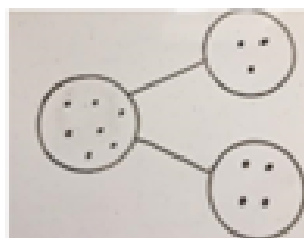
Addition - Year 1

Combining two parts to make a whole

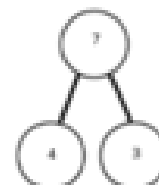
Concrete (use other resources too e.g. eggs, shells, teddy bears, cars).



Pictorial



Abstract



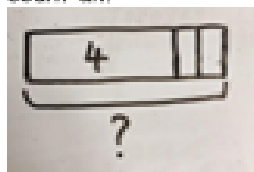
Counting on using a numberline

Concrete



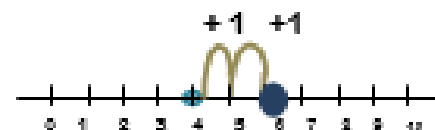
Pictorial

A bar model which encourages the children to count on, rather than count all.



Abstract

What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? $4 + 2$



Regrouping methods

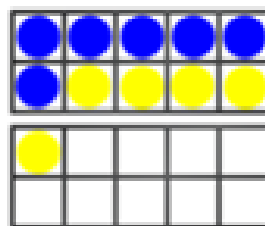
Concrete

Regrouping to make 10: using ten frames and counters/cubes or using Numicon.



Pictorial

Children to draw the ten frame and counters/cubes.



Abstract

Children to develop an understanding of equality e.g.

$$6 + \square = 11$$

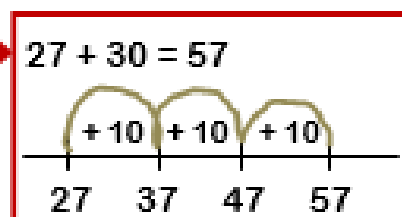
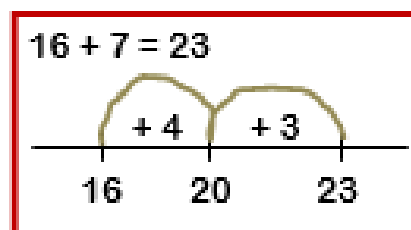
$$6 + 5 = 5 + \square$$

$$6 + 5 = \square + 4$$

Addition – Year 2

Children should explore and understand how to use blank number lines to add using their knowledge of place value and how to partition numbers in different ways. Once confident they should move onto written partitioning methods.

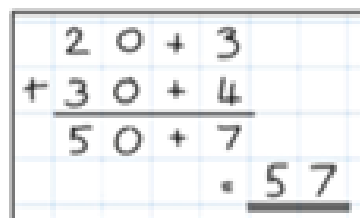
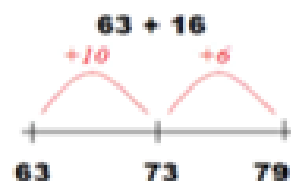
Counting on using Blank Number Line Method



Use empty number lines, concrete equipment, hundred squares etc. to build confidence and fluency in mental addition skills

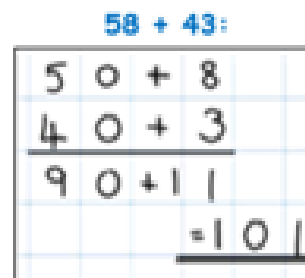
STEP 1

Add pairs of 2-digit numbers, moving to the partitioned column method when secure adding tens and ones: (Summer Term) $23 + 34$:



STEP 1: Only provide examples that do **NOT** cross the tens boundary until they are secure with the method itself.

STEP 2: Once children can add a multiple of ten to a 2-digit number mentally (e.g. $80+11$), they are ready for adding pairs of 2-digit numbers that DO cross the tens boundary (e.g. $58 + 43$).



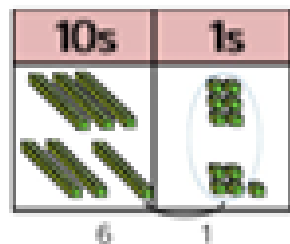
Children who are confident and accurate with this method can move on to using the exchange method with 2 digit numbers

Exchange Method

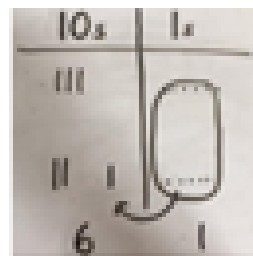
Continue to develop understanding of partitioning and place value with exchanging

Concrete

$$36 + 25$$



Pictorial



Abstract

$$36 + 25 =$$

30 + 20 = 50
5 + 5 = 10
50 + 10 + 1 = 61

1 5

Formal method:

$$\begin{array}{r} 36 \\ +25 \\ \hline 61 \\ \hline \end{array}$$

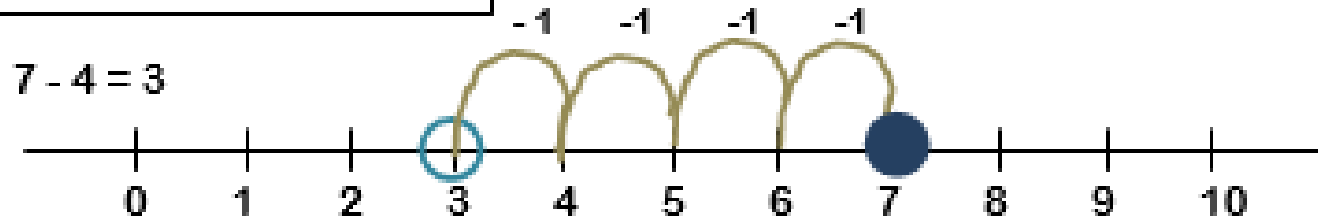
Subtraction – Year 1

In Year 1 children will use numbered number lines, objects and visual models to understand subtraction as taking away but also as the difference between or distance between two numbers.

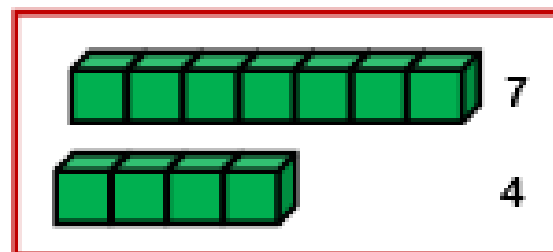
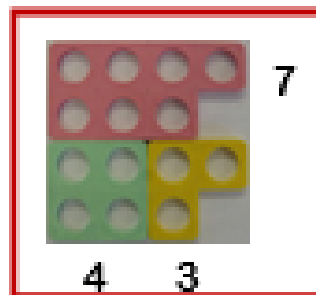
Numbered Number Line Method

For 7 take away 4, the child would start on the number line at 7 and count back 4 in ones. This would give them the answer 3.

Hundred squares, number tracks, counting, Numicon, objects and real life objects should all be used as well to explore subtraction in a variety of practical contexts.



To answer problems such as how many more is 7 than 4 or what is the difference between 7 and 4, cubes or Numicon should be made into rods so children can see the problem visually. This method can also be used to answer 'find the distance' problems.



Mental subtraction is equally important in year 1 and children should practice recalling subtraction facts up to and within 10 and 20. Children should also be taught about subtracting zero.

Subtraction – Year 2

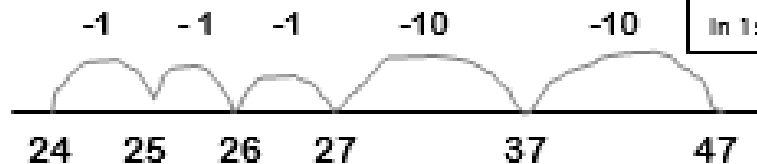
Focus: Subtracting with 2 digit numbers.

- I can complete subtraction calculations using a written method.
- I can solve subtraction calculations, mentally and using equipment eg objects or pictorial, with a 2 digit number and ones, 2 digit number and tens, two 2 digit numbers.

In year 2 children will start to use blank number lines to subtract by counting back using equipment initially if necessary. This will greatly support the development of mental subtraction skills.

Number Line Method

$$47 - 24 = 23$$

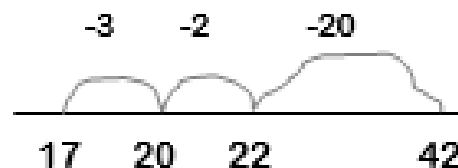


For $47 - 24 = 24$, children should start by partitioning the tens number and subtracting that first by counting back in tens. They will then subtract the ones number and subtract that by counting back in 1s.

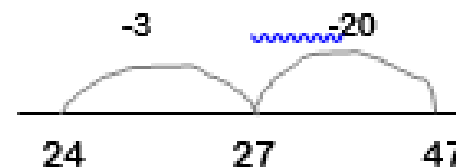
Once children develop their confidence of counting back they will be able to select more efficient jumps to solve a problem and will not have to partition the tens and ones numbers separately.

Once confident with efficient jumps, children are ready to subtract by bridging through 10. Again partitioning is very important here and the children will need to be very confident with partitioning in different ways.

$$42 - 25 = 17$$

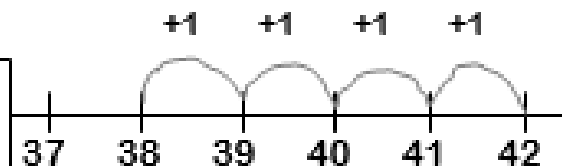


$$47 - 24 = 23$$



Counting on as a mental method

Counting on is a super mental method! It is especially useful for finding the difference problems and numbers that are close together. It is important that children understand that although they are



ADDITION : partitioning

- $36 + 45 = 30 + 40 + 6 + 5$
- $= 70 + 11$
- $= 81$
- Use of dienes blocks can support this.
- or
- $36 + 45 = 36 + 40 + 5$
- $= 76 + 5$
- $= 81$

Multiplication



- Doubles – objects / beadstring
- Counting in steps of 2,5,10
- Counting objects
- Pictures
- Number lines
- Times tables
- Arrays
- Grid method INTO YEAR 3

GROUPS OF

MULTIPLY

TIMES

LOTS OF

Multiplication – Year 1

Focus: Repeated addition with objects, arrays and pictorial representations.

- I can double numbers up to double 10 using resources.
- I can solve simple multiplication problems, with support, using concrete objects and pictorial representations.

In year one children will be exposed to many different multiplication based activities in a variety of contexts. Much of this will be repeated addition activities or be linked to counting in 2s, 5s or 10s.

Grouping Method

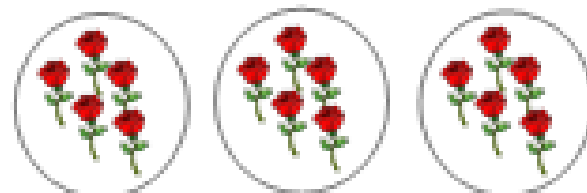
How many legs will 2 cats have?



$$4 + 4 = 8$$

Children use images and pictorial representations to solve simple problems that involve repeated addition. They may wish to use the picture to support or use other equipment. Adult support at this stage is to be expected. Some children may start to see the link between the problem below and counting in 5s and be able to use mental skills to solve the problem.

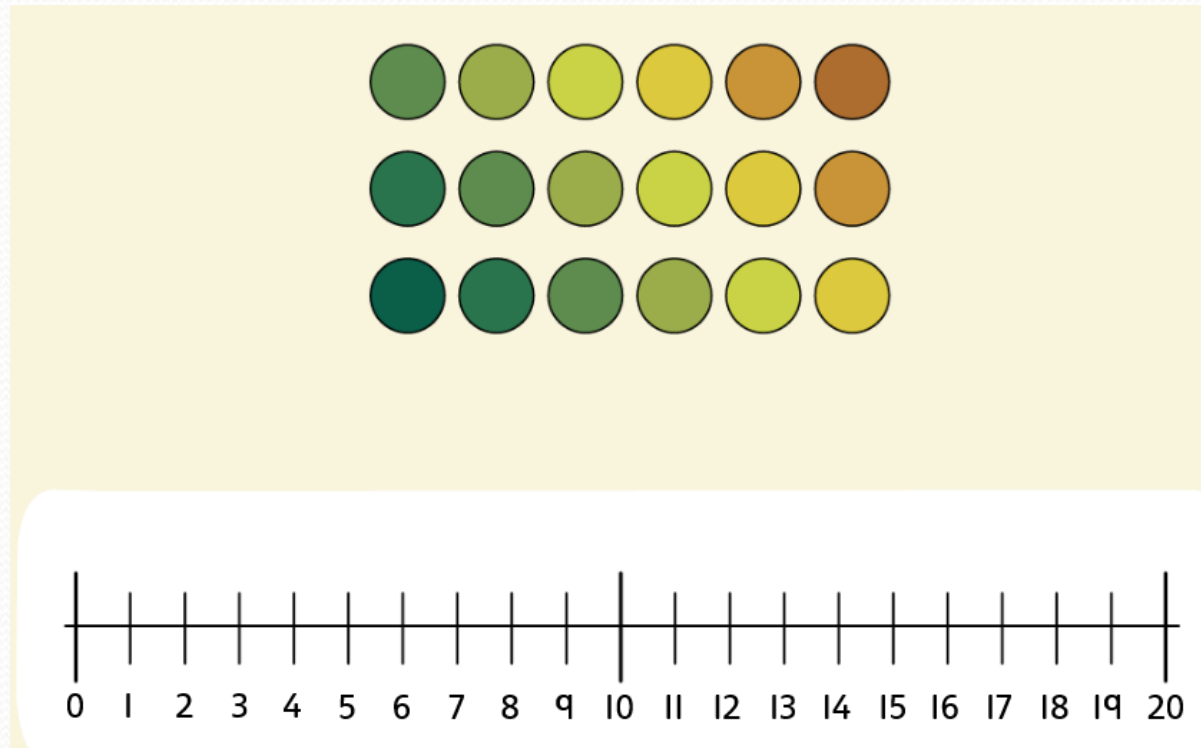
There are 5 roses in each garden. How many roses in 3 gardens?



$$5 + 5 + 5 = 15$$

Arrays and numberline

- Children represent by drawings, counters, cubes and begin to link to number line as **repeated addition**



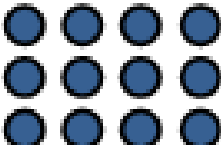
Multiplication – Year 2

Focus: Multiplying using arrays and repeated addition – 2, 3, 5 and 10 x tables fact.

- I can solve multiplication problems using arrays, repeated addition and multiplication facts.
- I can make number sentences using $\times$ and $=$ signs.
- I can explain how multiplication can be done in any order – commutative law.

In year 2 children will be aware of simple arrays and pictorial representations and understand what they mean. In year 2 children will develop knowledge of how to make their own arrays to solve a problem and also how repeated addition on a number line can get them to a solution.

Array Method



$4 \times 3 = 12$

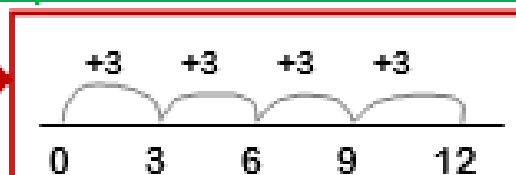
$3 \times 4 = 12$

$4 \times 3 = 4 + 4 + 4 = 12$

$3 \times 4 = 3 + 3 + 3 + 3 = 12$

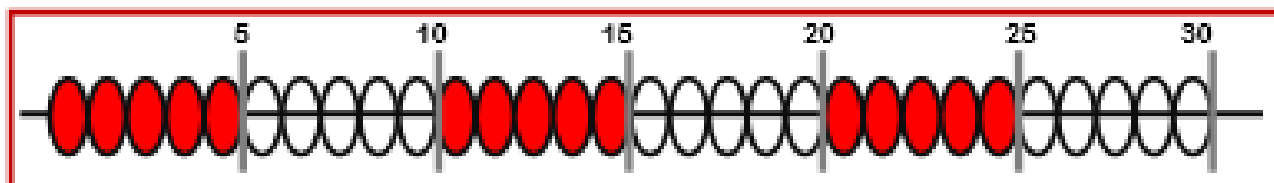
Arrays are super for children to solve the answer to simple problems. They are also great for showing children the commutative law, for example, if you turned this array for $3 \times 4 = 12$ sideways you would see that 4×3 also equals 12.

Repeated Addition on a Number Line



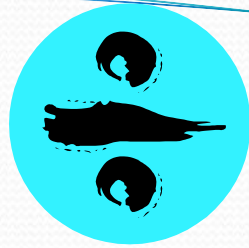
Repeated addition is a good progression from arrays. It encourages the children to use addition facts on a blank number line and count up to their answer as shown on the example above which models that $3 \times 4 = 12$.

Beadstring Method



Mental methods and practical apparatus are still very important at this stage. Visual images such as the bead string to the left that demonstrates $6 \times 5 = 30$. This will support children's visualization of multiplication and allow them to develop stronger mental skills.

Division



- Halving
- Sorting hoops and objects
- Pictures
- Related times tables facts

SHARE

GROUP

DIVIDE

Division – Year 1

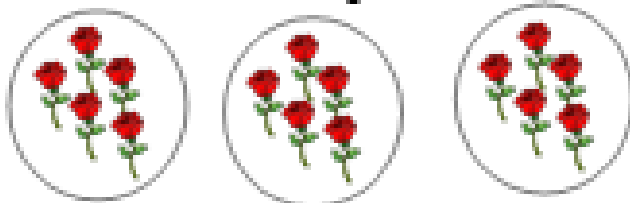
Focus: Grouping and sharing small quantities without remainders.

- I can solve simple division problems, with support, using concrete objects and pictorial representations.

As an introduction to division children in year 1 will solve problems in familiar and relevant contexts where they have to group and share. They will use objects and pictorial representations to solve problems and they will begin to use counting in 2s, 5s and 10s to support their problems solving.

Grouping Method

A farmer has 15 roses and shares them between 3 friends. How many rose does each friend get?



15 roses shared between 3 = 5 roses each

Children need to learn grouping and sharing alongside each other so they understand how they are linked. Grouping will also help children understand how multiplication can be used to solve division problems. Contextual problems will strengthen children's understanding of division.

Bats fly in groups of 2. How many groups of 2 will there be if there are 8 bats?



8 bats shared into 2 = 4 groups each with 2 bats

Division – Year 2

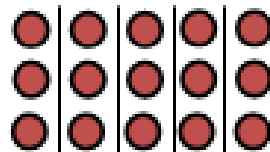
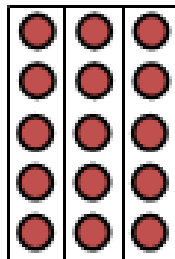
Focus: Grouping and sharing larger quantities using written methods and symbols.

- I can use the division facts for the 2x, 5x and 10x tables.
- I can make number sentences using $\div$ and $=$ signs.
- I can solve division problems using arrays, repeated addition, multiplication and division facts.

Children will continue to use the methods of sharing and grouping in division with objects to support their understanding of arrays for sharing and grouping and the division number line for grouping.

Array Method

To solve problems such as $15 \div 3 =$, children will share 15 objects into 3 groups like in the first array or make groups of 3 until they get to 15, like in the second image.

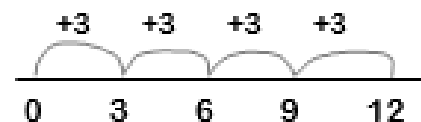


Completing both of these processes will help children see the link between sharing and grouping but also the link between $15 \div 3 = 5$ and $15 \div 5 = 3$.

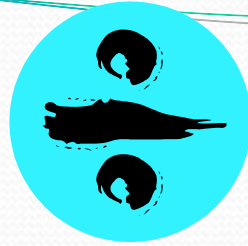
The difference between grouping and sharing should be discussed regularly and visual models and diagrams are very important. Children should solve a variety of contextual problems that will require them to group or share.

Children will start to group on a number line which will help cement their understanding of division as grouping. When grouping on a number line, children will start with a zero at the beginning and will write the dividend at the end of the line, they will then jump in steps of the divisor. The example to the right shows a number line for the calculation $12 \div 3 = 4$ as there were 4 jumps of 3 to get to 12.

Number Line without Remainders



Division



‘12 sweets shared equally between 6 children’

How many 6's go into 12?

12 divided by 6?

12 shared by 6?

There is no need to
divide! Use your
tables knowledge!



Helping at home

...And Some Don'ts!

Some Dos...

- **Play (maths) with your child**
- There are opportunities for impromptu learning in games with real people that you can't get from a DS or Xbox
- **Let your child win or be better than you**
- Otherwise all they learn is that you are better at maths than them
- **Recognise that there is more than one way of doing calculations**
- You may have learned one method, but children are actively encouraged to seek out alternative methods in school and choose one which works for them, no matter how long winded
- **Be an actor**
- Get excited about maths and your child will get excited too

- **Don't expect them to understand after you've explained it once**
- It is normal for a child to 'get it' one day, and then in a different context not know how to find an answer
- **Don't tell them you are hopeless at maths**
- You may remember maths as being hard, but you were probably not hopeless, and even if you were, that implies to your child, "I was hopeless at maths, and I'm a successful adult, therefore maths is not important"
- **Don't get into an argument over homework**
- It will be something that your child has covered in class, and if they really can't do it without a lot of tears and frustration, leave it and LET US KNOW!

Ideas taken from **Maths for Mums and Dads**
Eastaway, R. and Askew, M. (2010)

Helping at home KS1



- Play board games
- Cook – measuring and weighing
- Look at numbers in the environment e.g. telephone keys, number plates, door numbers, book pages, sleeps until Christmas!
- Money
- Comparing heights
- Birthdays, Months of the year, Days of the week
- Time