Aims of today

HS

To learn about teaching for mastery

To understand the key objectives for Y2

To focus on developing fluency of addition and subtraction facts

The importance of number bonds and addition/subtraction facts

The methods for teaching addition, subtraction, multiplication and division

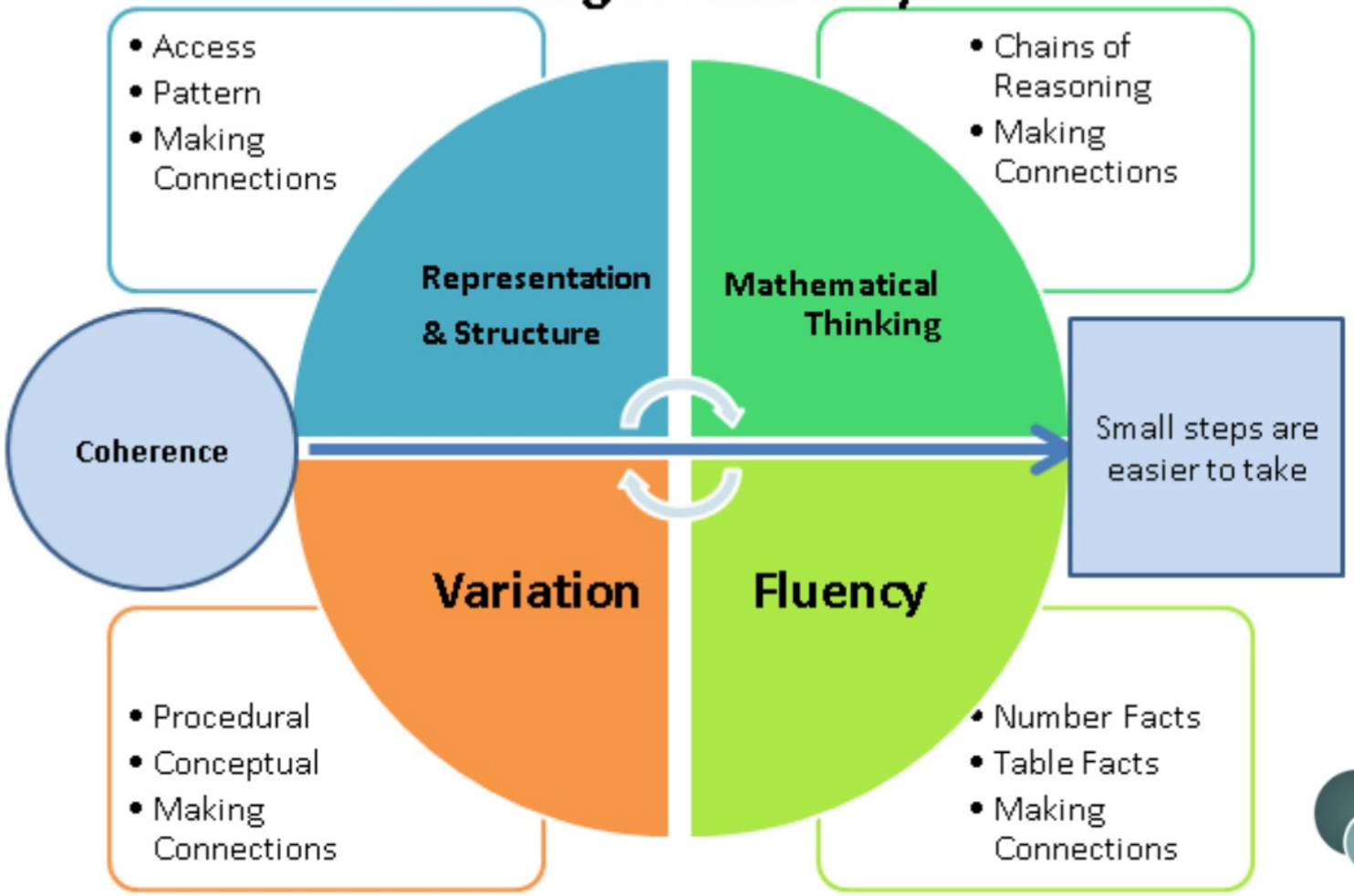
How to help at home

HS

The maths mastery approach

HS

Teaching for Mastery



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White Rose Maths

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Mastering Number

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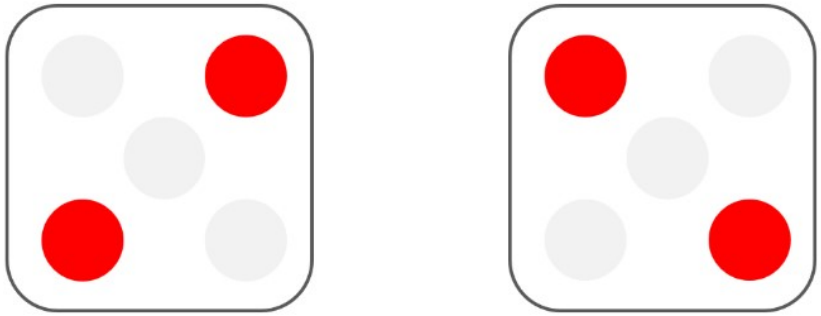
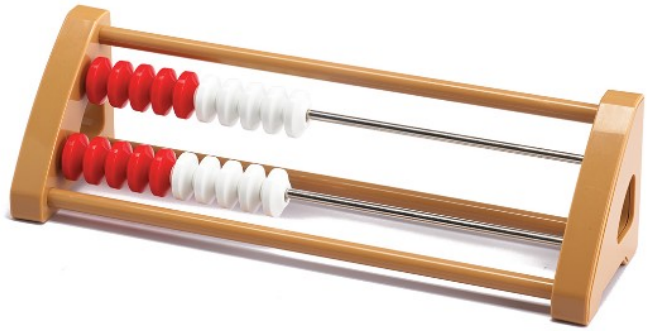
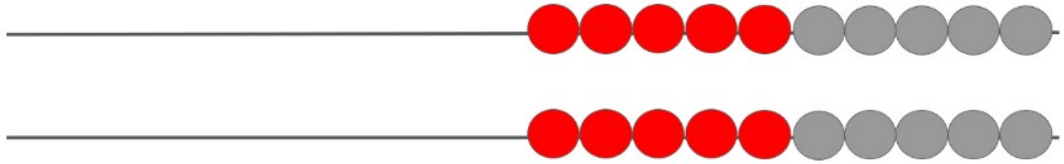
This national programme - now in its fifth year - aims to secure firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2. The aim over time is that children will leave KS1 with fluency in calculation and a confidence and flexibility with number. Attention will be given to key knowledge and understanding needed in Reception classes, and progression through KS1 to support success in the future.

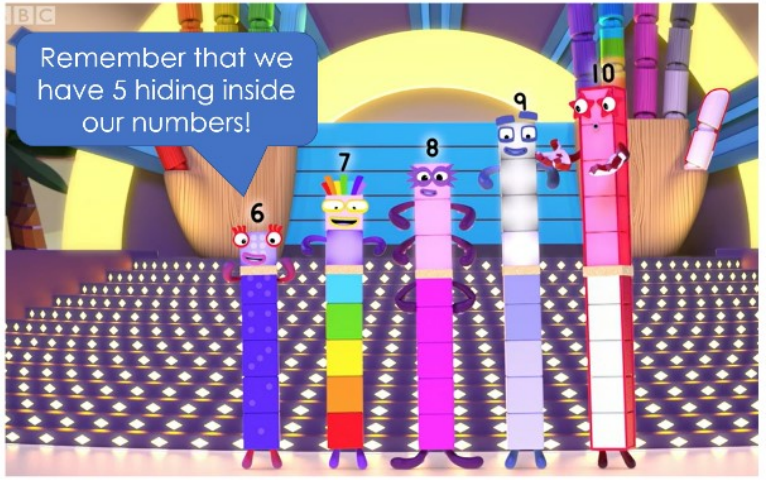
When the counters land on the dice, show the same number on your fingers





Imagine what double 6 looks like on the rekenrek





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The Y2 key objectives

HS

Number – number and place value

Statutory requirements

Pupils should be taught to:

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward
- recognise the place value of each digit in a two-digit number (tens, ones)
- identify, represent and estimate numbers using different representations, including the number line
- compare and order numbers from 0 up to 100; use <, > and = signs
- read and write numbers to at least 100 in numerals and in words
- use place value and number facts to solve problems.

HS

Number – addition and subtraction

Statutory requirements

Pupils should be taught to:

- solve problems with addition and subtraction:
  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

HS

Number – multiplication and division

Statutory requirements

Pupils should be taught to:

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

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Number – fractions

Statutory requirements

Pupils should be taught to:

- recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.

Measurement

Statutory requirements

Pupils should be taught to:

- choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
- compare and order lengths, mass, volume/capacity and record the results using >, < and =
- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins that equal the same amounts of money
- solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
- compare and sequence intervals of time
- tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
- know the number of minutes in an hour and the number of hours in a day.

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Geometry – position and direction

Statutory requirements

Pupils should be taught to:

- order and arrange combinations of mathematical objects in patterns and sequences
- use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).

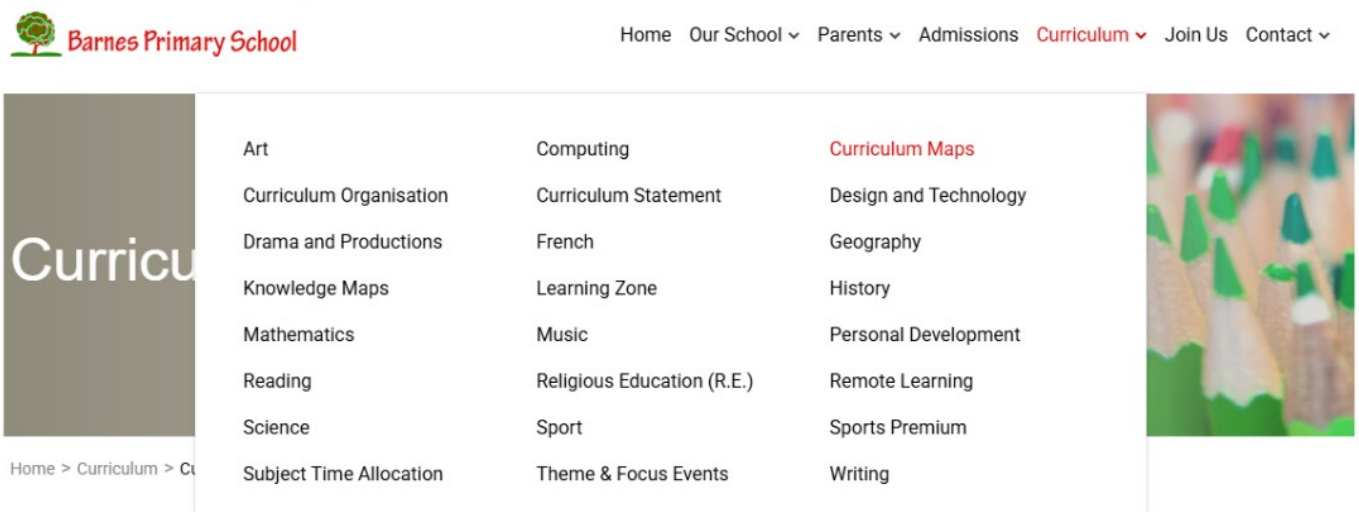
Statistics

Statutory requirements

Pupils should be taught to:

- interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- ask and answer questions about totalling and comparing categorical data.

What units and when?



Autumn: Place value, addition, subtraction, multiplication

Spring: Shape, fractions, measure

Summer: Position, direction, recap

TERM 1A		TERM 1B		TERM 2A		TERM 2B		TERM 3A		TERM 3B	
Number: Place value Number: Addition and subtraction		Number: Addition and subtraction Number: Multiplication and division		Geometry: Properties of shapes Number: Multiplication and division Number: Fractions, decimals, and percentages		Measurement		Geometry: Position and direction Statistics		Number: Place value Number: Addition and subtraction Number: Multiplication and division	
Key knowledge	Key skills	Key knowledge	Key skills	Key knowledge	Key skills	Key knowledge	Key skills	Key knowledge	Key skills	Key knowledge	Key skills
To know ten ones are called one ten. To know a two-digit number is made up of tens and ones. To know a number can be partitioned in many	To be able to count in steps of 2,3,5 from 0, and in tens from any number, forward and backward. To be able to recognise the place value of each digit in a two-digit	To know subtraction is partitioning a whole into two or more parts (partitioning), decreasing the whole (reduction) or finding the difference between two parts (difference).	To be able to solve problems with subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and	To know a 2D shape has height and width; it is completely flat and you cannot pick it up. To know an object that has height, width and depth, like any object in the real world is a 3D	To be able to identify and describe the properties of 2D shapes, including the number of sides, and line symmetry in a vertical line. To be able to identify	To know there are 60 seconds in a minute, 60 minutes in an hour, 24 hours in a day, 365 days in a (non-leap) year and 12 months in a year. To know time can be measured using a clock,	To be able to compare and sequence intervals of time. To be able to tell and write the time to five minutes, including quarter past/to the hour and draw the	To know to turn to our left for anti-clockwise. To know to turn to our right for clockwise. To know there are two half turns in a full turn.	To be able to use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a	To know halving is splitting the whole into two equal parts. To know my multiplication and division facts related to the 2, 5 and 10 times table.	To be able to halve by splitting the whole into two equal parts. To be able to recognise and use the inverse relationship between addition and subtraction and use this

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Fluency in Y2

If children are not fluent in basic addition and subtraction facts, then when solving complex problems the working memory is taken up by calculating basic facts and **children have less working memory to focus on solving the actual problem.**

What do we want by the end of Y2?

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Children to know the number bonds of numbers from 1-20

Basic addition facts

Basic subtraction facts

Number bonds

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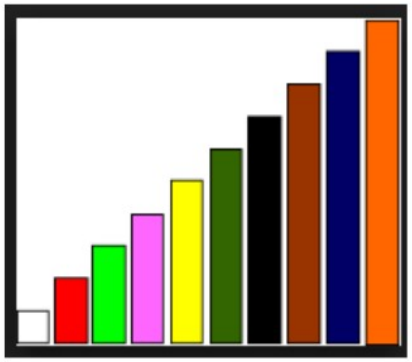
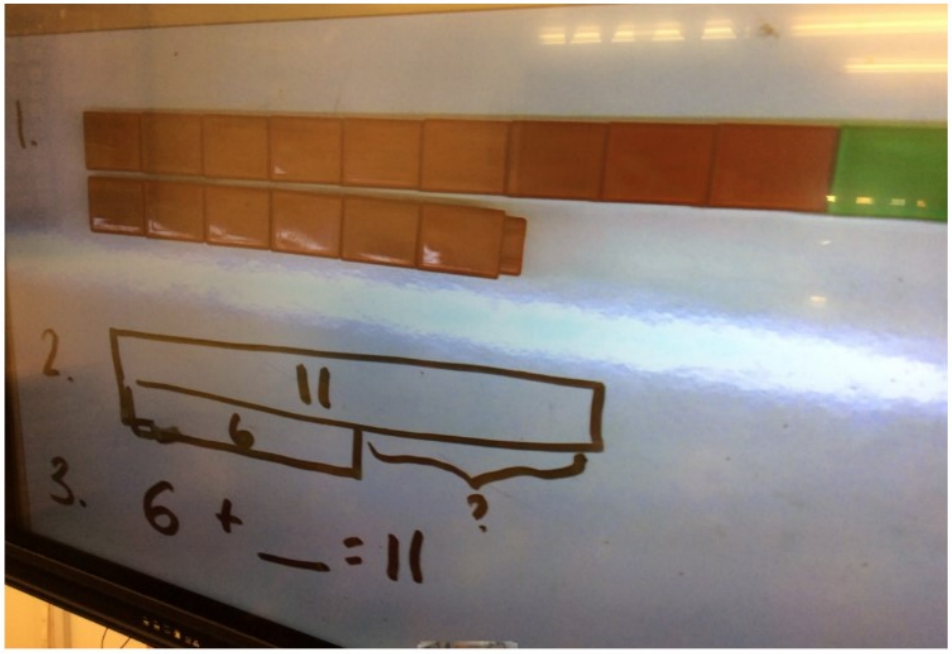
It is <u>essential</u> that children first work with concrete objects to understand and work out the bonds.





Number bonds

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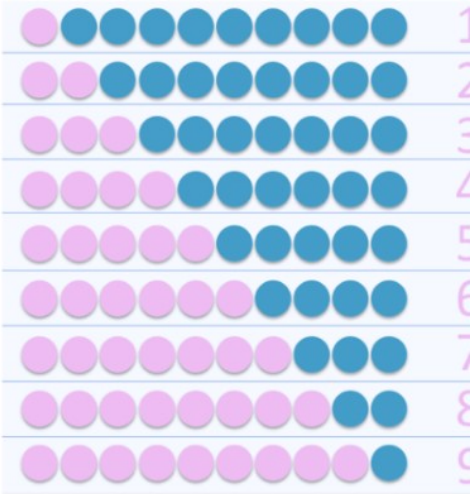
How many ways? (Using resources)

Writing bonds systematically and discussing patterns



Learning the bonds from memory

Using and applying this knowledge

Basic addition facts

MD

0+0	1+0	2+0	3+0	4+0	5+0	6+0	7+0	8+0	9+0	10+0
0+1	1+1	2+1	3+1	4+1	5+1	6+1	7+1	8+1	9+1	10+1
0+2	1+2	2+2	3+2	4+2	5+2	6+2	7+2	8+2	9.2	10+2
0+3	1+3	2+3	3+3	4+3	5+3	6+3	7+3	8+3	9+3	10+3
0+4	1+4	2+4	3+4	4+4	5+4	6+4	7+4	8+4	9+4	10+4
0+5	1+5	2+5	3+5	4+5	5+5	6+5	7+5	8+5	9+5	10+5
0+6	1+6	2+6	3+6	4+6	5+6	6+6	7+6	8+6	9+6	10+6
0+7	1+7	2+7	3+7	4+7	5+7	6+7	7+7	8+7	9+7	10+7
0+8	1+8	2+8	3+8	4+8	5+8	6+8	7+8	8+8	9+8	10+8
0+9	1+9	2+9	3+9	4+9	5+9	6+9	7+9	8+9	9+9	10+9
0+10	1+10	2+10	3+10	4+10	5+10	6+10	7+10	8+10	9+10	10+10

Basic subtraction facts

MD

1+0	2+0	3+0	4+0	5+0	6+0	7+0	8+0	9+0	10+0
1+1	2+1	3+1	4+1	5+1	6+1	7+1	8+1	9+1	10+1
1+2	2+2	3+2	4+2	5+2	6+2	7+2	8+2	9.2	10+2
1+3	2+3	3+3	4+3	5+3	6+3	7+3	8+3	9+3	10+3
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1+8	2+8	3+8	4+8	5+8	6+8	7+8	8+8	9+8	10+8
1+9	2+9	3+9	4+9	5+9	6+9	7+9	8+9	9+9	10+9
1+10	2+10	3+10	4+10	5+10	6+10	7+10	8+10	9+10	10+10

0-0	1-0	2-0	3-0	4-0	5-0	6-0	7-0	8
1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	9
2-2	3-2	4-2	5-2	6-2	7-2	8-2	9-2	1
3-3	4-3	5-3	6-3	7-3	8-3	9-3	10-3	1
4-4	5-4	6-4	7-4	8-4	9-4	10-4	11-4	1
5-5	6-5	7-5	8-5	9-5	10-5	11-5	12-5	1
6-6	7-6	8-6	9-6	10-6	11-6	12-6	13-6	1
7-7	8-7	9-7	10-7	11-7	12-7	13-7	14-7	1
8-8	9-8	10-8	11-8	12-8	13-8	14-8	15-8	1
9-9	10-9	11-9	12-9	13-9	14-9	15-9	16-9	1
10-10	11-10	12-10	13-10	14-10	15-10	16-10	17-10	18

How to help at home

Incorporate maths into daily routines

MD

Counting forwards and backwards

Measures in everyday play

Shape hunts
Direction games

"I'm thinking of a number"

Fluency of bonds, addition and subtraction facts

Positive messages about maths

HS

Do not praise children for being 'clever'.

Praise given for hard work.

Let children know that they can improve.

Make maths fun!

Be positive about maths yourself!

Regular and often

HS

Raise the profile of maths in line with reading.

Work on number bonds and basic addition and subtraction fluency in particular - upcoming Friday quizzes!

Follow the home learning letter information to continue to add to skills.

Learning next week	**Science:** We start our new unit on plants and we will be learning about seeds. **English:** We are starting our new unit based on the book 'The Whale Song' by Dyan Sheldon. **Maths:** We continue our unit on division. We will be dividing by 5 and 10. We will also be looking at number families (multiplication and division) and worded division problems.

MD

Written methods in Year 2

Number – addition and subtraction

Statutory requirements

Pupils should be taught to:

- solve problems with addition and subtraction:
  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Partitioning is when you split numbers up into smaller numbers that have the same total value. For example:

$$36 = 30 + 6$$

$$36 = 20 + 16$$

$$36 = 10 + 26$$

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Addition - 1 digit add 1 digit

4 + 3 =

Addition - 2 digit add 1 digit

24 + 3 =

Addition - 2 digit add a multiple of ten

MD

$$40 + 30 =$$

Addition - 2 digit add 2 digit -

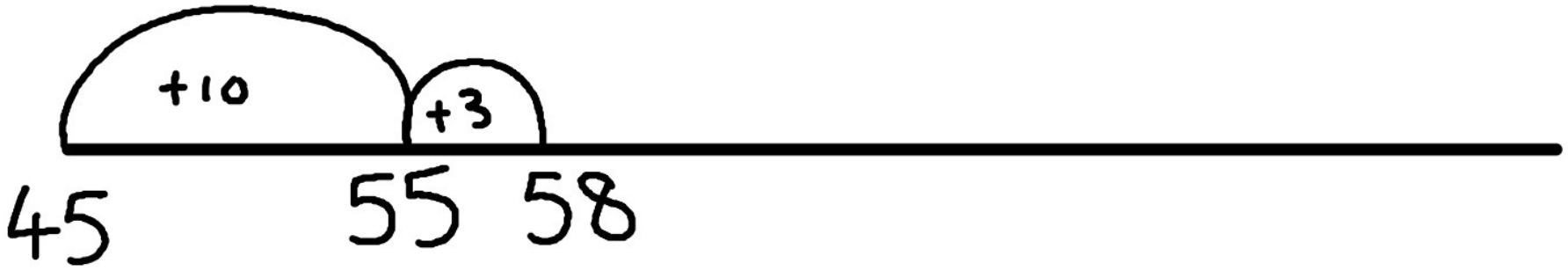
MD

When adding, if the numbers are far apart, we recommend adding on a number line.

$$45 + 13 = 58$$

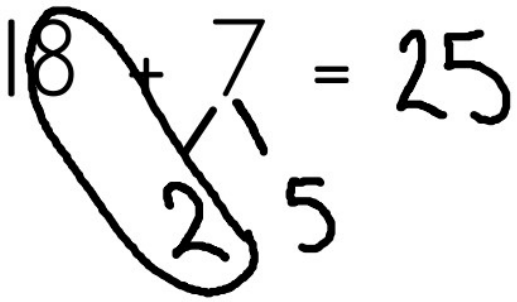
$$13 = 10 + 3$$

alternative methods
- count forwards

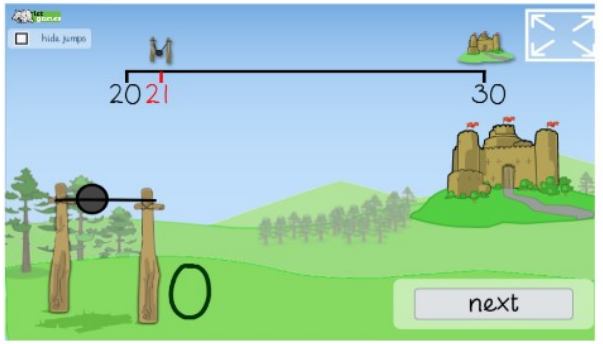


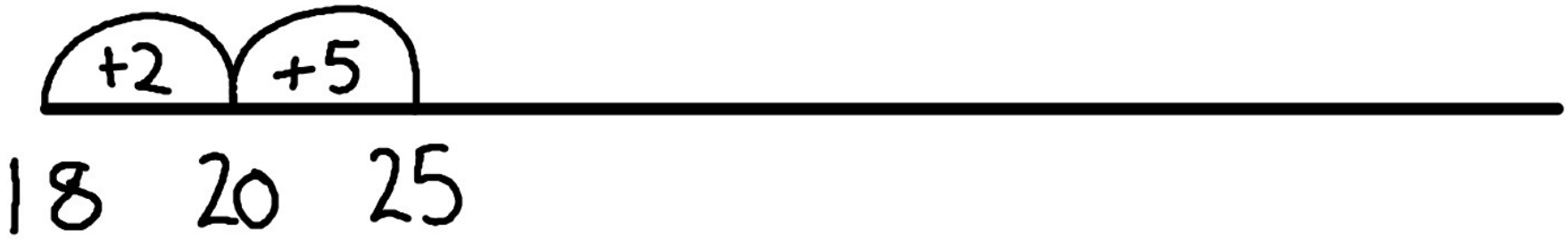
Addition - 2 digit add 1 digit - bridging through 10

MD



Your child will likely find it useful to find the next 10s number and then adding on the remainder.





Addition - 2 digit add 2 digit - bridging through 10

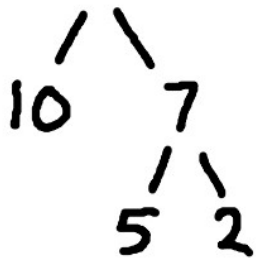
MD

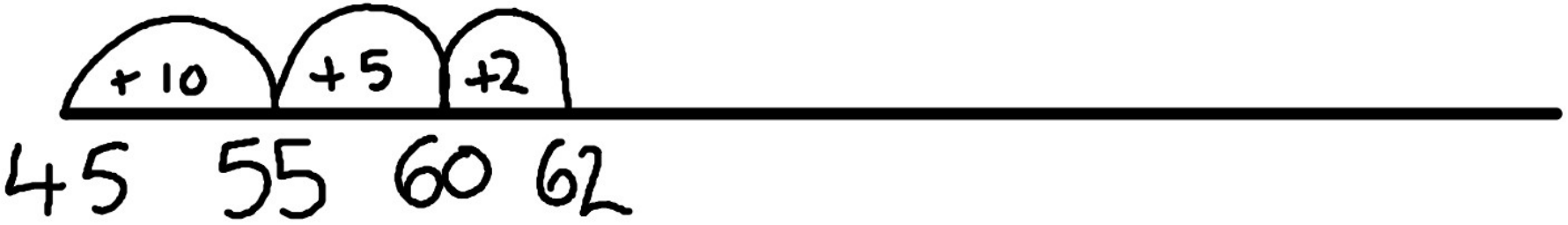
When adding, if the numbers are far apart, we recommend adding on a number line.

alternative methods

- compensate

$$45 + 17 = 62$$





Addition - 2 digit add 2 digit

MD

When adding 2, 2-digit numbers together we encourage the children to partition the numbers (into tens and ones) to make it more manageable.

$$25 + 34 = 59$$

20	+	5
30	+	4
50	+	9

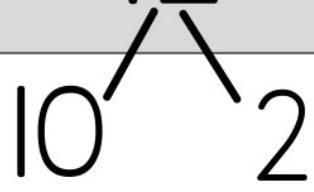
Addition - 2 digit add 2 digit

MD

When adding 2, 2-digit numbers together we encourage the children to partition the numbers (into tens and ones)to make it more manageable.

$$28 + 34 = 62$$

20	+	8
30	+	4
50	+	12



Bridging 10

Subtraction - 1 digit subtract 1 digit

HS

5 - 2 =

Subtraction - 2 digit subtract 1 digit

25 - 2 =

Subtraction - 2 digit minus a multiple of ten

HS

$$50 - 20 =$$

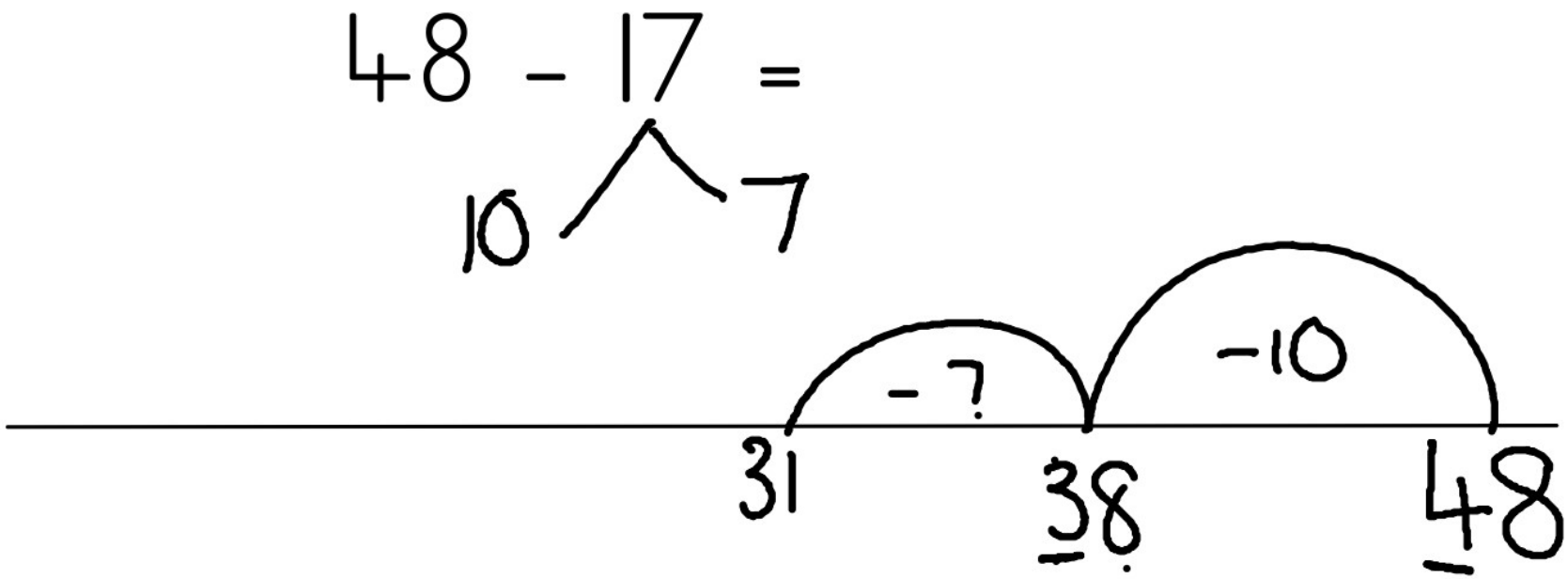
What number facts can I use to help me?

Subtraction - 2 digit subtract 2 digit

HS

When subtracting a two digit number from a two digit number use a number line.

48 - 17 =



HS

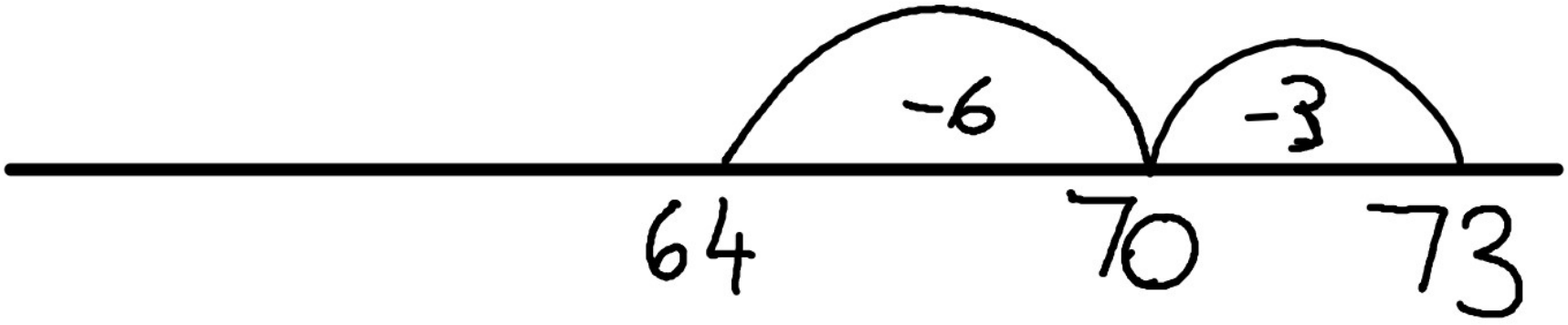
Subtraction - 2 digit subtract 1 digit - bridging through 10

When subtracting, if the numbers are far apart we recommend subtracting on a number line.

$$73 - 9 = \_\_$$

$$3 \quad 6$$

alternative methods
- count back
- compensate



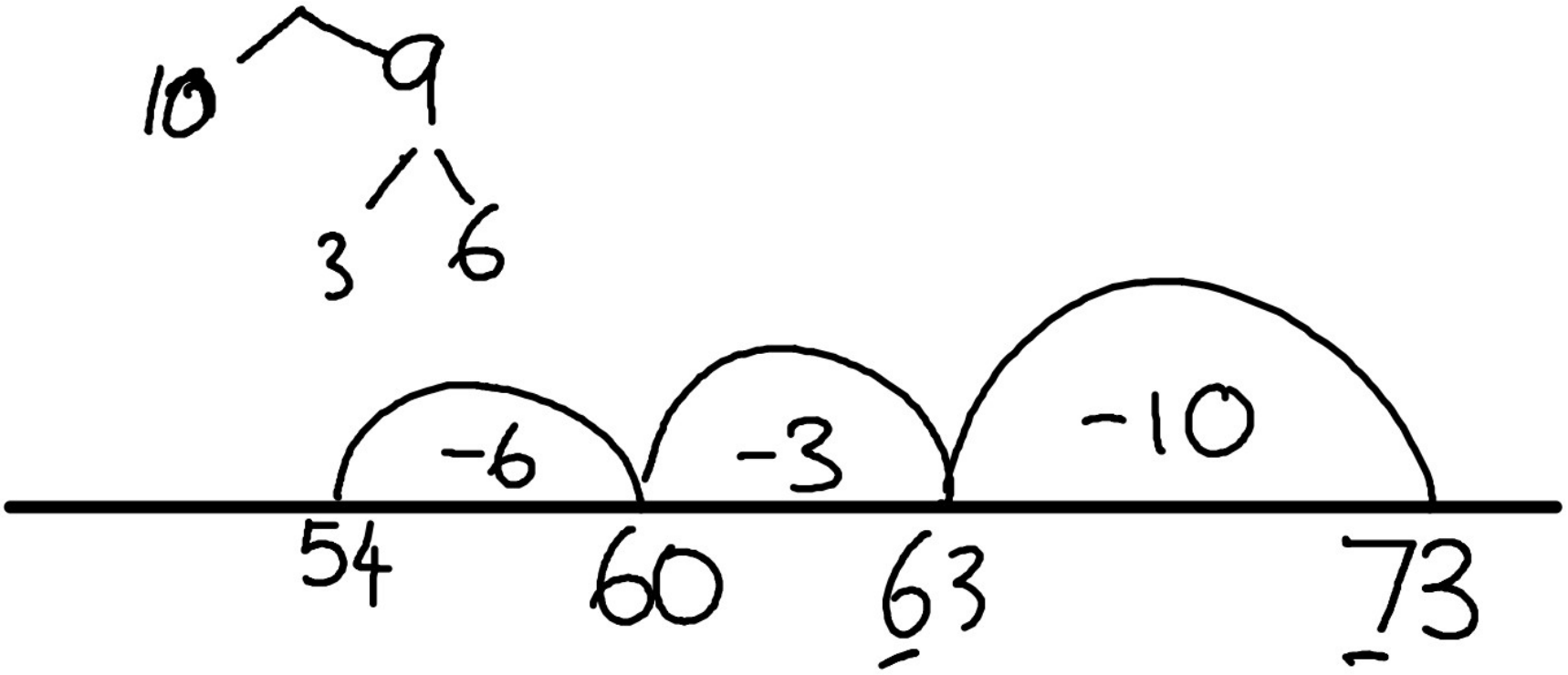
Subtraction - 2 digit subtract 2 digit - bridging through 10

HS

When subtracting, if the numbers are far apart, we recommend subtracting on a number line.

alternative methods
- compensate

73 - 19 =



Subtraction – Finding the difference

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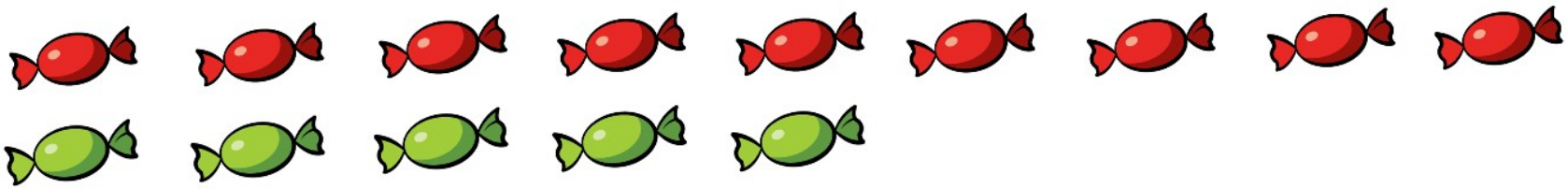
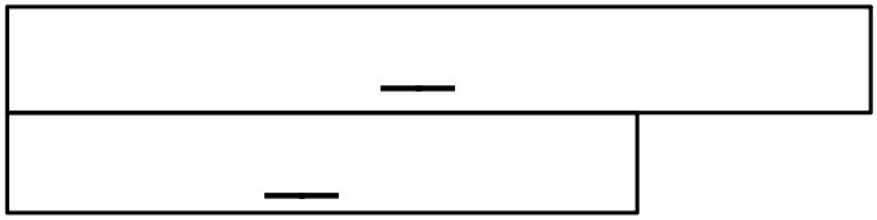
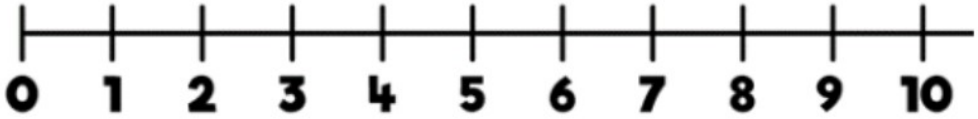


How many green sweets are there? ___

How many red sweets are there? ___

Complete the bar model and show the jumps on the number line.





The difference is ___ .

There are ___ fewer green sweets than red sweets.

There are ___ more red sweets than green sweets.

HS

Number – multiplication and division

Statutory requirements

Pupils should be taught to:

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Understanding multiplication

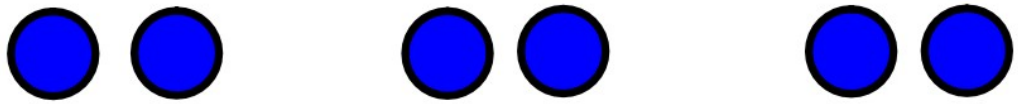
We want children to think of multiplication as groups of the same number of objects that we add together.

$$3 \times 2 = 6$$

This number represents how many groups there are.

This number represents how many there are in each group.

This number represents how many there if you add all the groups together.



This shows 3 groups of 2 dots. There are 6 dots altogether.

By the end of Year 2 the children must be fluent with the 2, 5 and 10 times tables. They must also be familiar with the 3 times table.

$$3 \times 5 = 15$$

$$5 \times 3 = 15$$

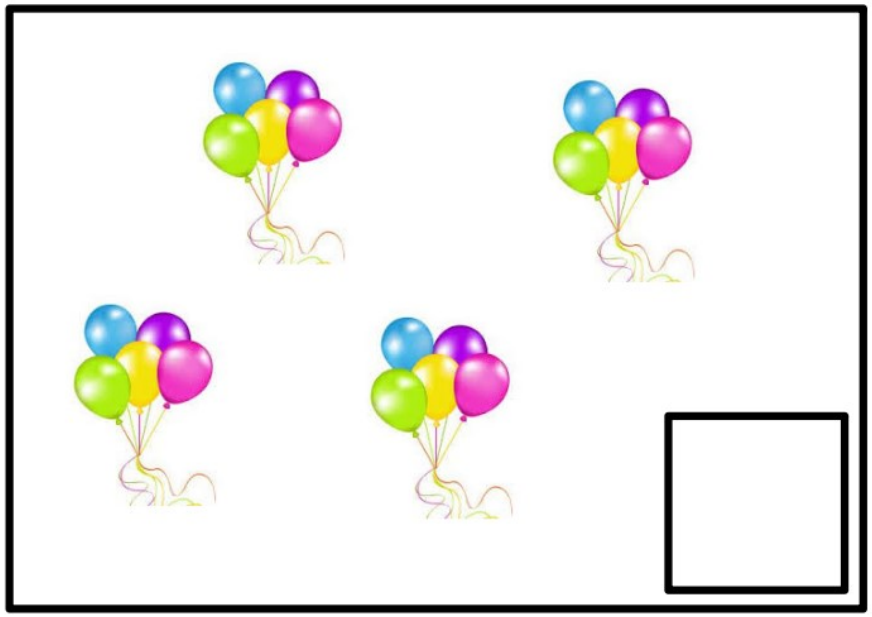
Multiplicand

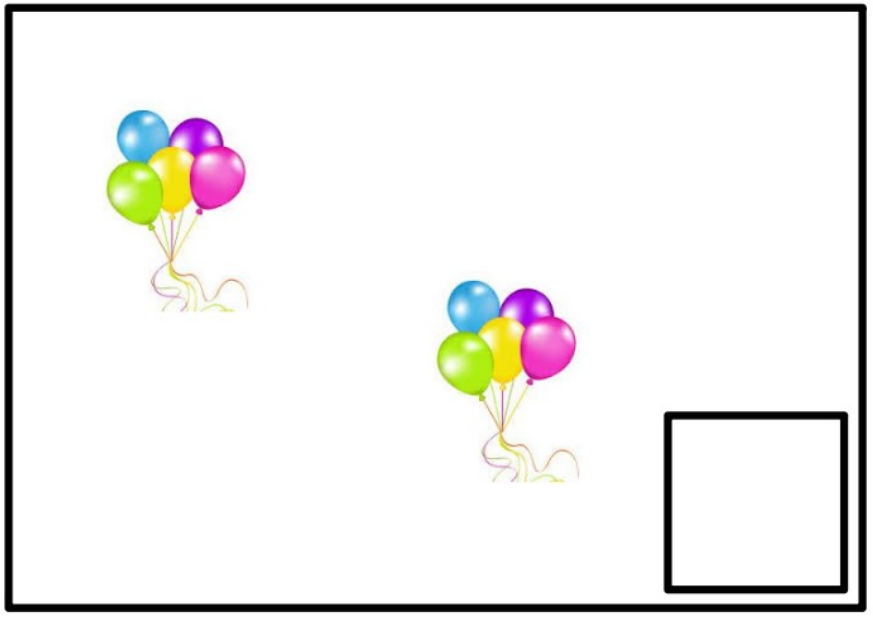
The amount we are multiplying

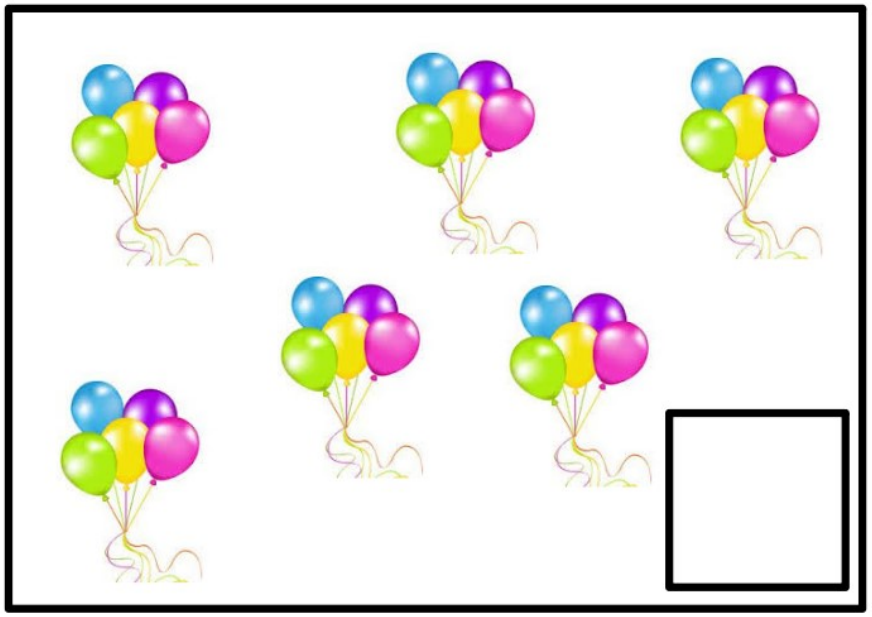
Multiplier

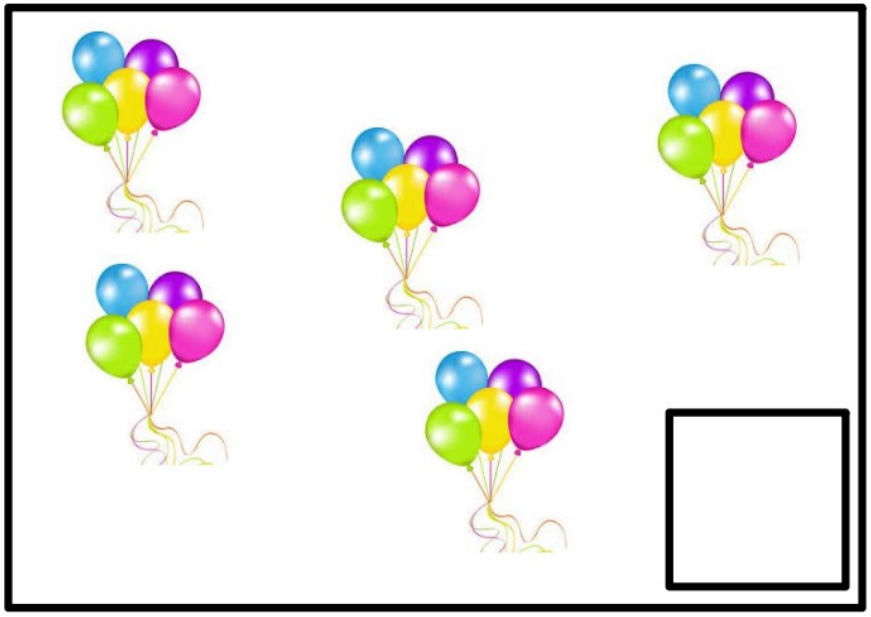
The number we are multiplying by

1 x 10 = 10
2 x 10 = 20
3 x 10 = 30
4 x 10 = 40
5 x 10 = 50
6 x 10 = 60
7 x 10 = 70
8 x 10 = 80
9 x 10 = 90
10 x 10 = 100
11 x 10 = 110
12 x 10 = 120









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

We are learning to count in fives

0, 5, 10, 15, 20, ___

15, 20, 25, ___, 35, 40

55, 60, 65, 70, 75, ___

20, 15, ___, 5, 0

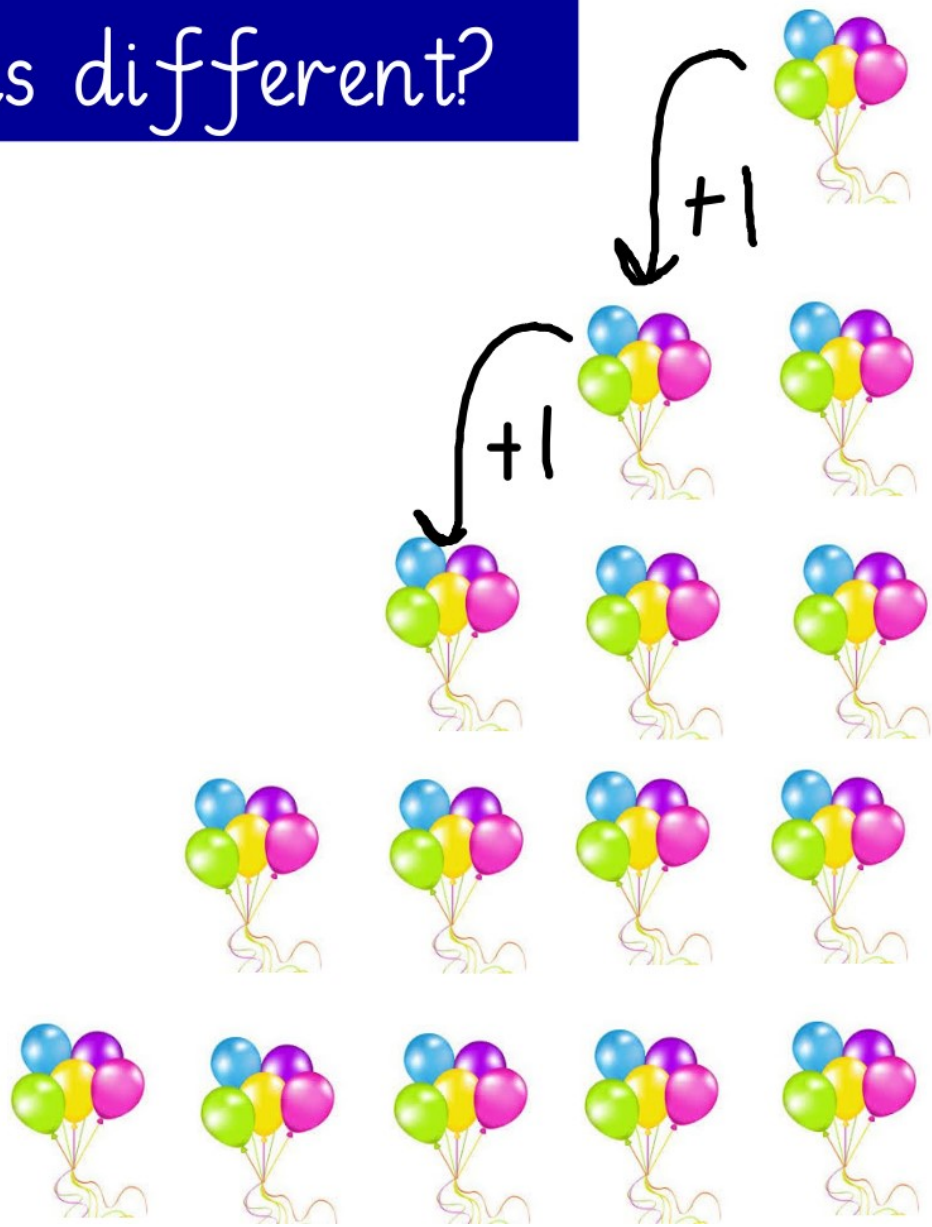
85, 80, 75, 70, ___, 60

60, ___, 50, 45, 40, 35

2 x 5 = 10

3 x 5 = 15

What do you notice?
What is the same?
What is different?



1 x 5 = 5

2 x 5 = 10

3 x 5 = 15

4 x 5 = 20

5 x 5 = 25

Multiplication is commutative!

It can be done in any order, just like addition.

$$2 \times 5 = 10$$

$$5 \times 2 = 10$$

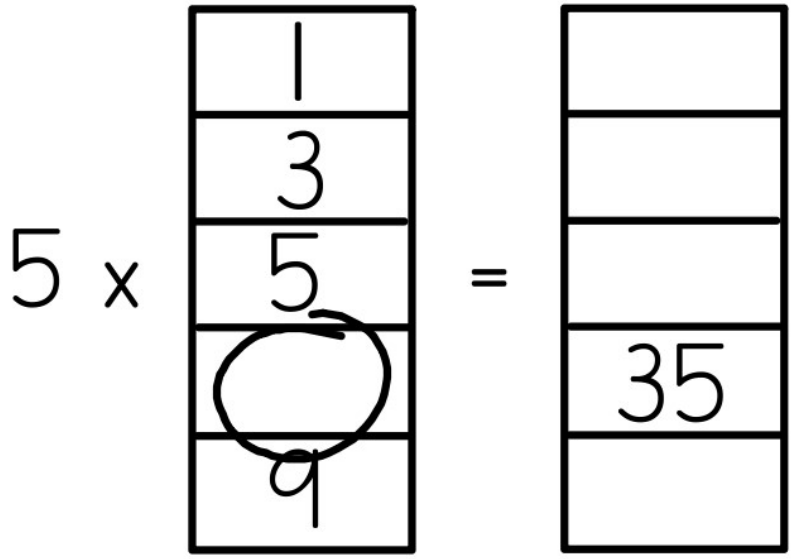
The position of the factors can change and the product stays the same.

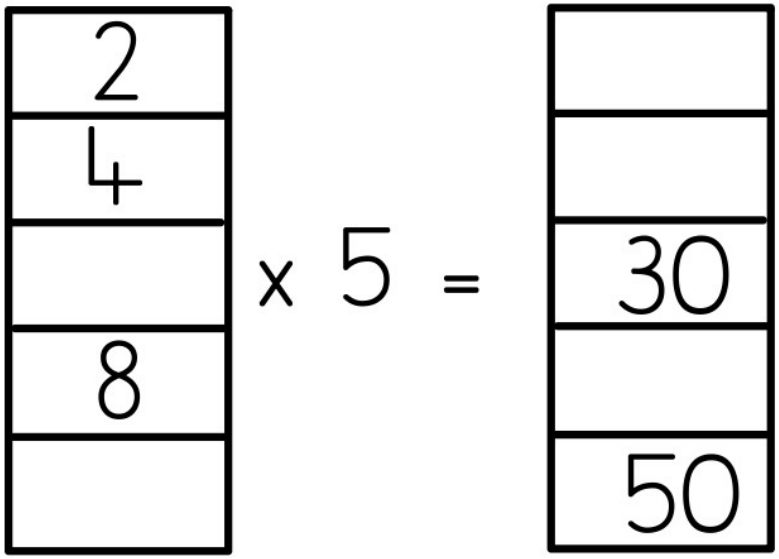
When you change the position of the factors, the product stays the same!

1 x 5 = 5	5 x 1 = 5
2 x 5 = 10	5 x 2 = 10
3 x 5 = 15	5 x 3 = 15
4 x 5 = 20	5 x 4 = 20
5 x 5 = 25	5 x 5 = 25
6 x 5 = 30	5 x 6 = 30
7 x 5 = 35	5 x 7 = 35
8 x 5 = 40	5 x 8 = 40
9 x 5 = 45	5 x 9 = 45
10 x 5 = 50	5 x 10 = 50
11 x 5 = 55	5 x 11 = 55
12 x 5 = 60	5 x 12 = 60

MD

We are learning to solve missing number problems using our knowledge of multiplying by five





0 x 5 =

40 = x 5

5 x 3 =

50 = 5 x

Division

HS

By the end of Year 2 the children must be fluent with all related division facts for the 2, 5 and 10 times table. They must also be familiar with division facts for the 3 times table.

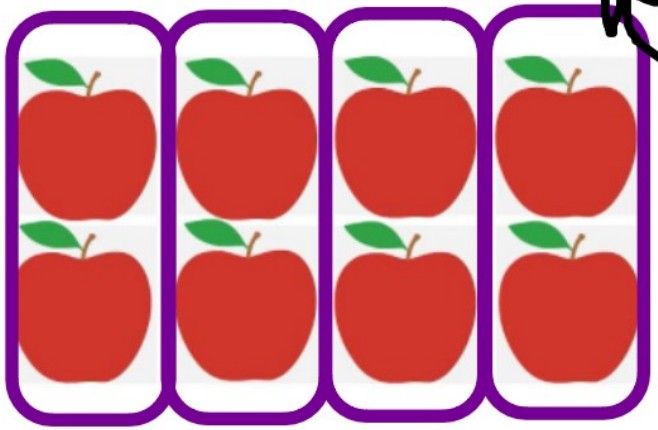
We link this to multiplication.

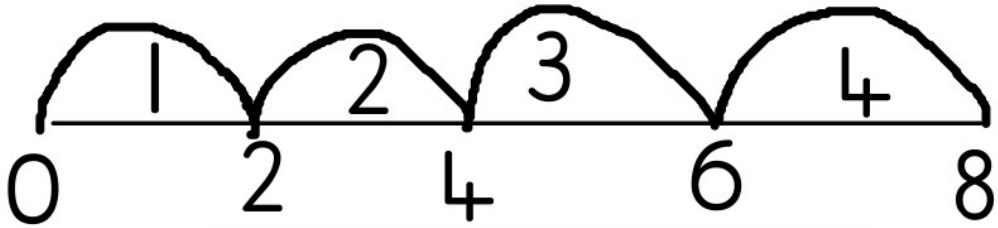
Division

HS

We teach the children division initially as grouping.

$$8 \div 2 = 4$$





grouped in

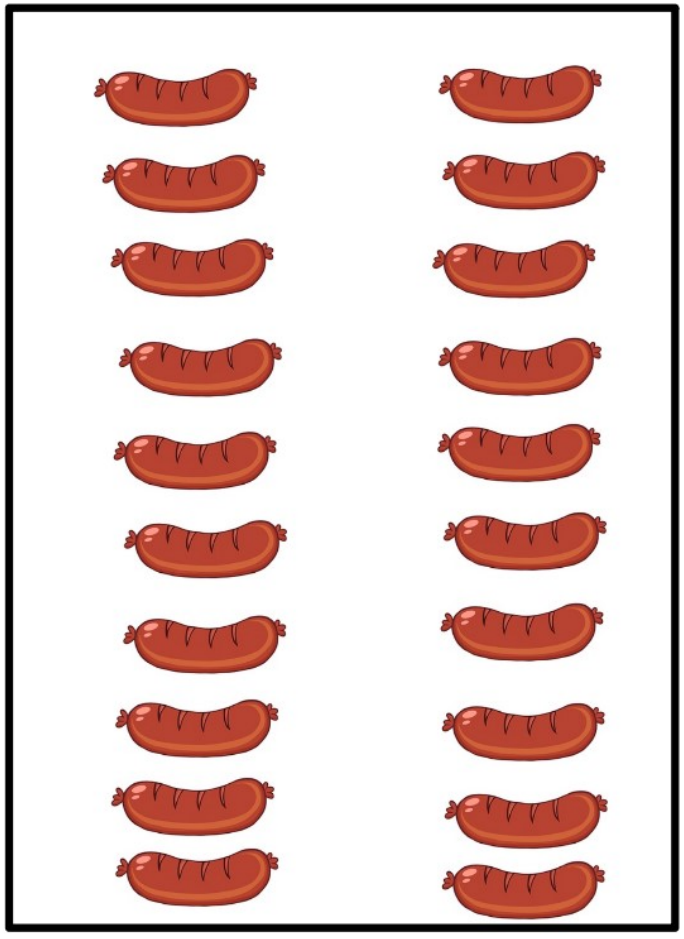
divided into groups of

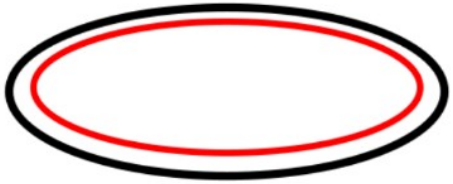
Sharing

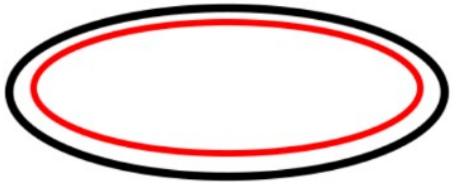
There are 20 sausages. 20 is the whole.

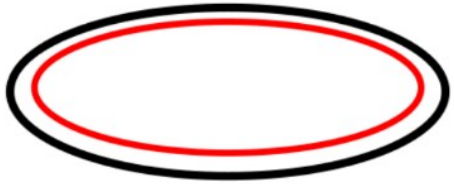
We need to put the sausages equally on all 5 plates.

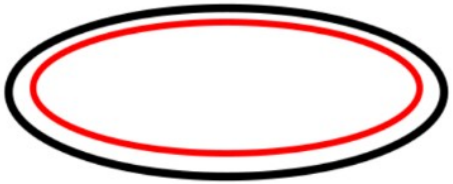
$$20 \div 5 = 4$$

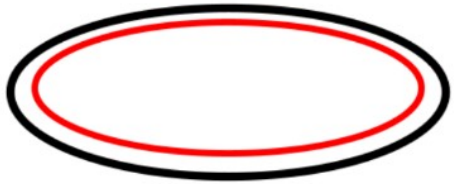












20 divided between 5

(grouping)

(sharing)

	Quotitive division contexts	Partitive division contexts	Division calculations with no associated context
Example problem	*'There are fifteen biscuits. If I put them into bags of five, how many bags will I need?'*	*'I have twenty conkers and I share them equally between five children. How many conkers does each child get?'*	30 ÷ 10 = ☐
Key language	***'…divided into groups of…'*** *e.g.* *'Fifteen divided into groups of five is equal to three.'*	***'…divided between…'*** *e.g.* *Twenty divided between five is equal to four each.'*	***'…divided by…'*** *e.g.* *'Thirty divided by ten is equal to three.'*

Sharing by skip counting

$20 \div 5 =$

Skip counting can be used to solve **sharing** problems.

I'm going to share 20 biscuits between 5 dogs.

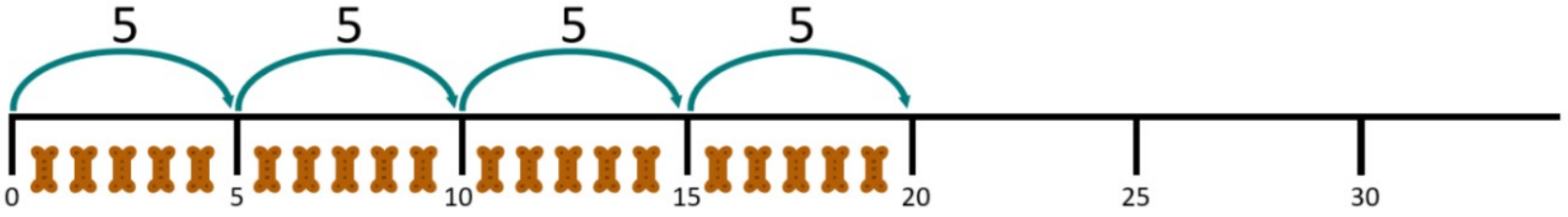
So how many biscuits does each dog get?

1 five is 1 each. That's 5

2 fives is 2 each. That's 10

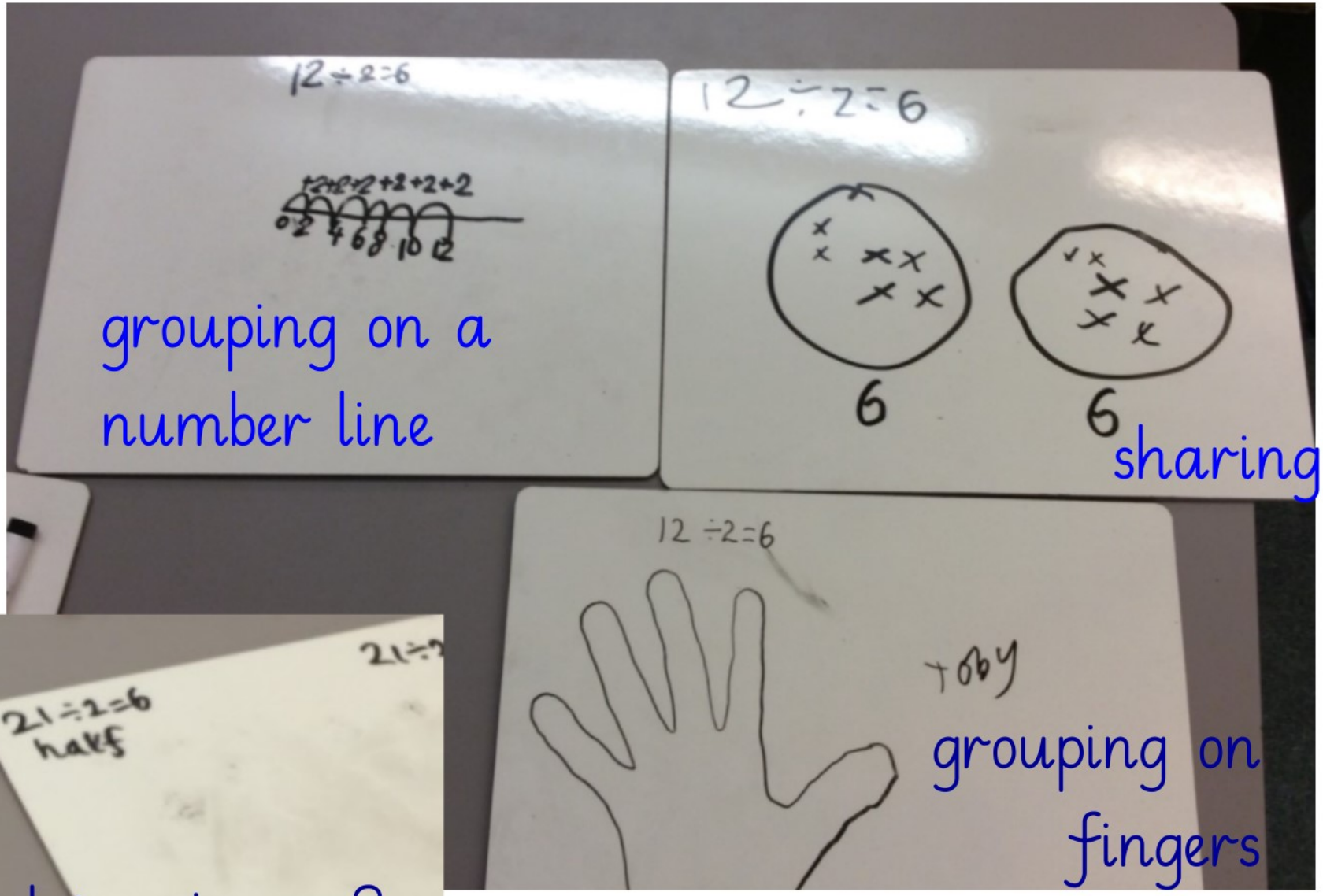
3 fives is 3 each. That's 15

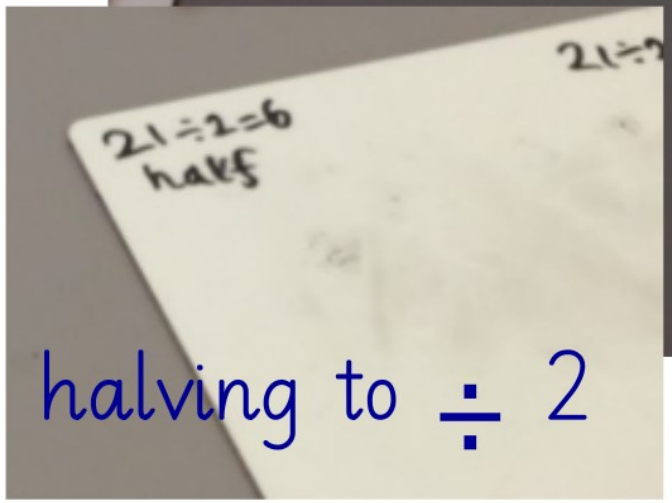
4 fives is 4 each. That's 20



12 ÷ 2 = 6

HS


12÷2=6
+2+2+2+2+2+2
0 2 4 6 8 10 12
grouping on a number line
12÷2=6
6
6
sharing
12 ÷2=6
Toby
grouping on fingers


21÷2=6
half
halving to ÷ 2

Fact families

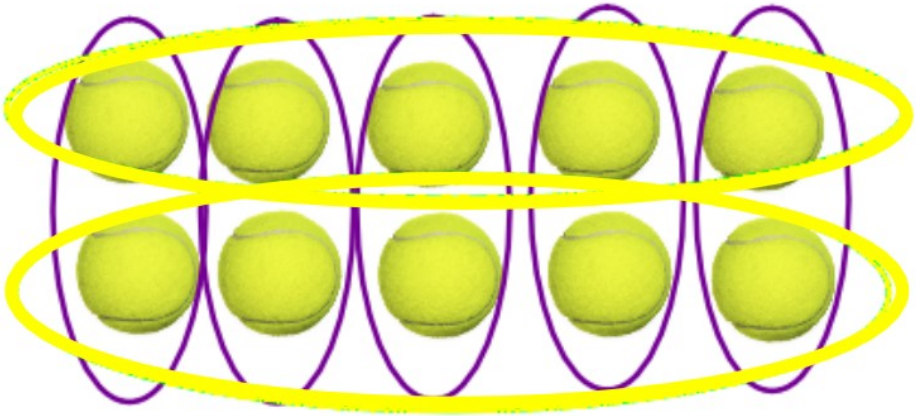
HS

$2 \times 5 = 10$

$5 \times 2 = 10$

$10 \div 5 = 2$

$10 \div 2 = 5$



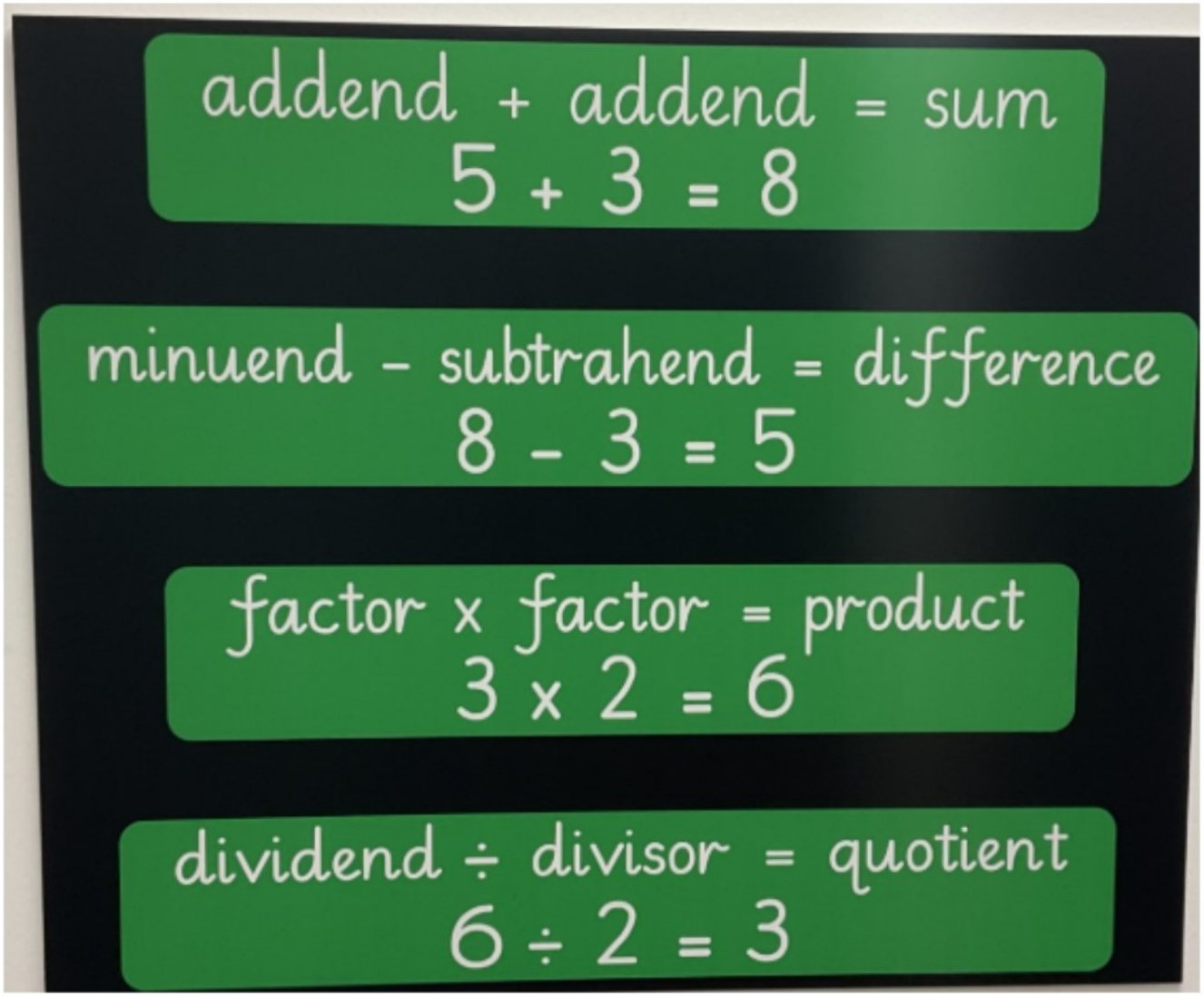
Multiplication and division challenges

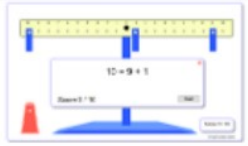
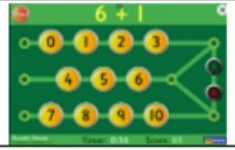
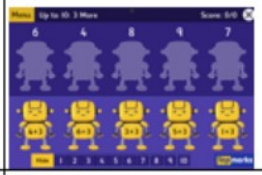
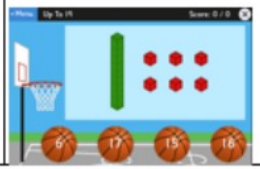
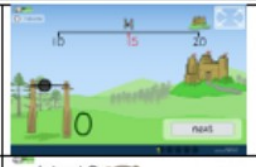
HS

1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
4 x 5 = 20
5 x 5 = 25
6 x 5 = 30
7 x 5 = 35
8 x 5 = 40
9 x 5 = 45
10 x 5 = 50

2 x 5 = 10
7 x 5 = 35
4 x 5 = 20
10 x 5 = 50
6 x 5 = 30
5 x 5 = 25
8 x 5 = 40
9 x 5 = 45
3 x 5 = 15
1 x 5 = 5

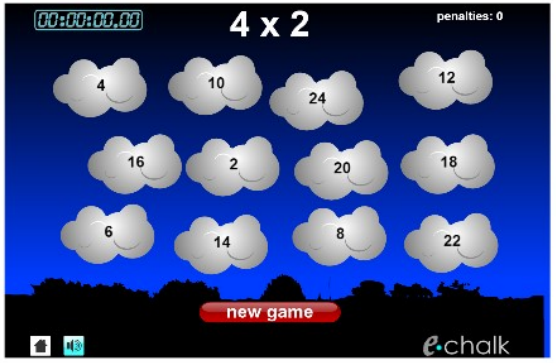
15 = __ x 5
__ x 5 = 35
___ ÷ 5 = 8
5 x __ = 10
50 = __ x 5
35 ÷ 5 = __
__ x 5 = 5
0 x 5 = ___
6 = ___ ÷ 5
45 ÷ 5 = ___


addend + addend = sum
5 + 3 = 8
minuend - subtrahend = difference
8 - 3 = 5
factor x factor = product
3 x 2 = 6
dividend ÷ divisor = quotient
6 ÷ 2 = 3

Link	Good for	Image
https://www.topmarks.co.uk/learning-to-count/todays-number-up-to-20	Number formation, recognising numerals, one more and one less	
https://mathszone.co.uk/resources/NumberBalance/	Good for Part + part = whole Finding the missing part	
https://www.topmarks.co.uk/maths-games/hit-the-button	Doubling, halving, number bonds and times tables (we have done 2x, 3x, 5x, and 10x)	
https://www.topmarks.co.uk/number-facts/number-fact-families	Understanding the relationship between addition and subtraction. Later in the year is helpful for division and multiplication (not yet!)	
https://www.topmarks.co.uk/maths-games/robot-more-or-less	Adding and subtracting	
https://www.topmarks.co.uk/learning-to-count/place-value-basketball	Understanding place value, especially of larger 2 digit numbers. Choose numbers up 99.	
https://ictgames.com/mobilePage/catapultCountOn/index.html	Finding the next 10 and understanding how many until the next 10.	
https://ictgames.com/mobilePage/tenLessShootOut/index.html	10, 20 or 30 less than a number – understanding that the tens digit changes, but the ones does not!	

Numbots

Cloud tables



KS1 Assessments

HS

Y2 assessments take place in the Summer Term just like in KS2. In maths, children have previously completed an arithmetic paper and a reasoning paper. They formed one part of evidence, along with the continuous teacher assessment that has taken place throughout the year.

- There is now no statutory requirement to carry out the end of key stage 1 (KS1) teacher assessment.
- The Standards and Testing Agency (STA) are, however, continuing to develop and supply printed materials to schools for optional end of KS1 tests
- These are both still valuable tools for assessing pupils at the end of KS1 but now there is no obligation to report these to parents or local authorities so there can be a degree of flexibility as to when and how these are used.

Thank you for listening!

0-0	1-0	2-0	3-0	4-0	5-0	6-0	7-0	8-0	9-0	10-0
1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	9-1	10-1	11-1
2-2	3-2	4-2	5-2	6-2	7-2	8-2	9-2	10-2	11-*2	12-2
3-3	4-3	5-3	6-3	7-3	8-3	9-3	10-3	11-3	12-3	13-3
4-4	5-4	6-4	7-4	8-4	9-4	10-4	11-4	12-4	13-4	14-4
5-5	6-5	7-5	8-5	9-5	10-5	11-5	12-5	13-5	14-5	15-5
6-6	7-6	8-6	9-6	10-6	11-6	12-6	13-6	14-6	15-6	16-6
7-7	8-7	9-7	10-7	11-7	12-7	13-7	14-7	15-7	16-7	17-7
8-8	9-8	10-8	11-8	12-8	13-8	14-8	15-8	16-8	17-8	18-8
9-9	10-9	11-9	12-9	13-9	14-9	15-9	16-9	17-9	18-9	19-9
10-10	11-10	12-10	13-10	14-10	15-10	16-10	17-10	18-10	19-10	20-10