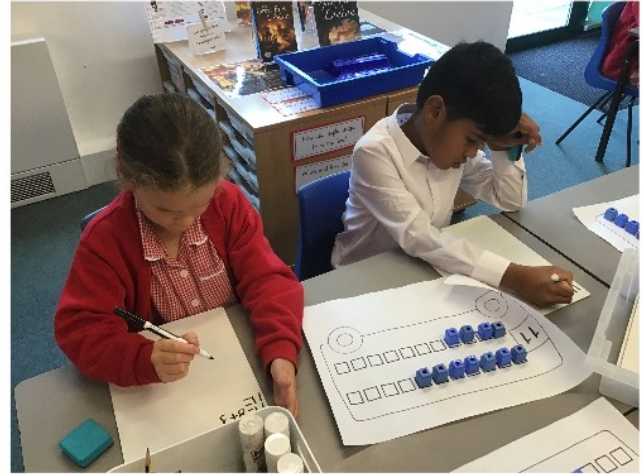
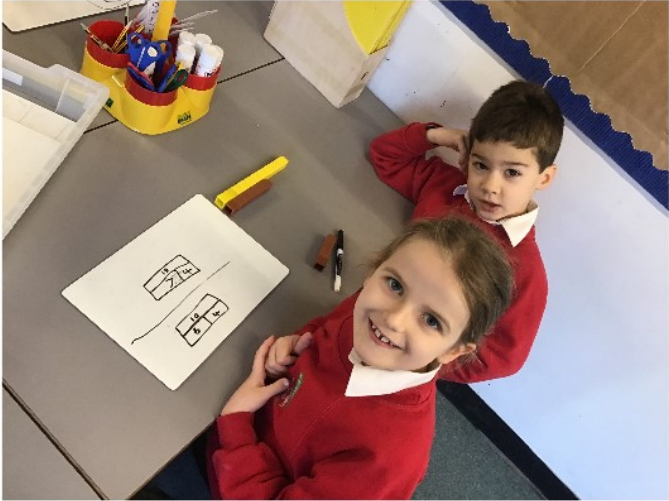


# Y2 Mathematics Workshop



# Aims of today

To learn about teaching for mastery

To understand the key objectives for Y2

To focus on developing fluency of addition and subtraction facts

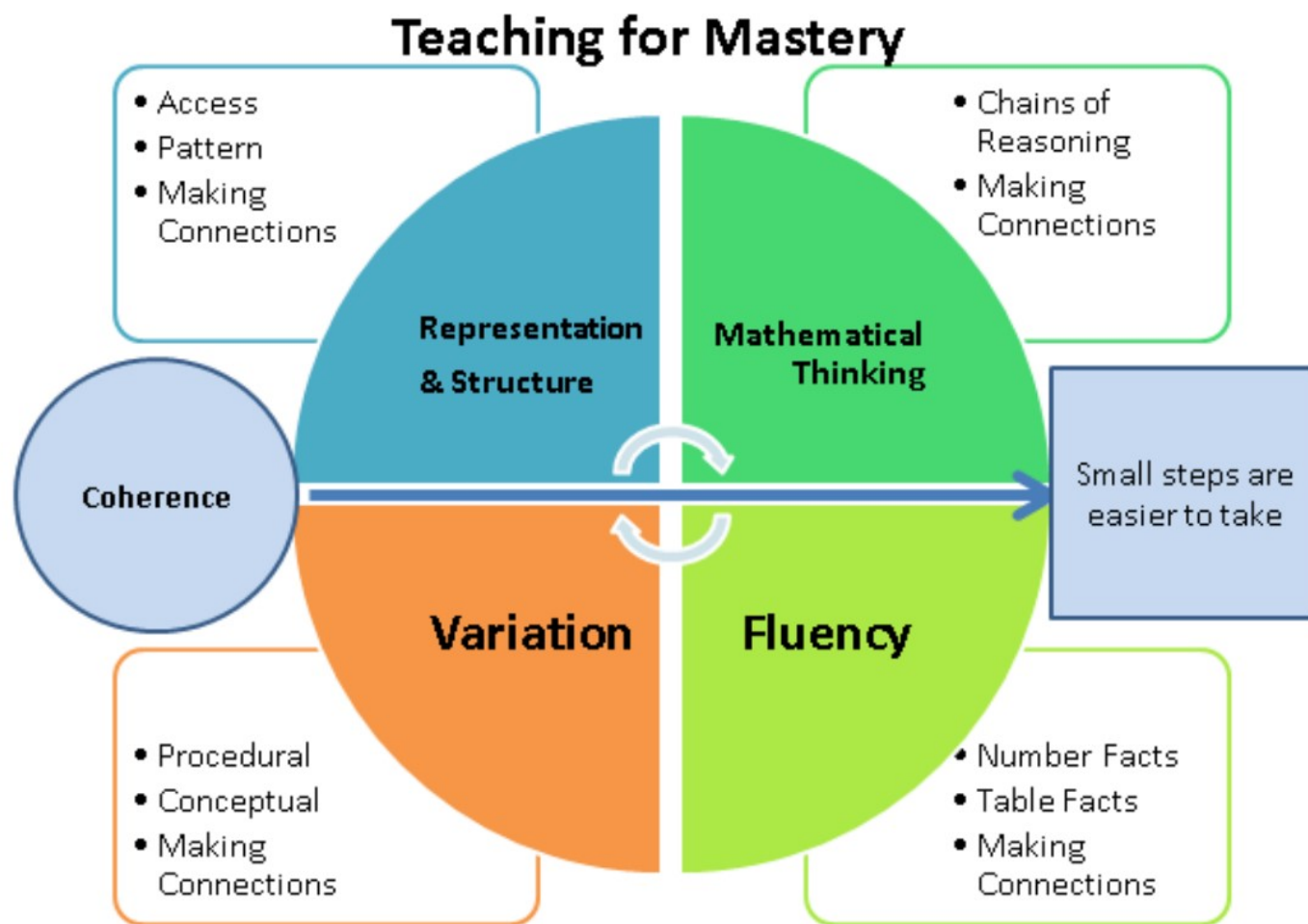
The importance of number bonds and addition/subtraction facts

The methods for teaching addition, subtraction, multiplication and division

How to help at home

# The maths mastery approach

# The five big ideas



# The Y2 key objectives

## 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.

## 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.

## 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 ( $\times$ ), division ( $\div$ ) 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.



## 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 ( $^{\circ}\text{C}$ ); 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.

## 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.

# 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?

CS

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

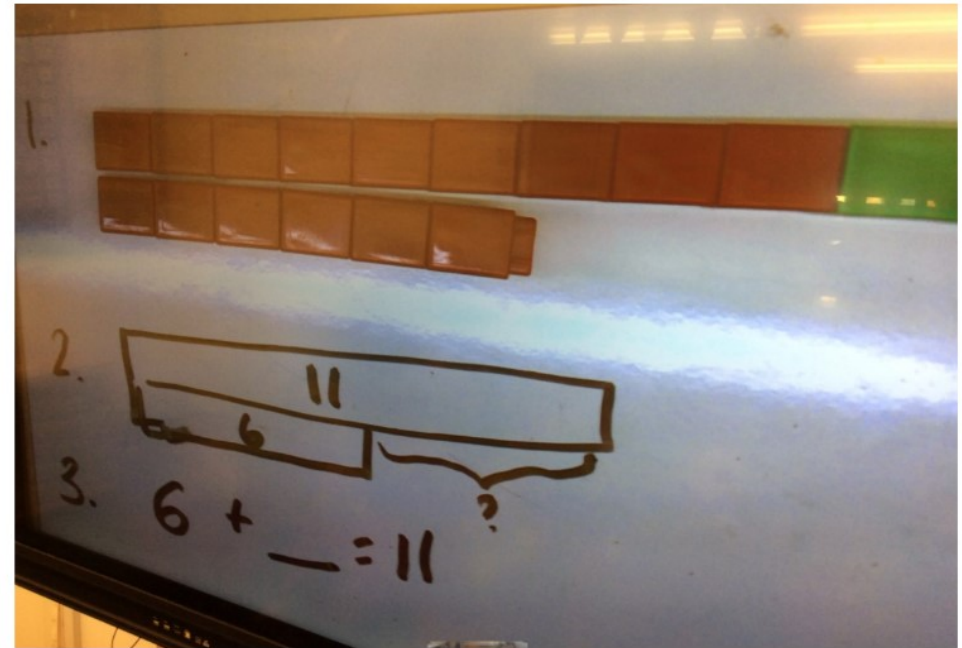
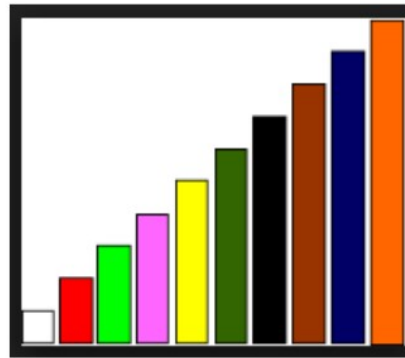
Basic addition facts

Basic subtraction facts



# Number bonds

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



# Number bonds

How many ways? (Using resources)

Writing bonds systematically and discussing patterns

Learning the bonds from memory

Using and applying this knowledge



# Basic addition facts

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

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

How to help at home

# Incorporate maths into daily routines <sup>CS</sup>



Counting forwards and backwards



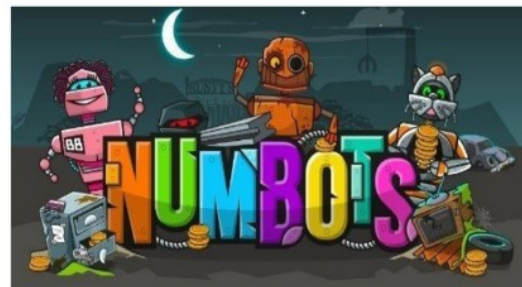
Measures in everyday play



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

Raise the profile of maths in line with reading.

Work on number bonds and basic addition and subtraction fluency in particular.

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

<b>Learning next week</b>	<b>Science:</b> We start our new unit on plants and we will be learning about seeds. <b>English:</b> We are starting our new unit based on the book 'The Whale Song' by Dyan Sheldon. <b>Maths:</b> 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.
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# Written methods in Year 2

### 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:

$$36 = 30 + 6$$

$$36 = 20 + 16$$

$$36 = 10 + 26$$

# Addition - 1 digit add 1 digit

CS

$$4 + 3 =$$

# Addition - 2 digit add 1 digit

$$24 + 3 =$$

# Addition - 2 digit add a multiple of ten

CS

$$40 + 30 =$$

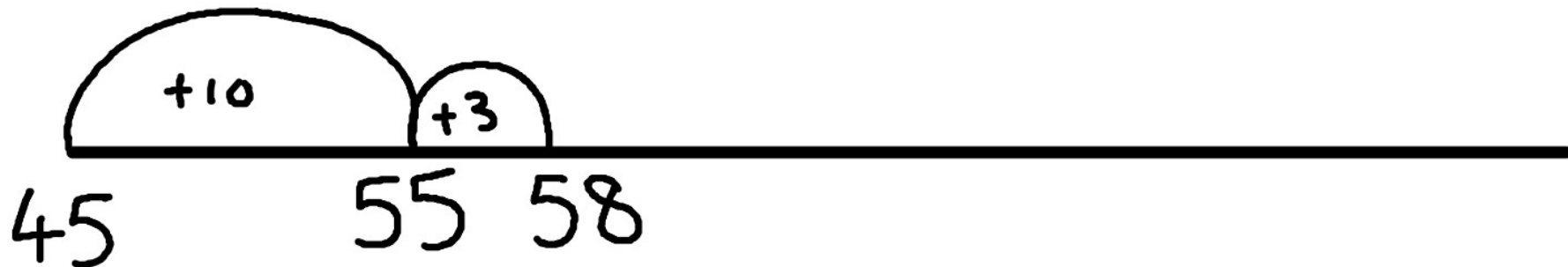
## Addition - 2 digit add 2 digit -

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

$$45 + 13 = 58$$

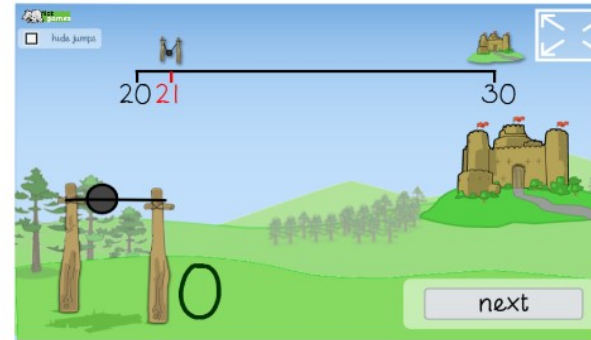
10    3

- alternative methods
- count forwards
  - compensate



# Addition - 2 digit add 1 digit - bridging through 10

CS



$$\begin{array}{r} 18 \\ + 7 \\ \hline 25 \end{array}$$

A handwritten diagram showing the addition of 18 and 7. The number 18 is written vertically, with a '1' above the '8'. A '7' is written to its right. A horizontal line is drawn under the 8 and 7. A '2' is written below the 8, and a '5' is written below the 7. A curved line connects the 2 and 5, forming a shape like a '25'.

18 + 7 = 25  
25

11167	11167	11167
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●

$$\begin{array}{ccc} \text{+2} & \text{+5} & \\ \hline 18 & 20 & 25 \end{array}$$

A handwritten number line starting at 18. A curved line above the line contains '+2' and '+5'. Below the line, the numbers 18, 20, and 25 are written.

# Addition - 2 digit add 2 digit - bridging through 10

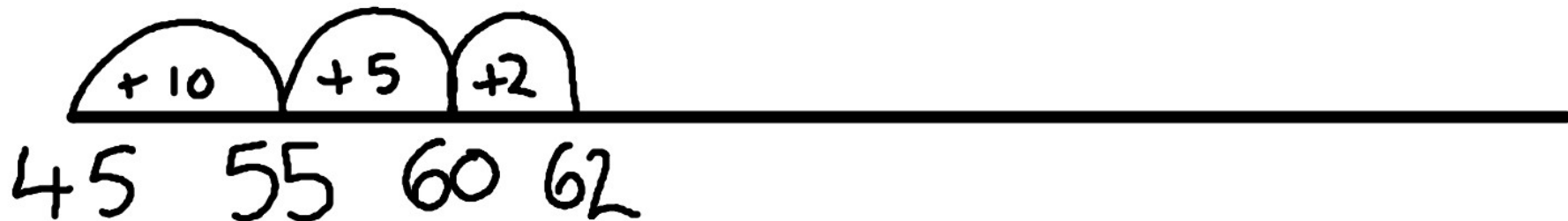
When adding, if the numbers are far apart, we recommend adding on a number line.

CS

alternative methods  
- compensate

$$45 + 17 = 62$$

A tree diagram showing the decomposition of 17 into 10 and 7, and then 7 into 5 and 2.



# Addition - 2 digit add 2 digit

CS

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

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

CS

$$28 + 34 = 62$$

20	+	8
30	+	4
50	+	12

10      2

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

$$50 - 20 =$$

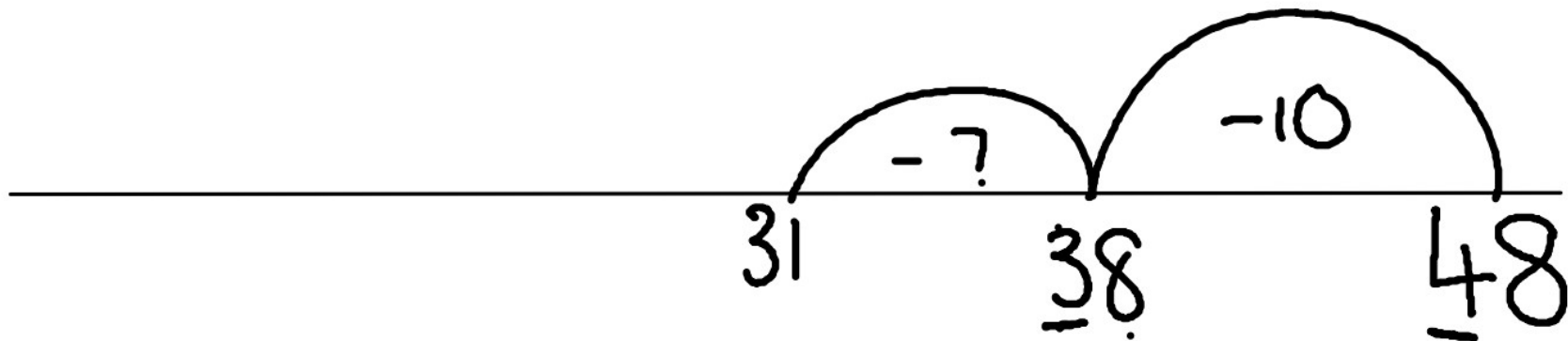
What number facts can I use to help me?

# Subtraction - 2 digit subtract 2 digit

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

$$48 - 17 =$$

10   7



# Subtraction - 2 digit subtract 1 digit - bridging through 10

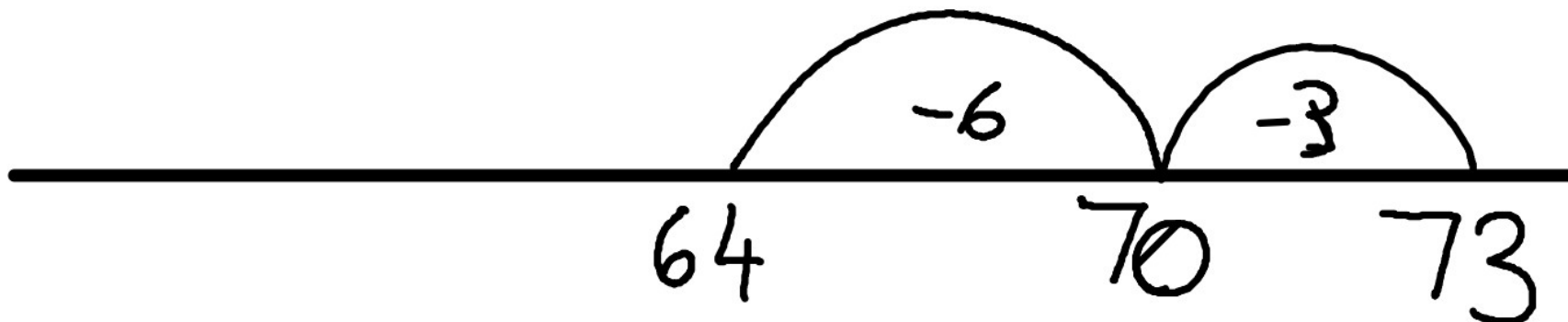
When subtracting, if the numbers are far apart we recommend subtracting on a number line.

$$73 - 9 = \underline{\quad}$$

3    6

alternative methods

- count back
- compensate



# Subtraction - 2 digit subtract 2 digit - bridging through 10

HS

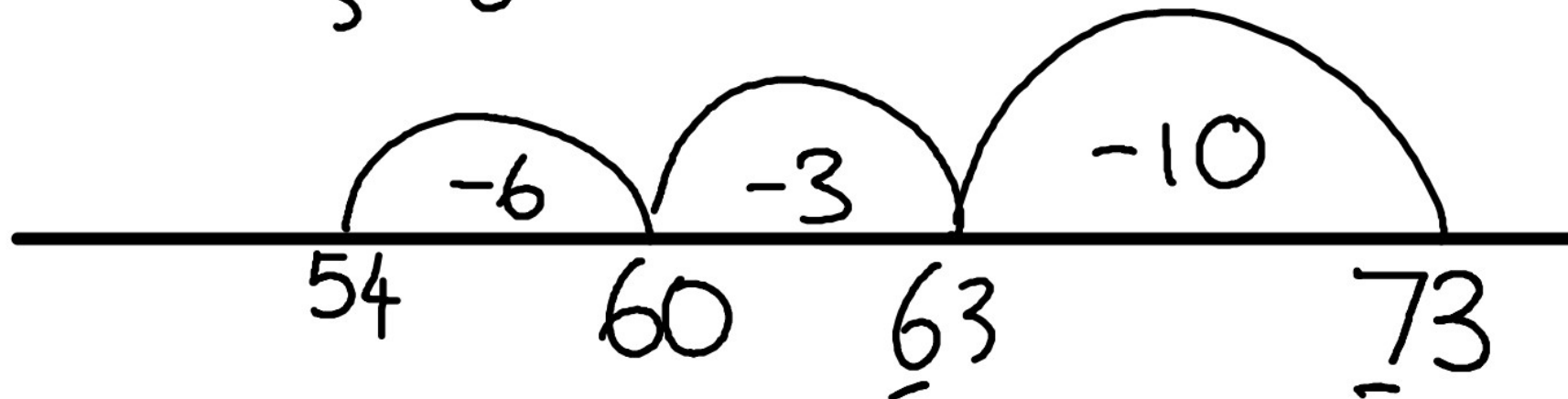
When subtracting, if the numbers are far apart, we recommend subtracting on a number line.

$$73 - 19 =$$

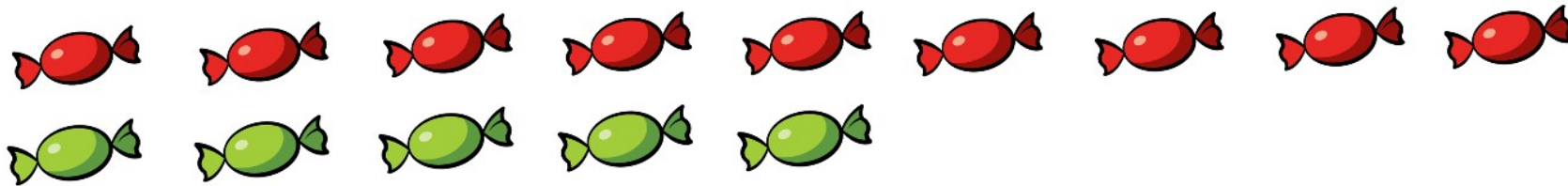
A tree diagram showing the decomposition of 19. The number 19 is at the top, with a line connecting it to 10 on the left and 9 on the right. From the 9, two lines branch out to 3 and 6.

alternative methods

- count back
- compensate



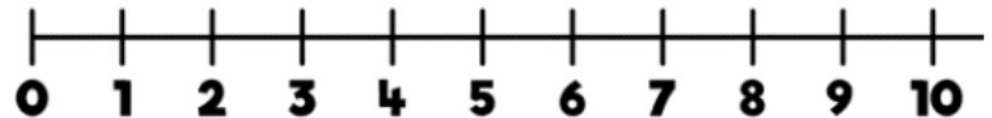
# Subtraction - Finding the difference



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.

## 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 ( $\times$ ), division ( $\div$ ) 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.

# Multiplication

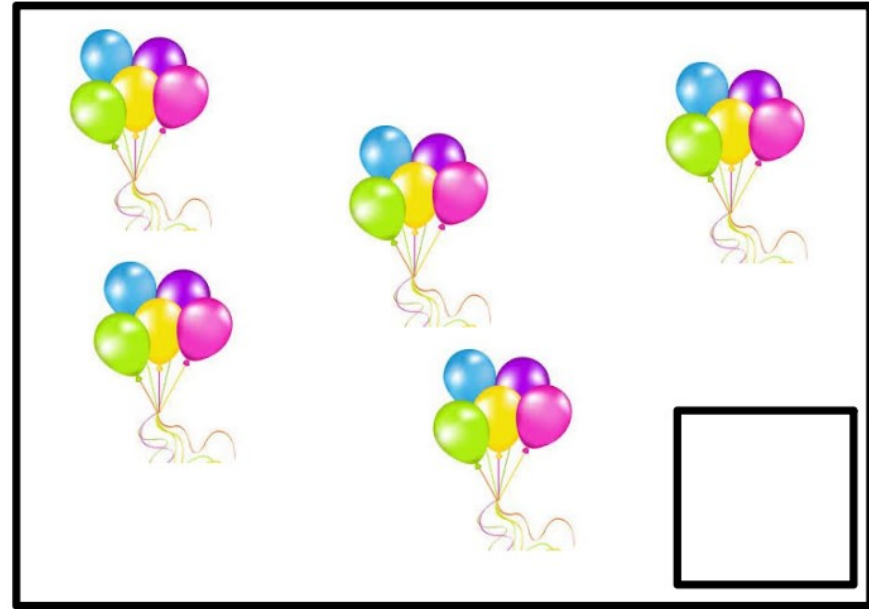
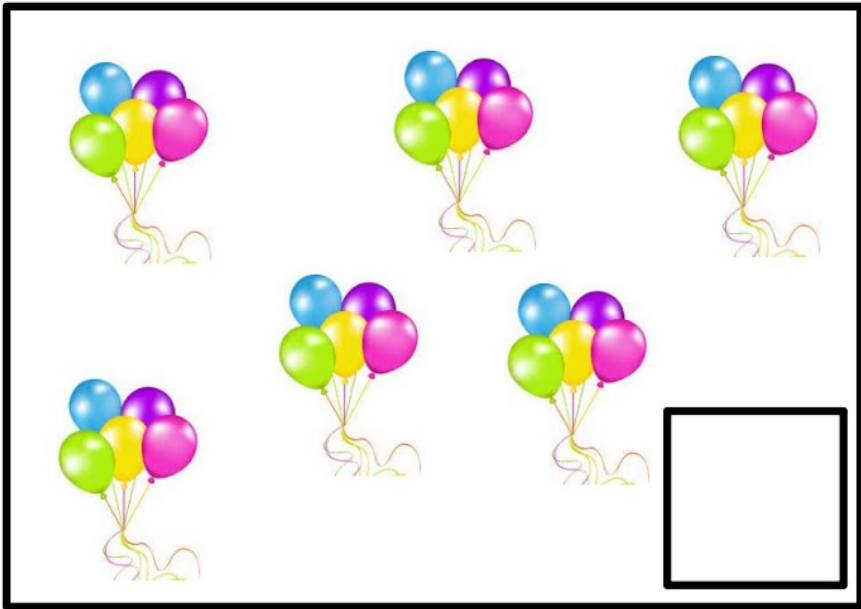
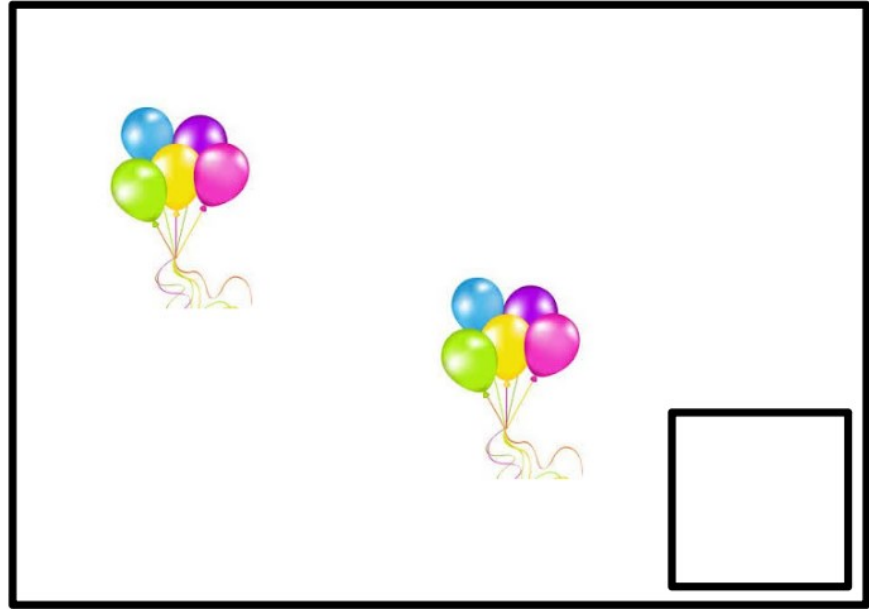
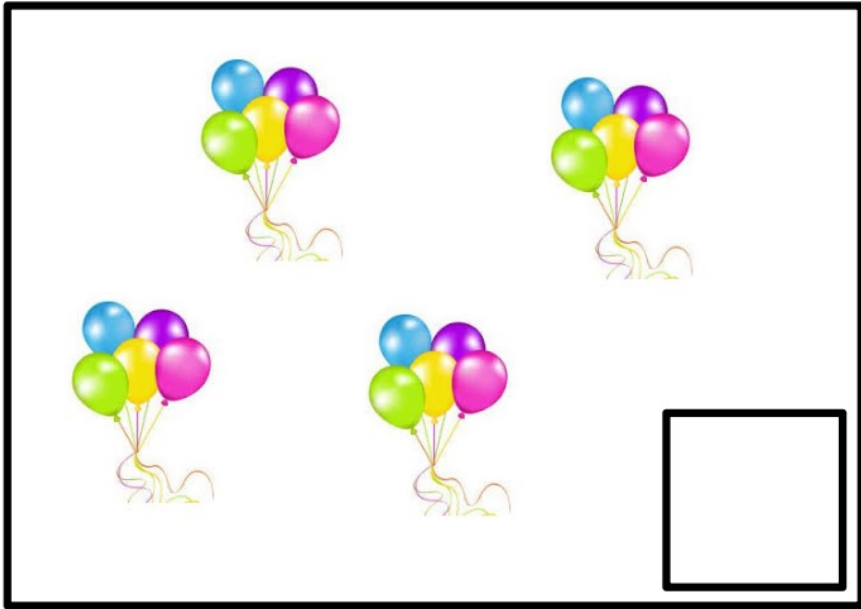
By the end of Year 2 the children must be fluent with the 2, 5 and 10 times tables. They must also be familiar with the 3 times table.

$$3 \times 5 = 15$$

$$5 \times 3 = 15$$



# Multiplication – Ideas from lessons



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

New

CS



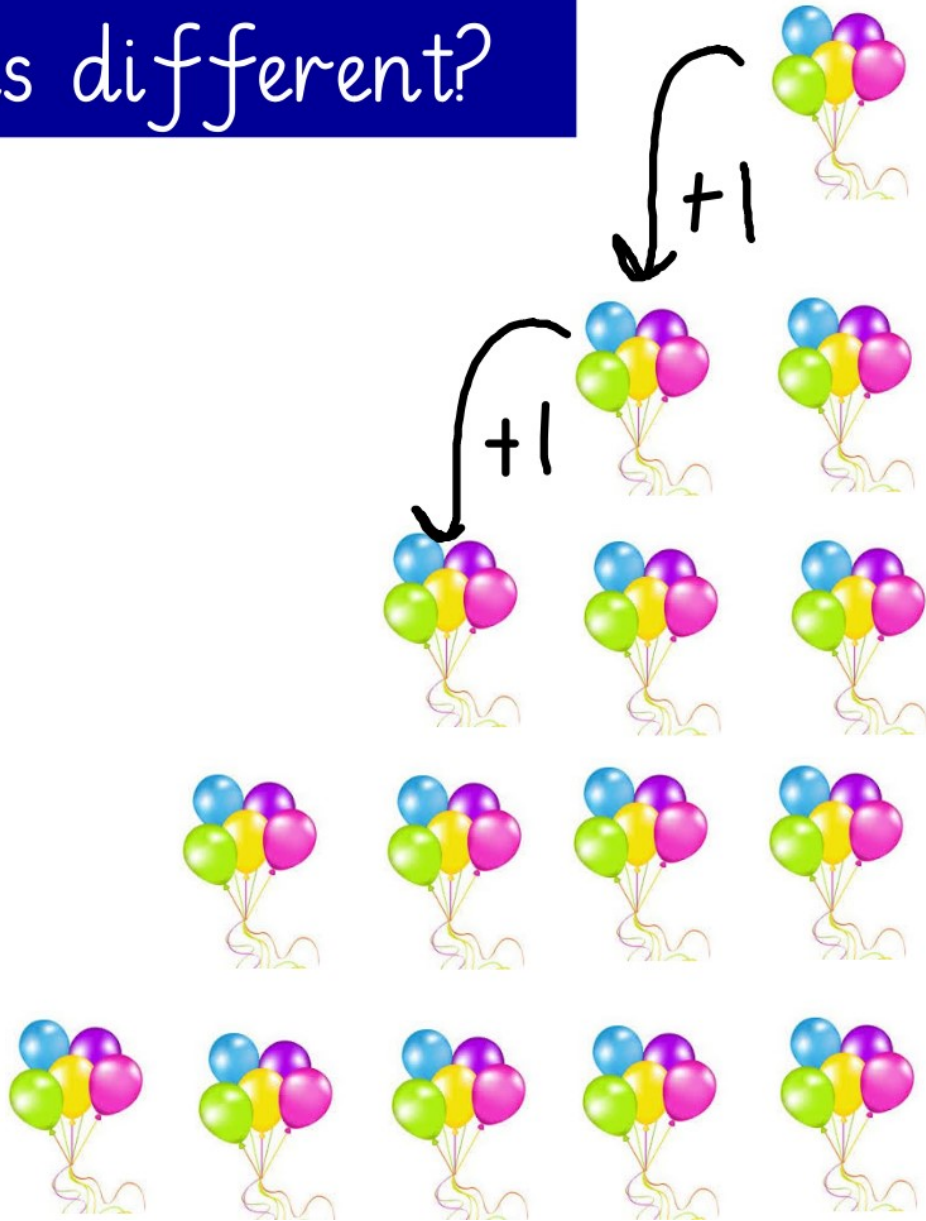
$$2 \times 5 = 10$$



$$3 \times 5 = 15$$



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



$$\begin{array}{l} 1 \times 5 = 5 \\ 2 \times 5 = 10 \\ 3 \times 5 = 15 \\ 4 \times 5 = 20 \\ 5 \times 5 = 25 \end{array}$$



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!

$$1 \times 5 = 5$$

$$2 \times 5 = 10$$

$$3 \times 5 = 15$$

$$4 \times 5 = 20$$

$$5 \times 5 = 25$$

$$6 \times 5 = 30$$

$$7 \times 5 = 35$$

$$8 \times 5 = 40$$

$$9 \times 5 = 45$$

$$10 \times 5 = 50$$

$$11 \times 5 = 55$$

$$12 \times 5 = 60$$

$$5 \times 1 = 5$$

$$5 \times 2 = 10$$

$$5 \times 3 = 15$$

$$5 \times 4 = 20$$

$$5 \times 5 = 25$$

$$5 \times 6 = 30$$

$$5 \times 7 = 35$$

$$5 \times 8 = 40$$

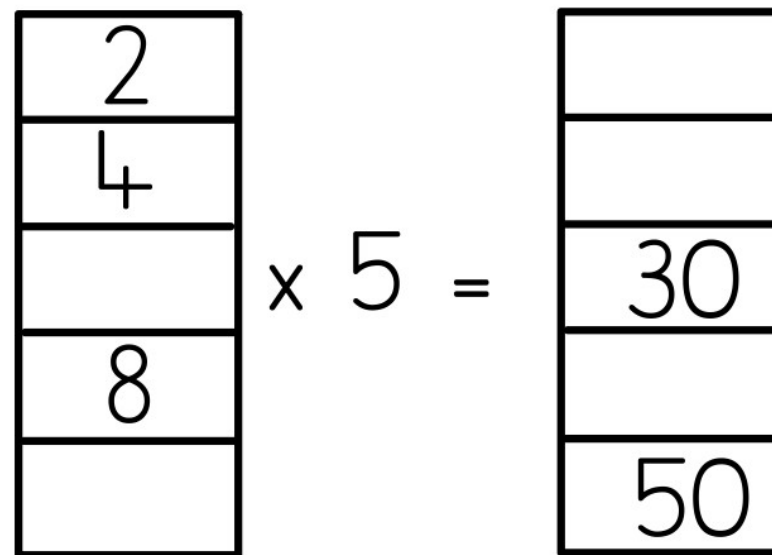
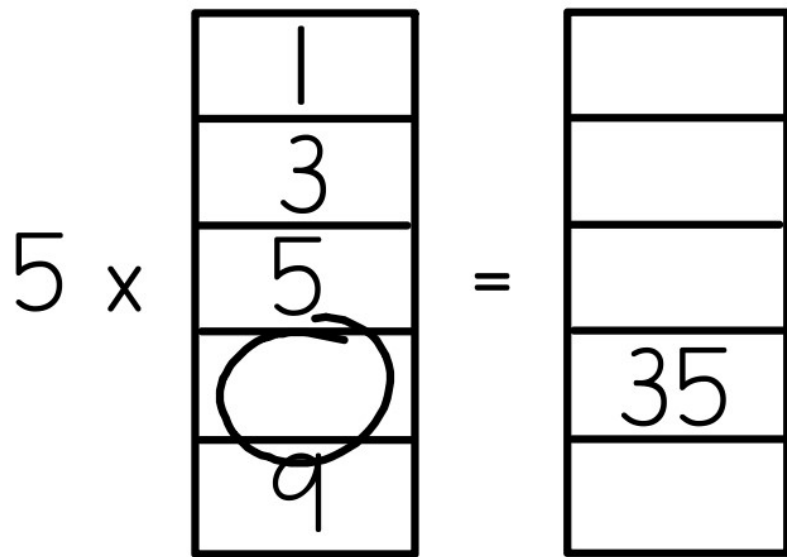
$$5 \times 9 = 45$$

$$5 \times 10 = 50$$

$$5 \times 11 = 55$$

$$5 \times 12 = 60$$

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



$0 \times 5 =$

$40 = \quad \times 5$

$5 \times 3 =$

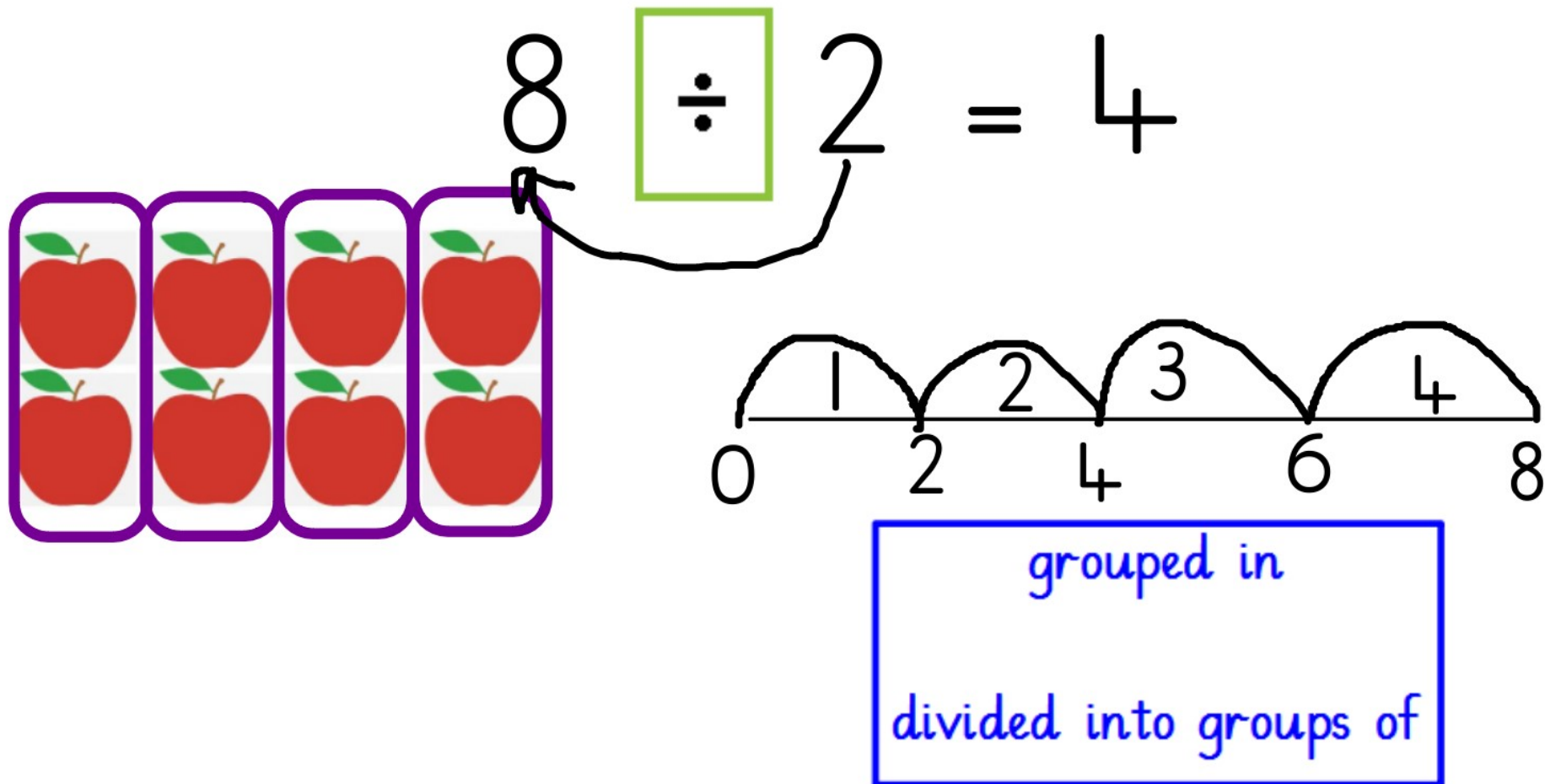
$50 = 5 \times$

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

We teach the children division initially as **grouping**.



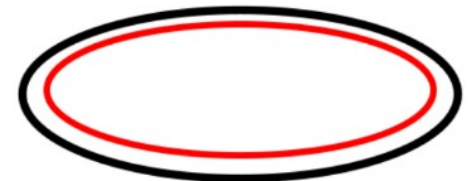
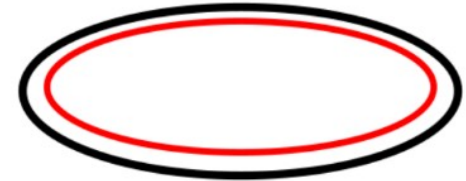
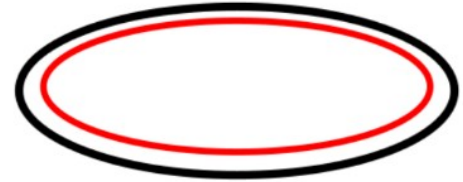
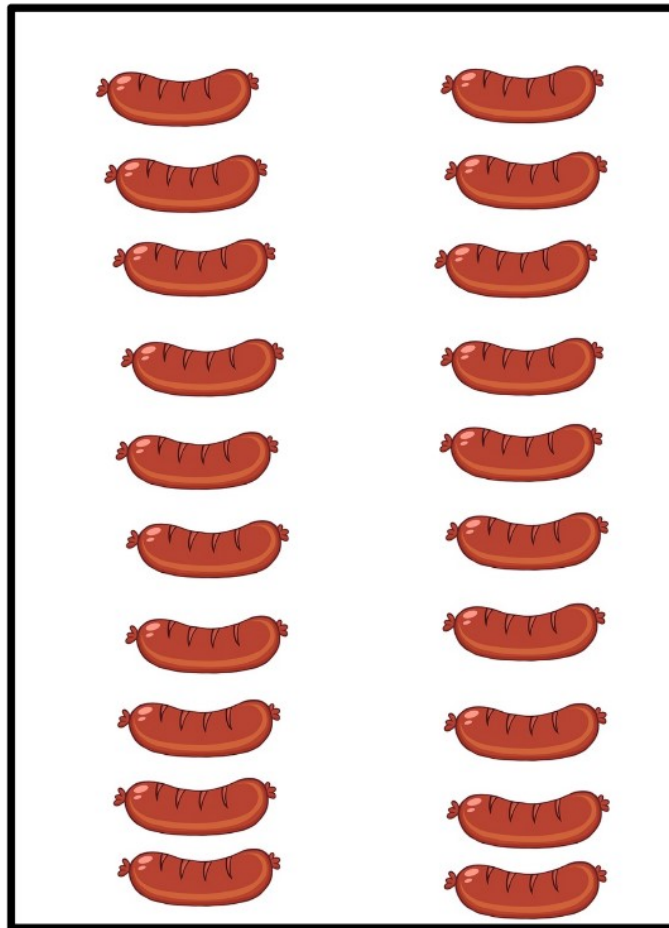
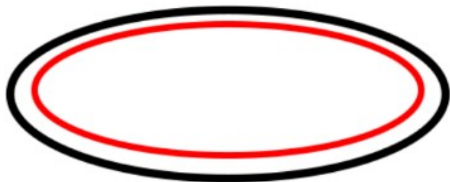
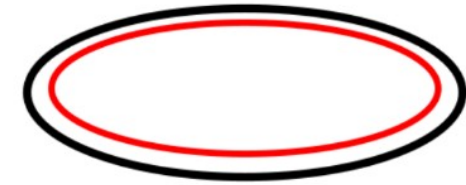
# Sharing

There are 20 sausages. 20 is the whole.

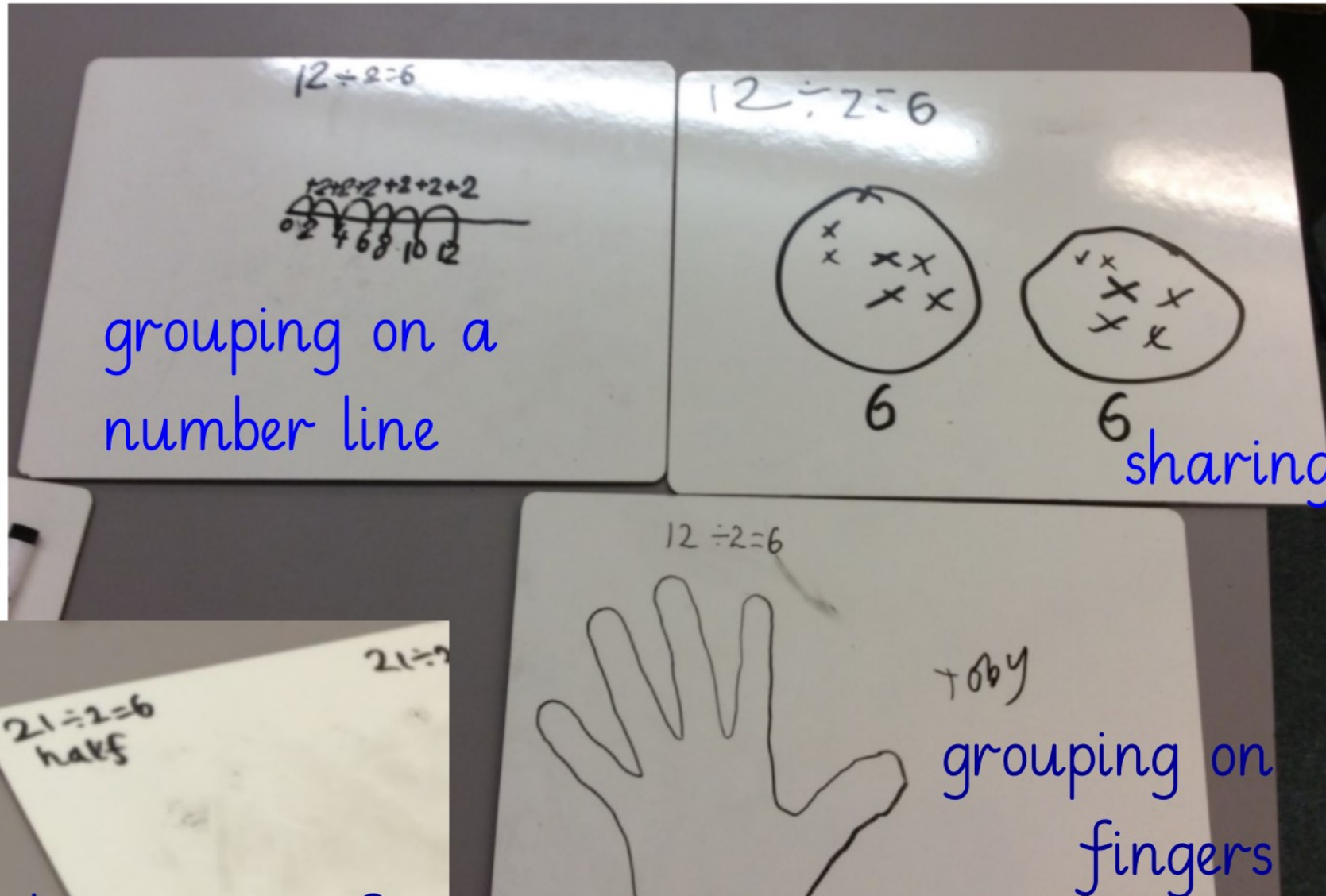
We need to put the sausages equally on all 5 plates.



$$20 \div 5 = 4$$



$$12 \div 2 = 6$$



grouping on a  
number line

sharing

Toby  
grouping on  
fingers

halving to  $\div 2$

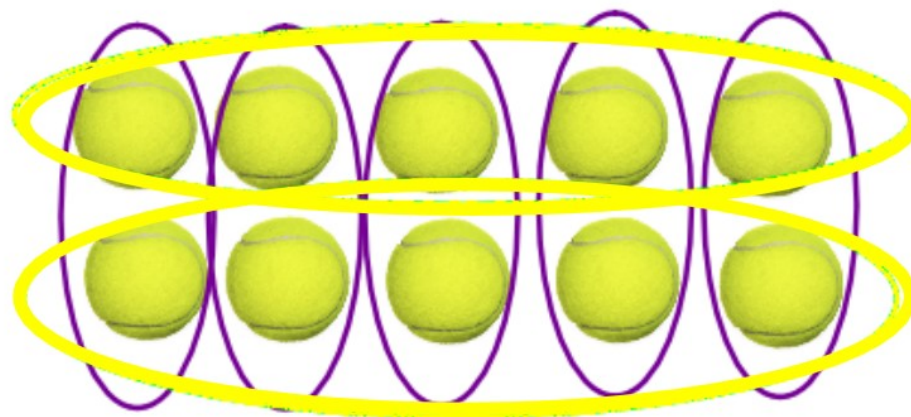
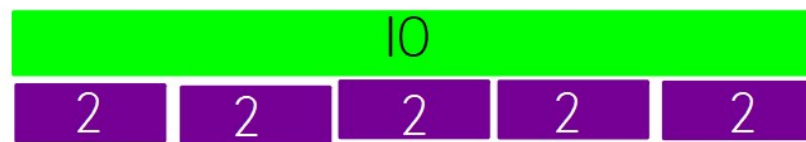
# Fact families

$$2 \times 5 = 10$$

$$5 \times 2 = 10$$

$$10 \div 5 = 2$$

$$10 \div 2 = 5$$





# Multiplication and division challenges

HS

$$1 \times 5 = 5$$

$$2 \times 5 = 10$$

$$3 \times 5 = 15$$

$$4 \times 5 = 20$$

$$5 \times 5 = 25$$

$$6 \times 5 = 30$$

$$7 \times 5 = 35$$

$$8 \times 5 = 40$$

$$9 \times 5 = 45$$

$$10 \times 5 = 50$$

$$2 \times 5 = 10$$

$$7 \times 5 = 35$$

$$4 \times 5 = 20$$

$$10 \times 5 = 50$$

$$6 \times 5 = 30$$

$$5 \times 5 = 25$$

$$8 \times 5 = 40$$

$$9 \times 5 = 45$$

$$3 \times 5 = 15$$

$$1 \times 5 = 5$$

$$15 = \_ \times 5$$

$$\_ \times 5 = 35$$

$$\_ \div 5 = 8$$

$$5 \times \_ = 10$$

$$50 = \_ \times 5$$

$$35 \div 5 = \_$$

$$\_ \times 5 = 5$$

$$0 \times 5 = \_$$

$$6 = \_ \div 5$$

$$45 \div 5 = \_$$

# Useful apps / sites

Hit the button



Numbots



Cloud tables



# KSI Assessments

HS

The KSI assessments take place in the Summer Term. In maths, children will complete an arithmetic paper and a reasoning paper. They form 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 (KSI) teacher assessment.
- The Standards and Testing Agency (STA) are, however, continuing to develop and supply printed materials to schools for optional end of KSI tests
- These are both still valuable tools for assessing pupils at the end of KSI 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.

# Arithmetic

HS

$4 + 2 =$

2

$19 - 9 =$

3

$89 + 10 =$

4

$17 - 6 =$

5

$15 + 3 + 3 = \boxed{\phantom{00}}$



7

$\boxed{\phantom{00}} + 5 = 9$

HS



18

$\frac{1}{4} \text{ of } 20 = \boxed{\phantom{00}}$



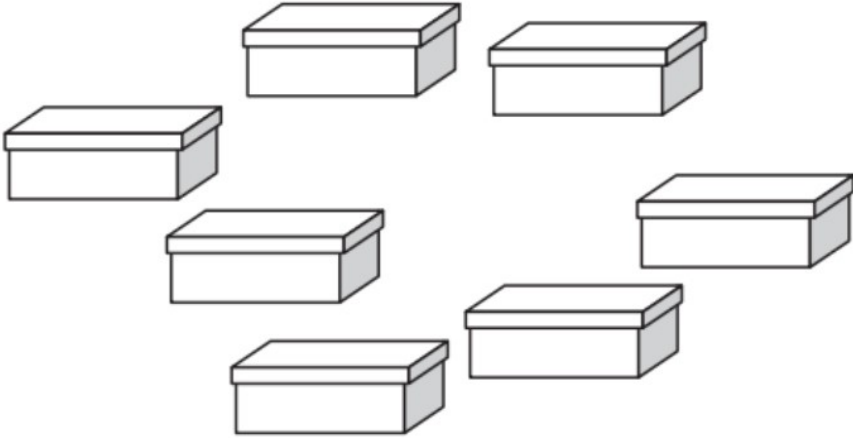
11

$87 - 40 = \boxed{\phantom{00}}$



# Reasoning

7



Sita puts **2** shoes in each of these boxes.

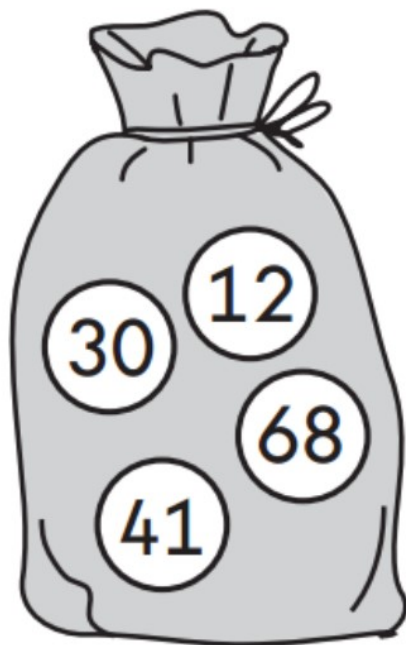
How many shoes are there altogether?

shoes

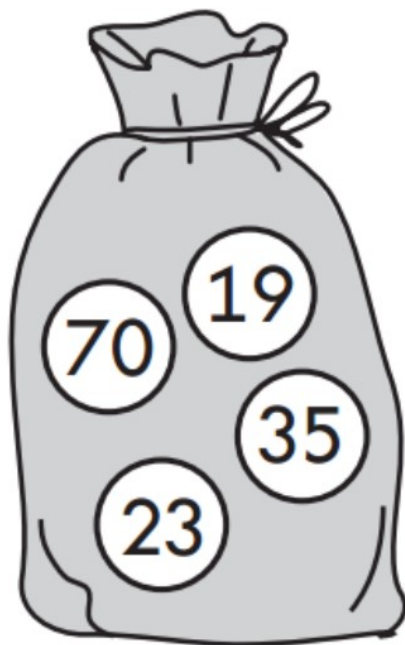


12 **Two** of the numbers are in the **wrong** bag.

Draw a cross (X) on each of them.



**even** numbers



**odd** numbers



8 Complete the table.

words	digits
thirty-eight	38
	40
ninety-four	





19 Amy buys an ice-cream for 90p.



(a) Tick (✓) **three** coins to show how Amy can make **90p**.

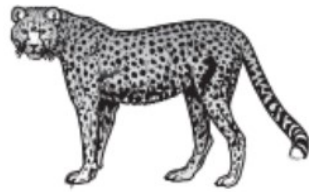


(b) Tick (✓) **four** coins to show another way to make **90p**.

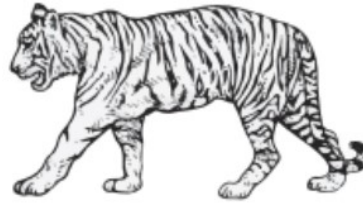


Abdul goes to the zoo.

He finds out the mass of some animals.



Cheetah  
**58 kg**



Tiger  
**94 kg**



Lion  
**94 kg**

Compare the mass of the animals.

Write  $<$  or  $>$  or  $=$  in each box.

Cheetah's mass

Tiger's mass

Tiger's mass

Lion's mass



# 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