Supporting Your Child with Maths

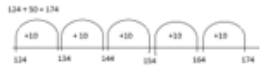
Parent Workshops Autumn Term 2023

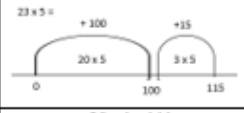
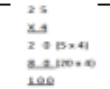
What Maths do we do?

- Daily 1 hour maths lessons-covering all aspects of the maths national curriculum

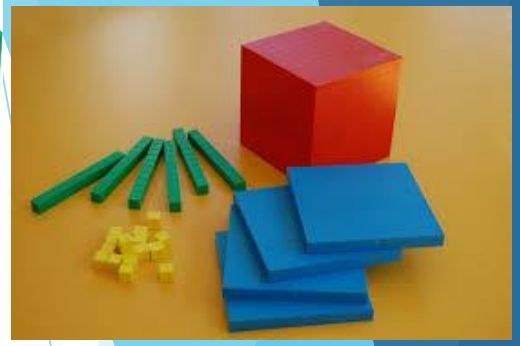
- Followed by a daily, 20 minute additional maths session;
  - Mon: KIRF Session for all year groups
  - Tues, Wed, Thurs: Times Tables Workshops for Years 3 and 4
  - MMM (Maths Morning Meeting) for Years 5 and 6
  - Fridays: Arithmetic Session for all year groups

Progression in Calculation

Year Group	Stage	Addition Strategy		Number Expectations	
KS1 / Year 3 / Year 4	One	Real Life Concrete Resources	 Socks, Fruit Pasta, Marbles Small toys etc.	Use real life objects to group objects to represent single digit numbers added to single digit numbers, for example 5 apples + 7 apples = 12 apples.	Numbers up to 20
	Two	Concrete Mathematical Resources	 Numicon Bead strings Straw bundles Dienes Place value counters	Use concrete materials to: Recall and use addition and subtraction facts up to 20. Derive related facts up to 100. Add three 1 digit numbers. Add pairs of 1 and 2 digit numbers Understand that addition is commutative. Concrete resources may also be used to support the introduction of the steps below.	Numbers up to 100 (KS1) Numbers up to 1000 (Yr3)
	Three	Number lines for addition		A three digit number and 1's, 10's and 100's Add two 2 digit numbers under 100. Add two 2 digit numbers totalling over 100.	Numbe (Yr3) Numbe (x 4) Numbe 1,0000
Year 5 / Year 6	Four	Elegant number lines for addition		Use elegant jumps to cross boundaries 10's, 100's, 1000's Use elegant number lines to support the development of mental methods. E.g. 678 + _____ = 1000	Numbe (Yr3) Numbe (x 4) Numbe 1,0000
	Five	Expanded addition including carrying	345 + 218 = 563 H T O 300 40 5 200 10 8 500 60 3 10	Addition of two 2 digit numbers without carrying. Addition of a 2 digit and a 3 digit number without carrying. Addition of two 3 digit numbers without carrying. Addition of two 2 digit numbers with carrying into the tens. Addition of larger numbers up to two 3 digit numbers including carrying into the tens and into the hundreds.	Numbe (Yr3) Numbe (x 4 – move the sta
Year 5 / Year 6	Six	Compact addition	3,458 + 1,322 = 4,780 Th H T O 3 4 5 8 +1 3 2 2 4 7 8 0 1	Compact addition should initially be shown alongside expanded addition. Addition of 2 digit and 3 digit numbers without carrying. Addition of 2 digit and 3 digit numbers carrying into the tens. Calculations which require carrying into the tens, hundreds, thousands and beyond. Calculations which require multiple times within a single calculation.	Numbe (Yr3) Numbe (x 4) Numbe 1,0000 Numbe 10,000
	Seven	Compact addition with decimal places.	245.87 + 17.089 = H T O .Th Hd Thd 2 4 5 . 8 7 0 + 0 1 7 . 0 8 9 2 6 2 . 9 5 9 1 1	Calculations which involving numbers with up to 3 decimal places. Calculations which require carrying into the hundredths, tenths and one's column. Addition calculations where numbers are different sizes E.g. 3,467.02 + 85.089	Numbe (Yr3) Numbe (x 4) Numbe 1,0000 Nu 10,(

Year Group	Stage	Multiplication Strategy		Number Expectations	
KS1 / Year 3 / Year 4 / Year 5	One	Real Life Concrete Resources		Use real life objects to group objects to represent single digit numbers multiplied by single digit numbers, for example 2 groups of 4 apples.	2x, 5x, 10x
	Two	Concrete Mathematical Resources		Use concrete mathematical resources to multiple single digit numbers by single digit numbers, for example 4 x 5.	2x, 5x, 10x 4x, 8x 3x
	Three	Arrays		Single digit x single digit e.g. 4 x 5 Multiples of ten x single digit e.g. 20 x 4 Teen numbers x single digit numbers, e.g. 16 x 5	2x, 5x, 10x 4x, 8x 3x
	Four	Repeated Addition on a Number Line		Single digit x single digit e.g. 4 x 5	2x, 5x, 10x 4x, 8x 3x
	Five	Using known facts for multiplication	If 3 x 4 is 12 3 x 40 = 120 30 x 40 = 1200	Derive related facts from known facts with appropriate size numbers for year group.	2x, 5x, 10x 4x, 8x 3x 6x
	Six	Partitioning (Number line)		Teen numbers x single digit numbers, e.g. 16 x 5 Two digit numbers x single digit numbers e.g. 24 x 3	2x, 5x, 10x 4x, 8x 3x 6x
	Seven	Partitioning using mental methods	26 x 4 = 144 20 x 4 = 120 6 x 4 = 24 120 + 24 = 144	Multiply numbers mentally drawing upon known facts.	2x, 5x, 10x 4x, 8x 3x 6x All up to 12x
	Eight	Expanded Column Method		Two and three digit numbers x single digit numbers e.g. 145 x 5 Two digit number x two digit numbers e.g. 67 x 23	All up to 12x
	Nine	Compact Column Method (Short Multiplication)		Two, three and four digit numbers x single digit numbers e.g. 2,145 x 5	All up to 12x
	Ten	Long Multiplication		Two, three and four digit numbers x two digit numbers e.g. 235 x 27	All up to 12x

The CPA approach



The Concrete Pictorial Abstract (CPA) approach is a system of learning that uses physical and visual aids to build a child's understanding of abstract topics.

Concrete-KS1 and early KS2 but can continue further up where needed. Children use practical objects to help count and calculate, for example buttons, Dienes, counters, multi-link, real life objects, bead-strings, fraction tiles, Numicon etc

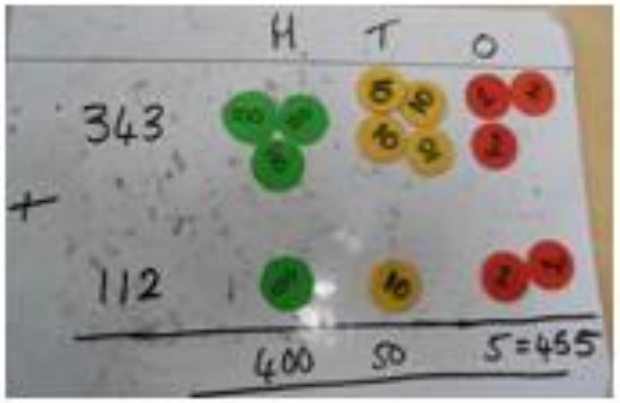
Pictorial-children draw pictures and jottings to help them. E.g. dots to share out when dividing or bar models to draw out the problem

Abstract-children use just the numbers and symbols

Concrete and Pictorial

46 + 17 = 63

T	O
40	6
+10	7
60	3
10	



3 groups of 3 = 9

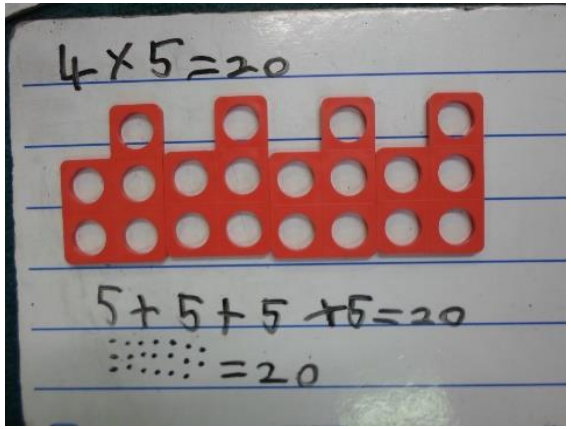
or

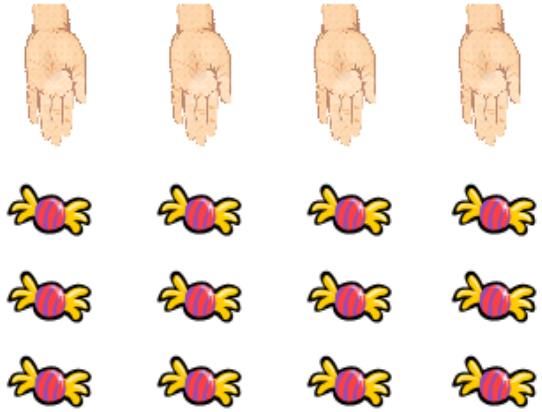
3 x 3 = 9

2 groups of 4 = 8

or

2 x 4 = 8





3 2

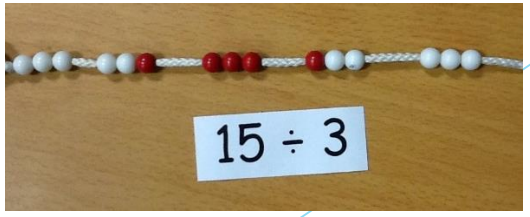
X 4

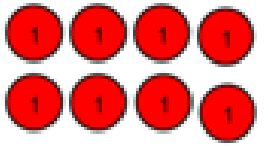
8 (4 x 2)

1 2 0 (4 x 30)

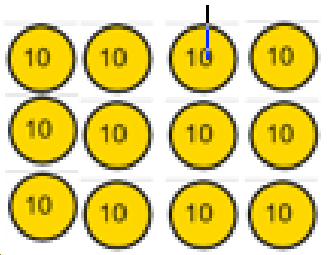
2 0 0

1





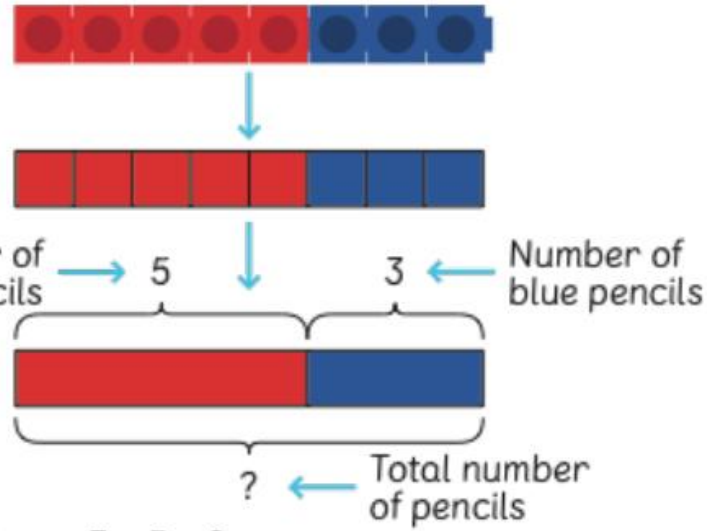
4 x 2



4 x 30

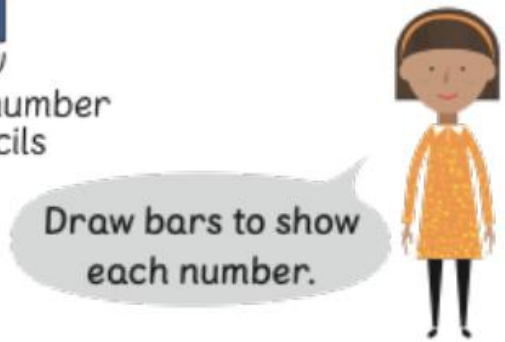
Moving from concrete to pictorial

1 Use  to show the number of pencils.



$5 + 3 = 8$ or $3 + 5 = 8$

There are 8 pencils altogether.

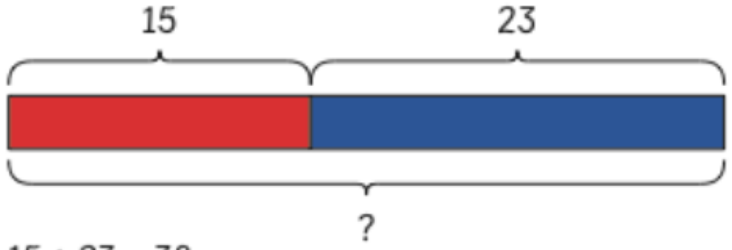


2

has 15 pencils.

has 23 pencils.

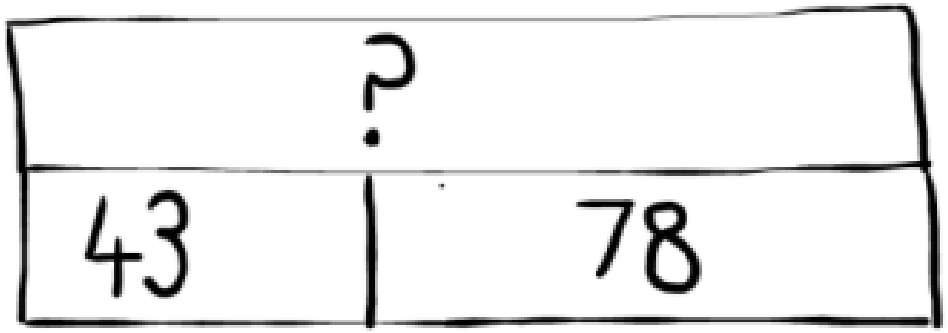
How many pencils do they have altogether?



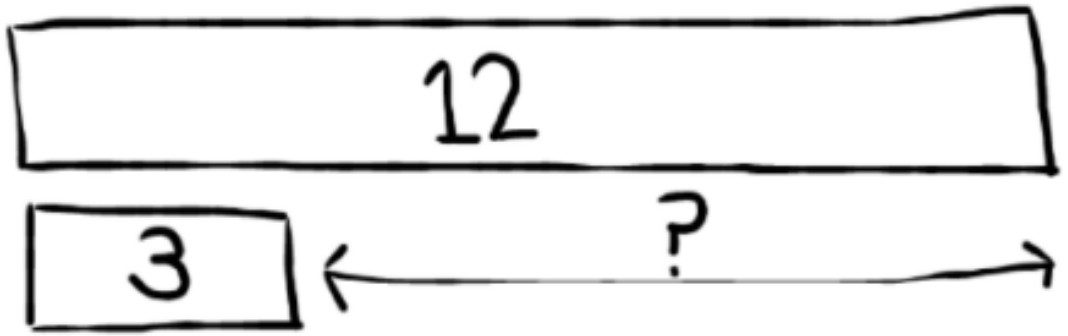
$15 + 23 = 38$

They have 38 pencils altogether.

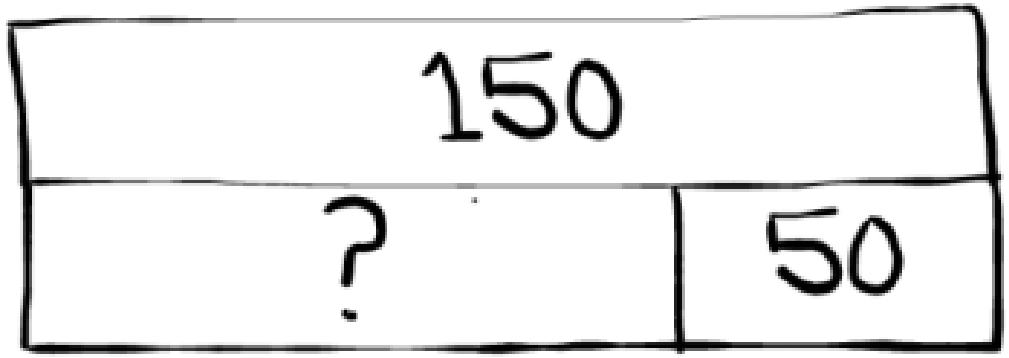
	T	O
	1	5
+	2	3
	3	8

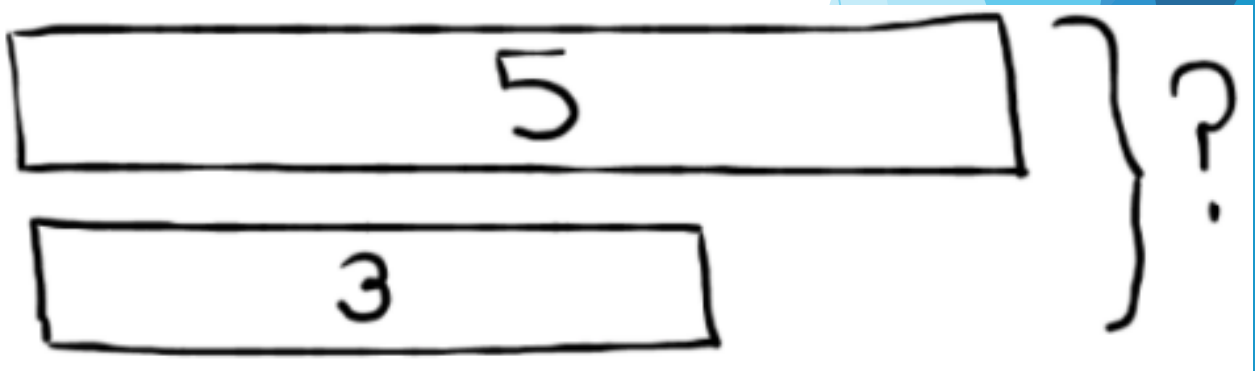


Sandi has 12 football cards and Umar has 3. How many more cards does Sandi have than Umar

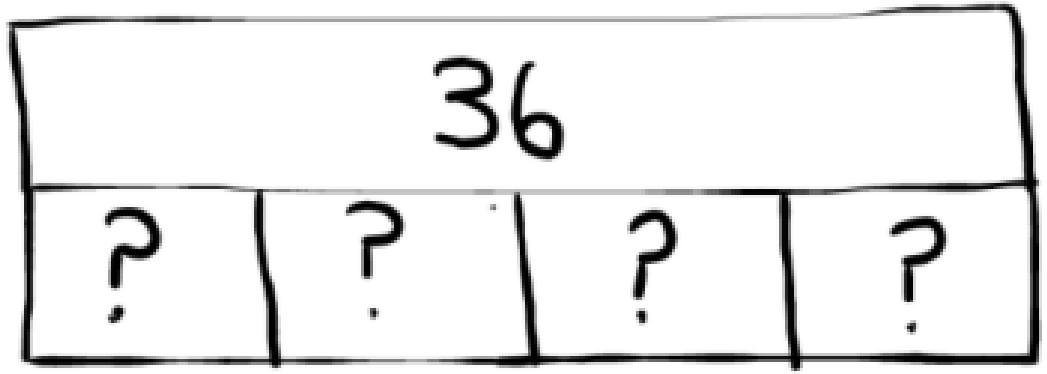


Bar model representing the subtraction equation '150 – 50 = ?'

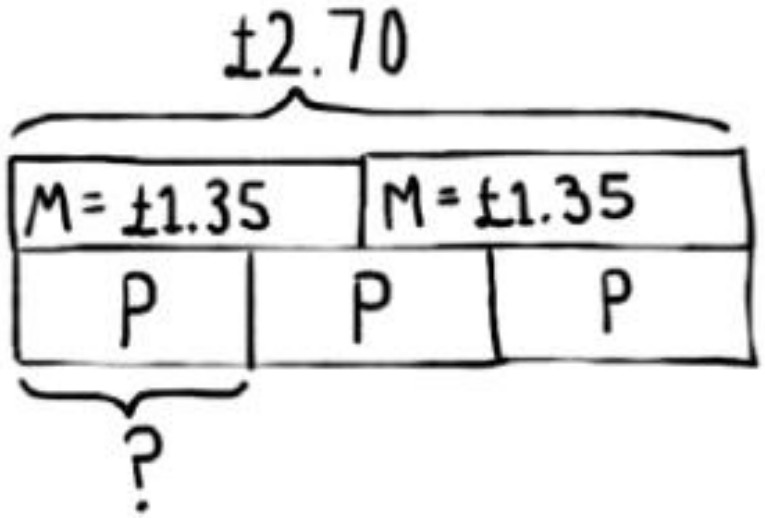




Bar model representing the division equation '36 ÷ 4 = ?'
or the multiplication' equation '4 x ? = 36'



3 pineapples cost the same as 2 mangoes. One mango costs £1.35.
How much does one pineapple cost?

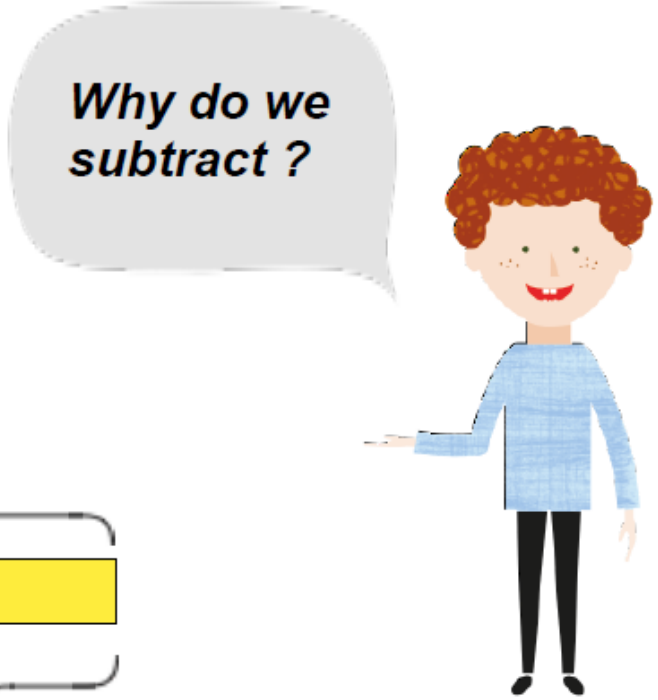


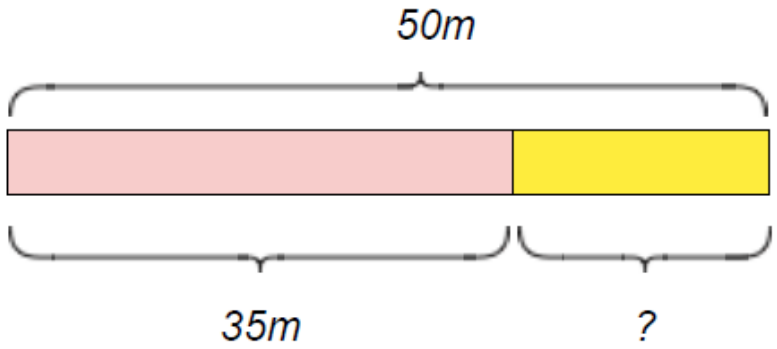
Bar Method for Subtraction

Lulu wants to swim 50 metres.

She has swum 35m.

How far is she from the finishing line?





Seeing a visual representation of the problem helps children develop their conceptual understanding of ***why*** we need to subtract.

Problem One:

Sam had 5 times as many marbles as Tom.

If Sam gives 26 marbles to Tom, the two friends will have exactly the same amount.

How many marbles do they have altogether?

Sam

Tom

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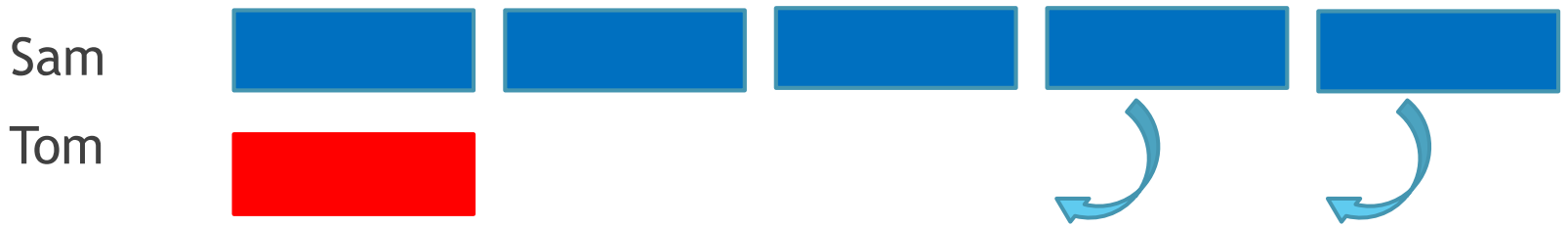
How many marbles do they have altogether?

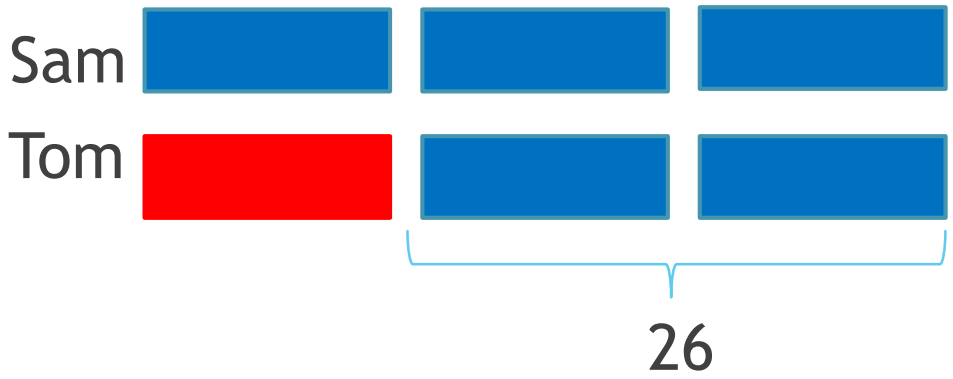


Children can visually see the need to move two bars down so that Tom and Sam each have the same amount.

Sam had 5 times as many marbles as Tom.

If Sam gives 26 marbles to Tom, the two friends will have exactly the same amount.

How many marbles do they have altogether?



If Sam has given Tom 26 marbles (2 bars) then they can now work out how many 1 bar would be and then go on to complete the question.

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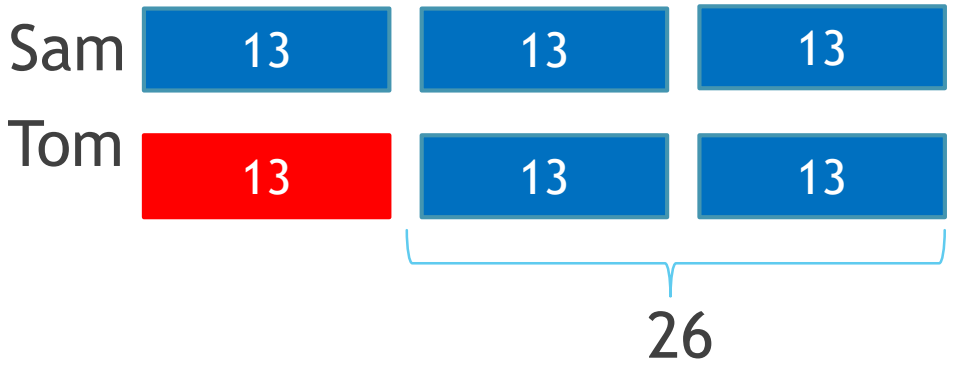

If Sam has given Tom 26 marbles (2 bars) then they can now work out how many marbles 1 bar represents, and then go on to complete the question. (13 x 6 = **78**)

Bar Models

- It is a visual model to help children understand a variety of maths problems including addition, subtraction, multiplication, division, fractions, percentages, ratio and algebra.
- It is *not* a method for solving the problem in itself, but a way or revealing the mathematical structure of a problem (conceptual understanding) i.e. it helps them understand ***why*** we need to subtract or divide for example
- It can help to bridge the gap between using concrete resources and abstract methods.

Expanded and Compact Methods (+, - and x)

- Expanded Methods

357 + 285

300	50	7		357
+ 200	80	5		+ 285
10	2		or	12
100	30	0		130
500	0	0		500
600	40	2		642

- Compact Methods

357 + 285

357

+ 285

642

1 1

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Expanded and Compact Methods (+ - and x)

- Expanded Methods

876 - 214 = 562

800	70	6				8 7 6	
- 200	10	4				- 2 1 4	
		2		or		2	
	60					6 0	
600						6 0 0	
600	60	2				6 6 2	

- Compact Methods

876 - 214

8 7 6

- 2 1 4

6 6 2

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Expanded and Compact Methods (+ - and x)

- Expanded Methods

42 x 54

```
    4 2
  x 5 4
  ------
      8   (4 x 2)
  1 6 0   (4 x 40)
  1 0 0   (50 x 2)
2 0 0 0   (50 x 40)
  ------
2 2 6 8
```

- Compact Methods

42 x 54

```
    4 2
  x 5 4
  ------
  1 6 8
2 1 0 0
  ------
2 2 6 8
```

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Division

Short Division

$864 \div 4$

$$4 \overline{)\,86^{2}4} \quad = \quad 216$$

$574 \div 3$

$$3 \overline{)\,5^{2}74} \quad = \quad 191 \text{ r } 1$$

Chunking

$840 \div 24$

$$24 \overline{)\,840} \quad = \quad 35$$

840	
$-\ 480$	(20)
360	
$-\ 240$	(10)
120	
$-\ 120$	(5)
0	

Fact Box

$24 \times 10 = 240$

$24 \times 20 = 480$

$24 \times 5 = 120$

$24 \times 2 = 48$

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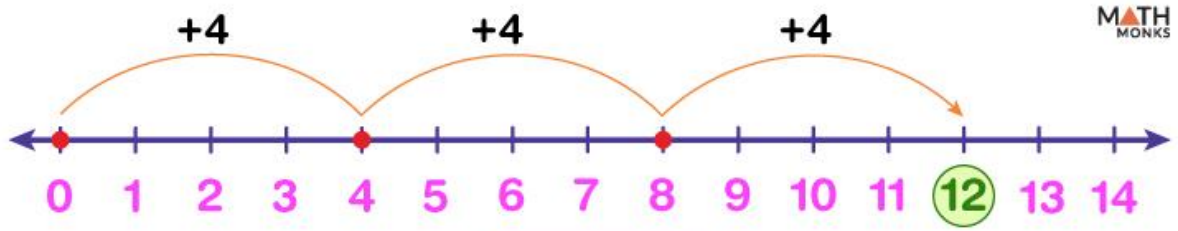
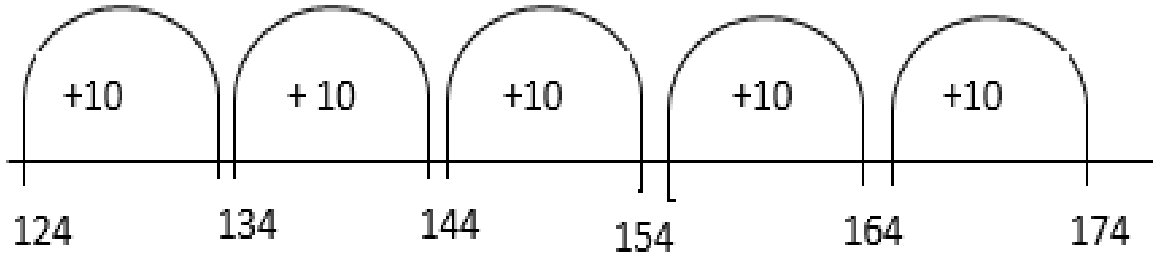
Number Lines

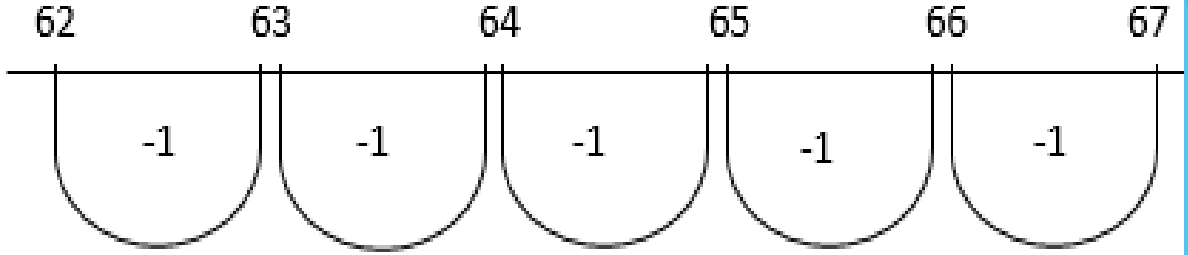


$3 \times 4 = 12$

$124 + 50 = 174$

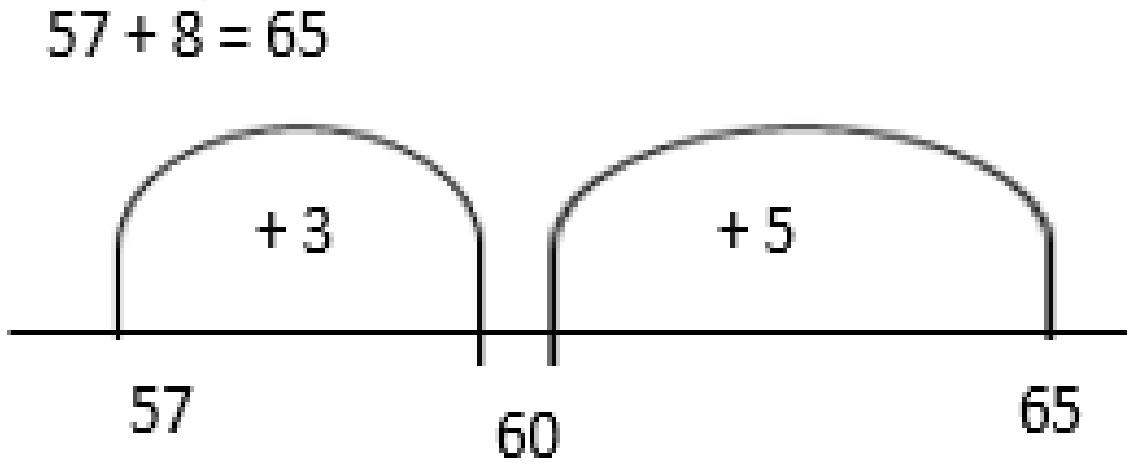


$67 - 5 = 62$



Partitioning on a number line

8 has been partitioned into 3 and 5 to reach the next multiple of 10 first.



How can you help?

- Practising the KIRF with your child
- Supporting your child to learn their times tables-instant recall
- Encouraging your child to complete the arithmetic homework each week
- Take a ‘little and often’ approach to recalling key skills

Useful websites

Hit the Button- https://www.topmarks.co.uk/maths-games/hit-the-button
Snappy Maths http://www.snappymaths.com/multiplication/multiplication.htm
Time table games: https://www.timestables.co.uk/games/
Maths frame: https://mathsframe.co.uk/en/resources/resource/477/Multiplication-Tables-Check
TT Rockstars: https://ttrockstars.com/
BBC Bitesize: https://www.bbc.co.uk/bitesize/subjects/z826n39