Maths Parents Workshop

24.11.2022

Importance of Maths Poem… ☺

If all the numbers in the world were rubbed out, removed, taken away:

I wouldn't know how old I was,

I wouldn't know the time of day,

I wouldn't know which bus to catch,

I wouldn't know the number of goals I had scored,

I wouldn't know how many scoops of ice-cream I had,

I wouldn't know the page on my reading book,

I wouldn't know how tall I was,

I wouldn't know how much I weighed,

I wouldn't know how many sides there are in a hexagon,

I wouldn't know how many days are in the month,

I wouldn't be able to work my calculator.

And I wouldn't be able to play hide-and-seek!

But I would know

As far as my mum was concerned,

I was still her NUMBER ONE!

By Ian Souter

Aims of today's workshop

- To gain an understanding of the National Maths curriculum and expectations.

- To get an insight into how Maths is taught at Garfield School, and understand the written methods used for the four operations (addition, subtraction, division and multiplication).

- To take away some ideas and activities to support your children at home.

The Maths Curriculum

Children should:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations and developing an argument, justification or proof using mathematical language.

- **Solve problems** by applying their mathematics to a variety of problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.
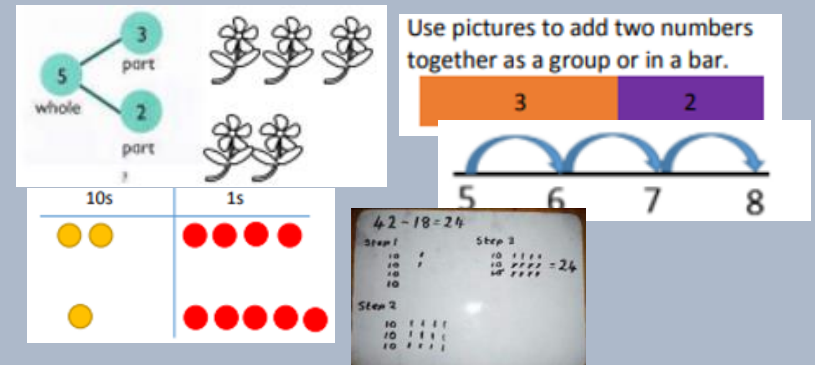
White Rose Maths Scheme

CPA Approach

CONCRETE -
using physical objects to solve maths problems.
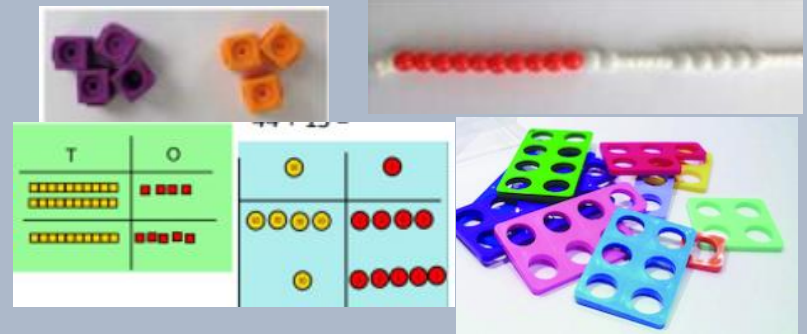
(eg. numicon, cubes, diennes, place value coins, bead lines)

PICTORIAL -
using drawings to solve maths problems.

(eg. part whole models, bar models, drawing pictures and images, number lines, drawing place value coins or diennes)
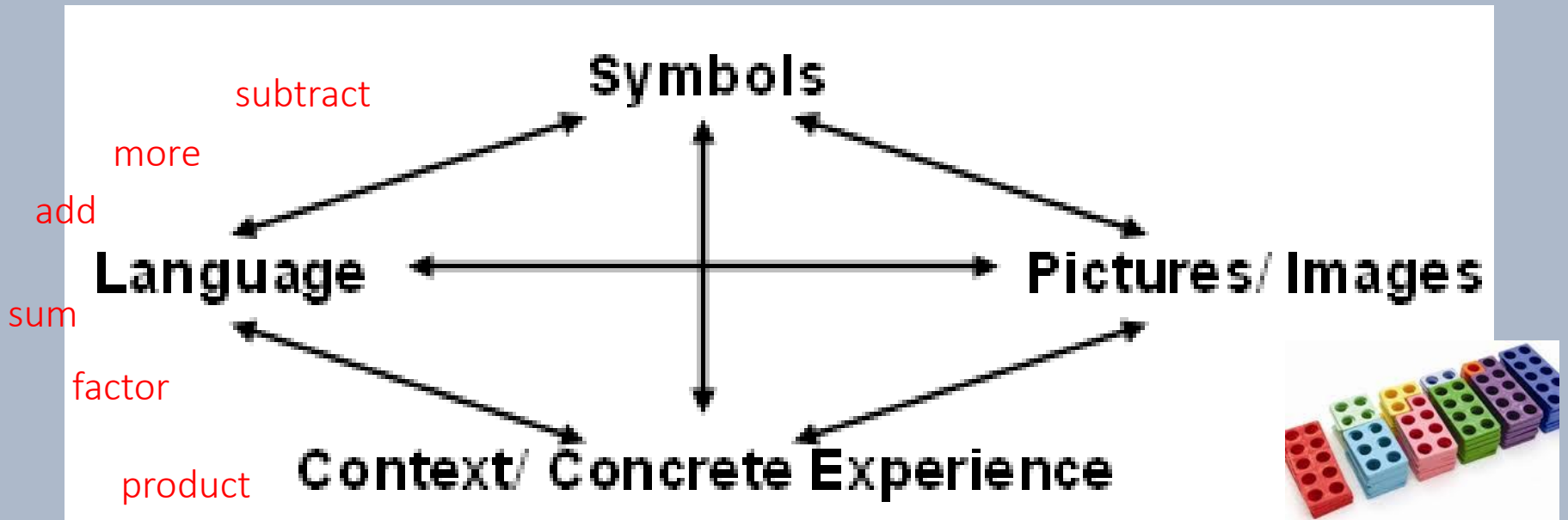
ABSTRACT -
solving maths problems using only numbers.

$$2 + 3 = 5$$
$$3 + 2 = 5$$
$$5 = 3 + 2$$
$$5 = 2 + 3$$

$$24 + 15 \over 39$$

$$100 + 40 + 6$$
$$500 + 20 + 7$$
$$600 + 70 + 3 = 673$$

$$146 + 527 \over 673$$
1

(eg. **formal written methods** - number sentences, expanded and contracted column addition, short addition with remainders)
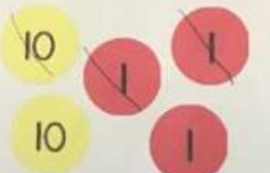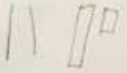
Maths at Garfield

$=$ $+$ x %

Symbols

subtract

more

add

Language

sum

factor

product

Pictures/ Images

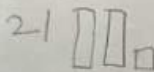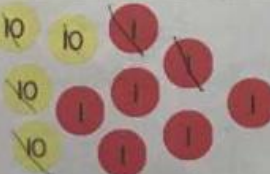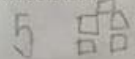**Context/ Concrete Experience**

When we plan a sequence of maths lessons, we always ensure children are exposed to the correct mathematical language, manipulatives and pictures, symbols (+ - = x) and a context.
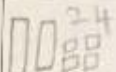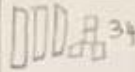
Concrete, Pictorial to Abstract

23-12=11

24 + 10 =

24 − 10 =

Addition

add   more   plus

increase   total

sum   altogether

Resources/Pictures

Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters.

24 + 15 =

44 + 15 =
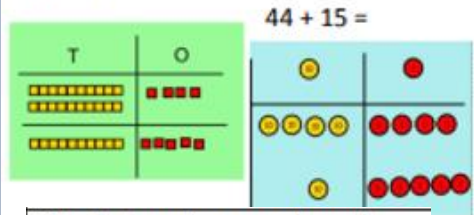
Make both numbers on a place value grid.

Add up the units and exchange 10 ones for 1 ten.

Make both numbers on a place value grid.

146
+ 527

Add up the units and exchange 10 ones for 1 ten.

146
+ 527
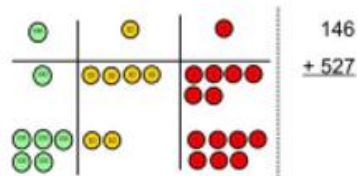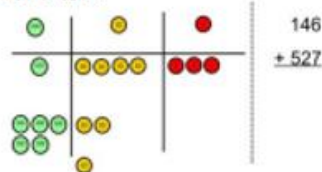
After physically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.
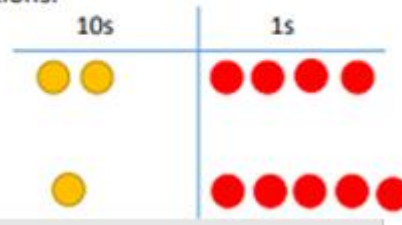
Using place value counters, children can draw the counters to help them to solve additions.

Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding.

Written Methods

24 + 15 = 39

```
  24
+ 15
  39
```

40 + 9
20 + 3
60 + 12 = 72

100 + 40 + 6
500 + 20 + 7
600 + 70 + 3 = 673

As the children progress, they will move from the expanded to the compacted method.

```
  146
+ 527
  673
    1
```

Addition Written Methods

Counters

2 5 + 1 7 =
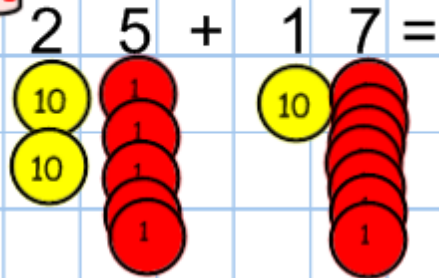
3 0 + 1 2 = 4 2

Tens and ones

3 5 + 2 6 =

5 0 + 1 1 = 6 1

Partitioning (expanded method)

1 4 5 + 3 8 = 183

	H		T		O
+1	0 0		4 0		5
			3 0		8
	1 0 0	+	7 0	+	1 3

2 8 7 + 1 4 5 =

H	T	O
2	8	7
1	4	5
	1	2
1	2	0
3	0	0
4	3	2

Column (contracted method)

H	T	O
	2	8	7
+	1	4	5
	4	3	2

Addition: Column Method

1
```
  453
+348
─────
─────
```
Place the numbers one on top of the other, lining up the hundreds, tens and ones.

2
```
  453
+348
─────
    1
─────
```
Add the ones and write the answer

3
```
  453
+348
─────
    1
─────
  1
```
Regroup any tens under the tens column.

4
```
  453
+348
─────
  0 1
─────
 1 1
```
Add the tens including any tens you have regrouped. Regroup any hundreds under the hundreds column.

5
```
  453
+348
─────
 80 1
─────
 1 1
```
Add the hundreds including any hundreds you have regrouped.

6
```
  453
+348
─────
 801
─────
 1 1
```
Check your answer.

Subtraction

subtract   minus

less   take away

decrease   leave

fewer   difference

Resources/Pictures

Written Methods

Counting back (using number lines or number tracks) children start with 6 and count back 2.
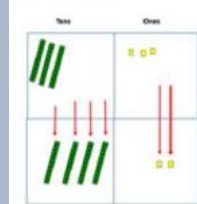
$6 - 2 = 4$

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Use physical objects, counters, cubes etc. to show how objects can be taken away.

$4 - 2 = 2$

(subtracting ones and counting back)

$75 - 42 = 33$

Use Base 10 to make the bigger number then take the smaller number away.

Draw the Base 10 or place value counters alongside the written calculation to help to show working.

(column method without regrouping)

Start with the ones, can I take away 8 from 4 easily? I need to exchange 1 of my tens for 10 ones.

Column method

Calculations
234
- 88
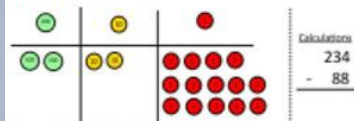
Now I can subtract my ones.

Calculations
234
- 88

Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

$836 - 254 = 582$

(column method with regrouping)

Children can start their formal written method by partitioning the number into clear place value columns.

$728 - 582 = 146$

Moving forward the children use a more compact method.

Calculations

- 88

146

(short column method with regrouping)

Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.
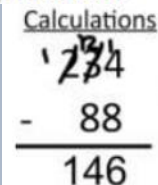
As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.

Tens   **Ones**
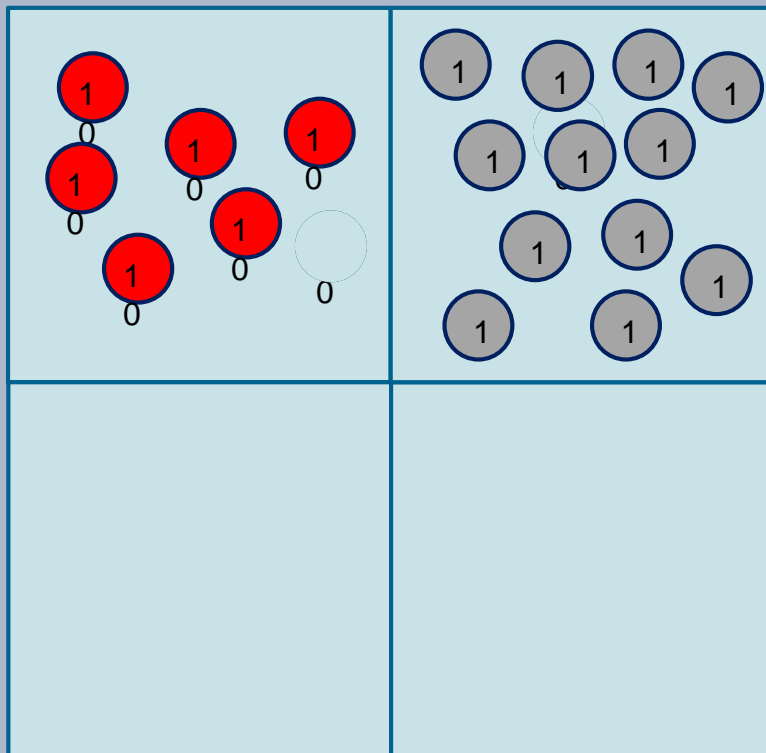
$$\begin{array}{r} \overset{6}{\cancel{7}}\,\overset{1}{2} \\ -\;4\;7 \\ \hline \\ \hline \end{array}$$
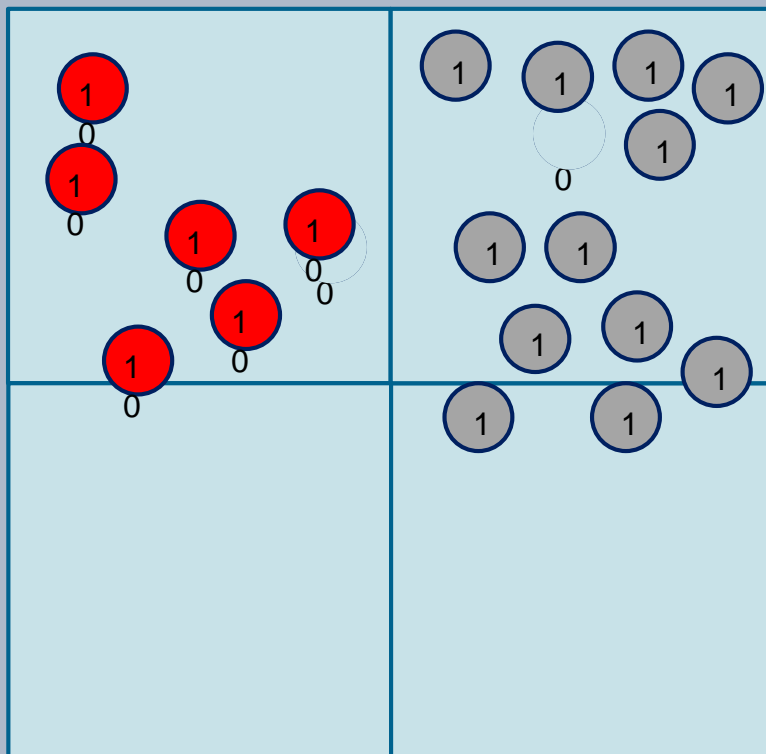
Tens	Ones

$$\begin{array}{r} \overset{6}{\cancel{7}}\,\overset{1}{2} \\ -\ 4\ 7 \\ \hline \\ \hline \end{array}$$

Tens	Ones
1 0 1 0 1 0 1 0 1 0	1 1 1 1 1 0 1 1 1 1 1 1 1 1
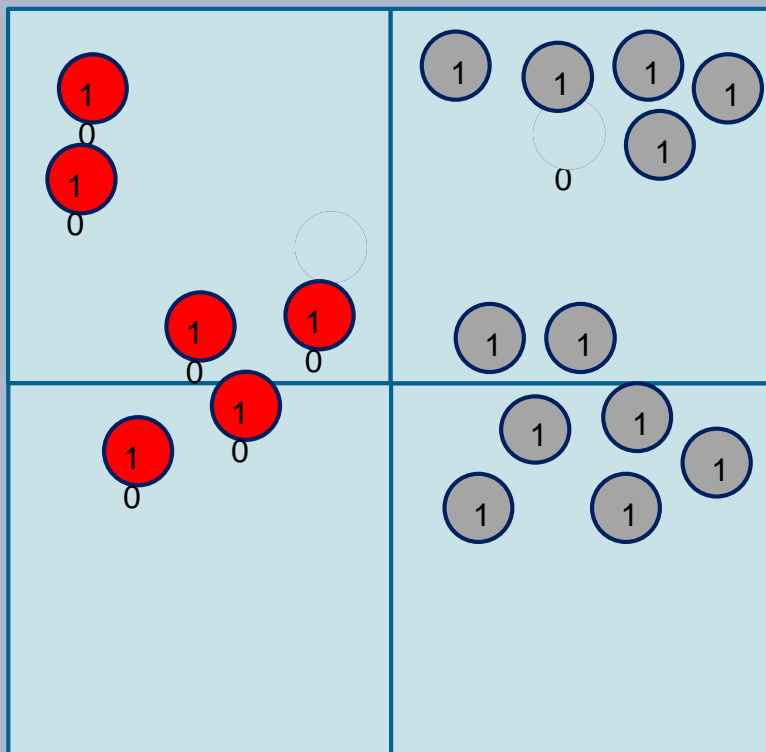
$$\begin{array}{r} \overset{6}{\cancel{7}}\,{}^{1}2 \\ -\ 4\ 7 \\ \hline \\ \hline \end{array}$$
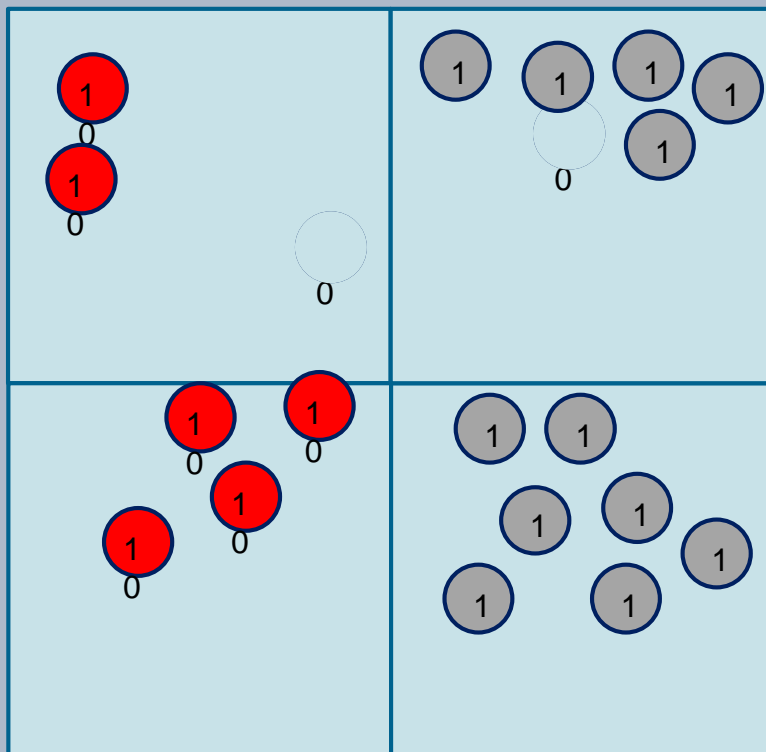
Tens	Ones

$$\begin{array}{r} {}^{6}\cancel{7}\,{}^{1}2 \\ -\ 4\ 7 \\ \hline \\ \hline \end{array}$$

Tens	Ones
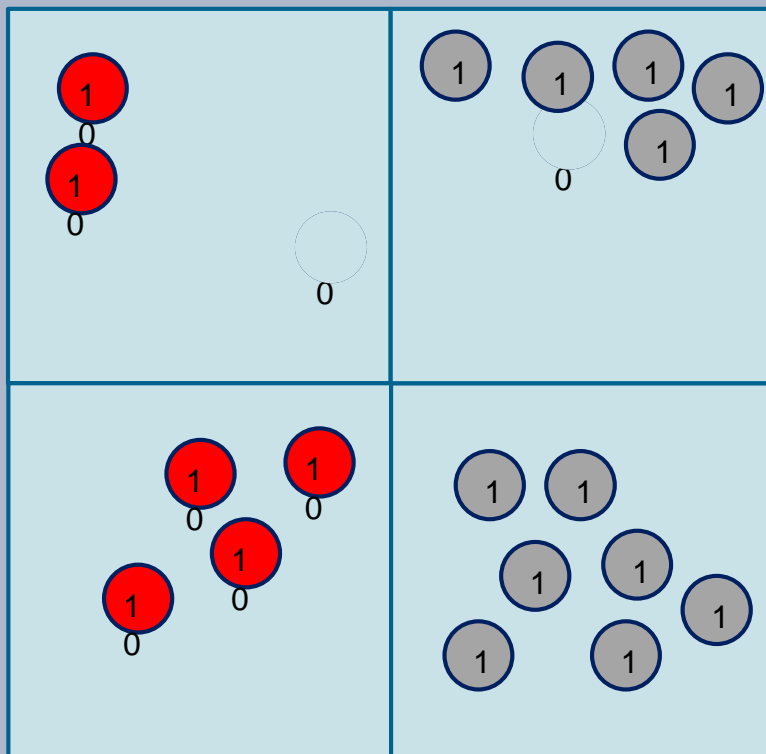
$$\begin{array}{r} {}^{6}\cancel{7}\,{}^{1}2 \\ -\ 4\ 7 \\ \hline 2\ 5 \end{array}$$

Written Method for Column Subtraction

H T o

$^5 \cancel{6}$ $^1 5$

- 2 9

3 6

1. Put the largest number on top.

2. Place the digits in the correct column.

3. Show the subtraction and equal sign.

4. **Exchange and then subtract** the top number from the bottom number in the ones column.

5. Subtract the top number from the bottom number in the tens column. **Exchange if you need to.**

Progression of Written Methods of Subtraction

1

Number Line:
72 − 43 = 29

2

Number line, counting on:
72 − 43 = 29

OR

4

Compact − Decomposition

$$\begin{array}{r} 6\,7^{1}2 \\ -\ 4\ 3 \\ \hline 2\ 9 \\ \hline \end{array}$$

3

Partitioning:

$$\begin{array}{r} 72 \\ -\ 43 \\ \hline 29 \end{array}$$
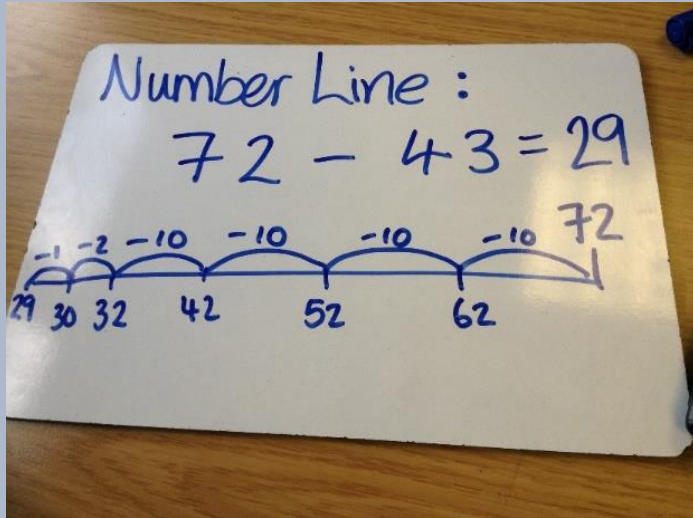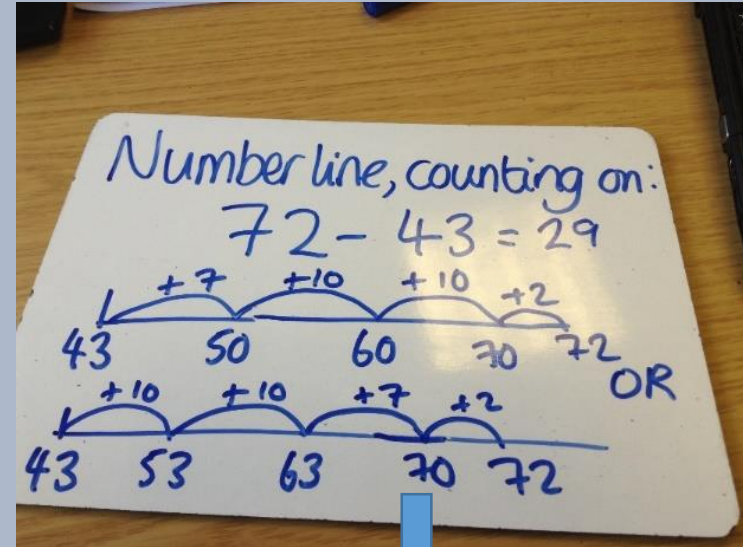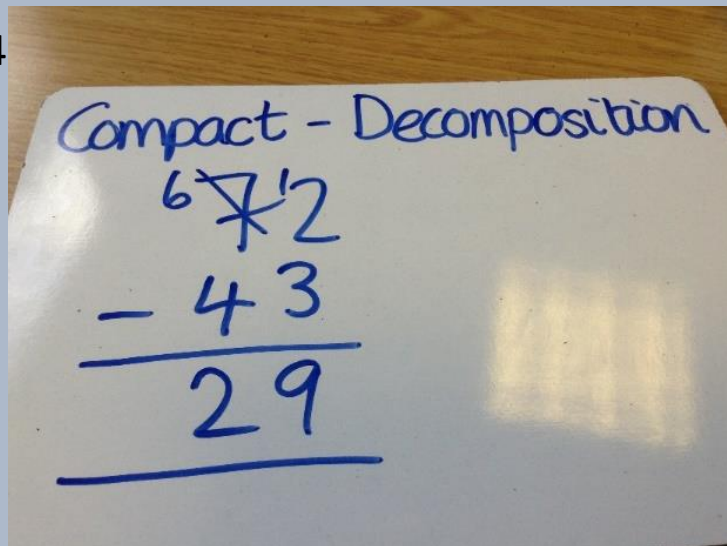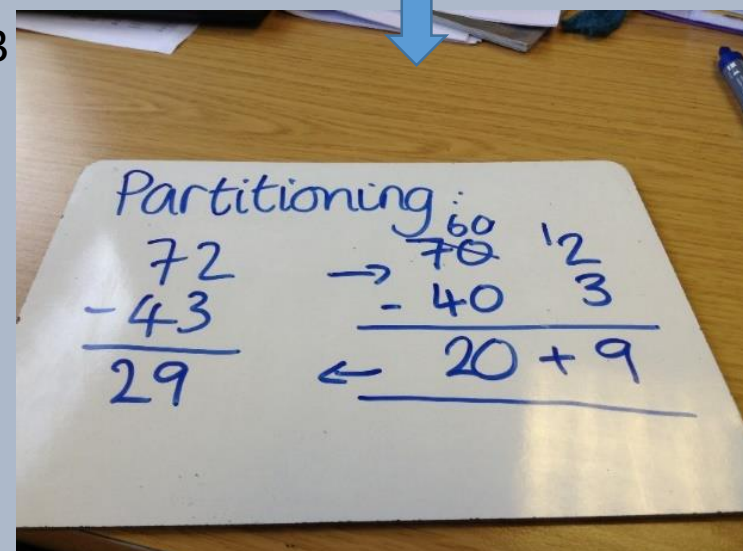
Multiplication

multiply   lots of

times   groups of

multiplied by   array

repeated   product
addition

Times Tables

- In Year 2, pupils are taught the 2, 5 and 10 times tables.
- In Year 3, the 3, 4 and 8 times tables are introduced and by the end of Year 4, pupils are expected to know all of the times tables up to 12 by 12.
- At the end of Year 4, pupils have to take part in a National Multiplication Check. It will take place in June 2023.

Why are times tables so important?

- It is a skill children will use in every day life (e.g.. baking cakes, calculating how much things cost in shops etc.) so need to be able to understand it and have an instantaneous recall

- Times tables knowledge underpins a lot of mathematical understanding and as children move up in primary school, it becomes more crucial. A good understanding of tables helps with many different areas of maths including long division and multiplication, fractions, percentages, ratio, area and more.

- In order to master the maths curriculum, children need to be able to link multiplication to other areas of maths and deepen their mathematical knowledge and understanding. They will need to be able to apply these skills to answer in depth reasoning tasks, worded problems and investigations. It is vital that they develop these skills by Year 6 in order to complete their SATs maths papers.

MATH RICH
everyday life skills
NurtureStore

Tips for Learning and Practising Times Tables at Home…
1.Hang up a times table sheet/poster. Practise some daily/weekly.

2. Listen to some fun songs.
There are a great selection of songs on YouTube by 'Number Rock'

3. Play some 'times tables' games.

You can use playing cards, dice or even play ball games. Children love to challenge their parents/teachers, so a competition is a great idea.

4. Use online games to practise including 'Times Tables Rock Stars' and 'Top Marks'

5. Use physical every day objects and set worded multiplication questions for them to answer.
You could do this when you go shopping 'How much will it cost me to buy three sweets that cost 12p each?'

6. Create times table raps, poems or even quizzes! Making it cross curricular might encourage children to get involved.

Times Table Grid

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Resources/Pictures

Create arrays using counters/cubes to show multiplication sentences.

Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.

Calculations
4 x 126

Fill each row with 126.

Calculations
4 x 126
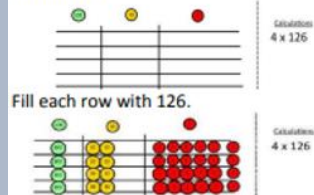
Show the link with arrays to first introduce the expanded method.

10   8

10
100   80

3   30   24

Children can continue to be supported by place value counters at the stage of multiplication.

64X3 =192

Draw arrays in different rotations to find **commutative** multiplication sentences.

4 × 2 = 8

2 × 4 = 8

2 × 4 = 8

4 × 2 = 8

They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.
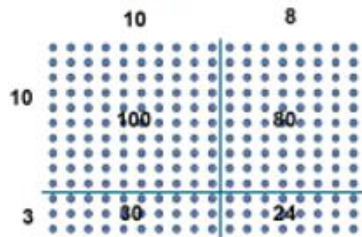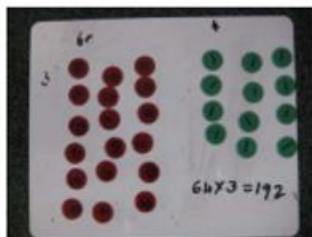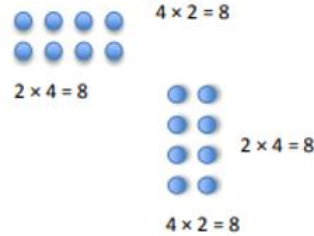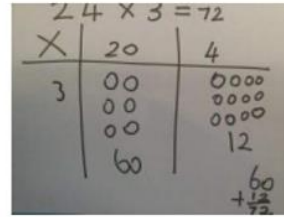
24 × 3 = 72

×   20   4
3   00   0000
     00   0000
     00   0000
     60   12
            60
          + 12
            72

Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.

8 = 59
= 8 × 60 = 8
8 × 6 = 48

8 × 60 = 480
480 - 8 = 472

Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.

8 = 59
= 8 × 60 = 8
8 × 6 = 48

8 × 60 = 480
480 - 8 = 472
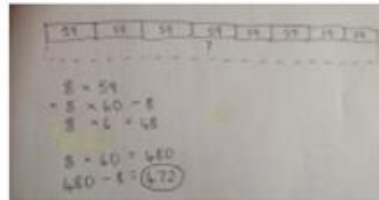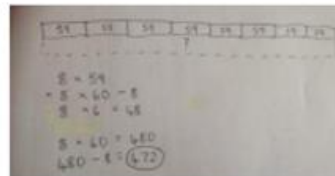
Written Methods

Use an array to write multiplication sentences and reinforce repeated addition.

(repeated addition and arrays)

5 + 5 + 5 = 15

3 + 3 + 3 + 3 + 3 = 15

5 x 3 = 15

3 x 5 = 15

(grid method)

×	30	5
7	210	35

210 + 35 = 245

```
    4 8 7
x       9
  4 3 9 3
    7 8
```

(short multiplication)

Start with long multiplication, reminding the children about lining up their numbers clearly in columns.
If it helps, children can write out what they are solving next to their answer.

```
          7  4
   ×      6  3
          1  2
       2  1  0
       2  4  0
   + 4  2  0  0
     4  6  6  2
```

This moves to the more compact method.

```
      1342
   ×    18
     13420
     10736
     24156
```

(long multiplication)

Models for multiplication

Fingers

"3"   "6"   "9"   "12"
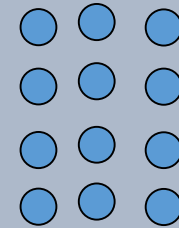
Bead Bar

12

4×3

3×4

Number Line

0   3   6   9   12
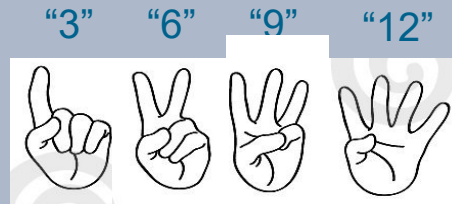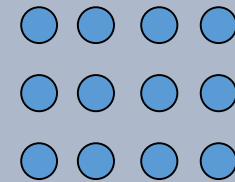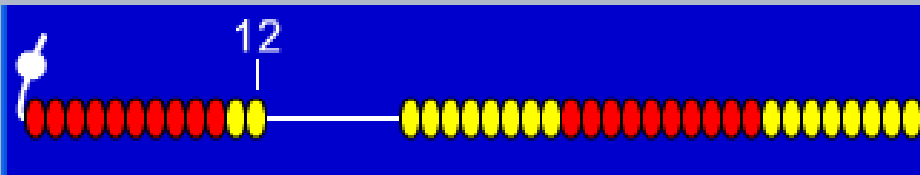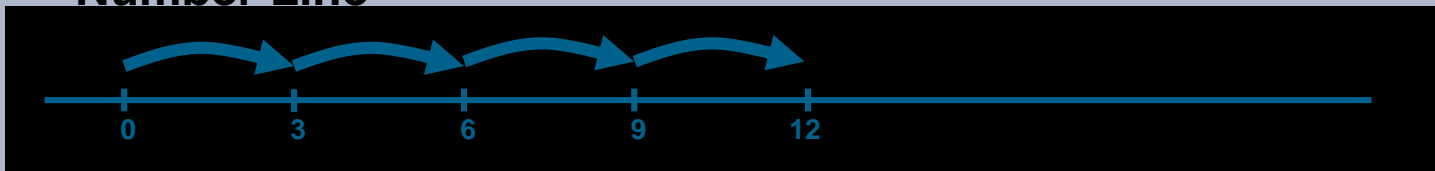
Multiplication Progression

arrays

grid

compact

Progression of Written Methods

2. The grid method…

1. Multiplication arrays…

4×3

3×4

8 0

3 0   **2 4**
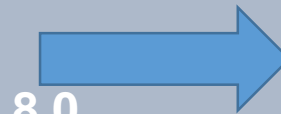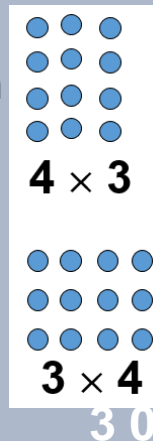
183 x 6 = 109
8

x	100	80	3
6	600	480	18

600
480
18 +
1098

3. Expanded multiplication method…

4. Progressing towards compact multiplication…

1. Multiply the 1s: 5 x 3
2. Multiply the 10s: 30 x 3
3. Multiply the 100s: 200 x 3
Don't forget to add any 'carry' digits!

2 3 5
x   3
1 1
7 0 5

H	T	O
	3	4
×		3
	1	2	← (3 × 4)
	9	0	← (3 × 30)
1	0	2

In extended multiplication, we multiply the **ones** and tens separately, then add the answers together.

Method for Short Multiplication (

Use short multiplication to multiply 3- and 4-digit numbers by 1-digit numbers.

Find 5 x 2326

$$
\begin{array}{r}
2\ 3\ 2\ 6 \\
\times \qquad 5 \\
\hline
1\ 1\ 3 \\
\hline
1\ 1\ 6\ 3\ 0
\end{array}
$$

Remember to leave a line for the 'carry' digits, as in addition.

Step 1
6 x 5 is **30.**

Step 2
20 x 5 is, **10** tens, plus the **3** tens we had from multiplying the 1s, so that's **13** tens.

Step 3
300 × 5
That's **15** hundreds, plus the **1** hundred we had from multiplying the 10s. So, that's **16** hundreds.

Step 4
2000 × 5
That's **10** thousands, plus the **1** thousand we had from multiplying the 100s. So, that's **11** thousands.

Division
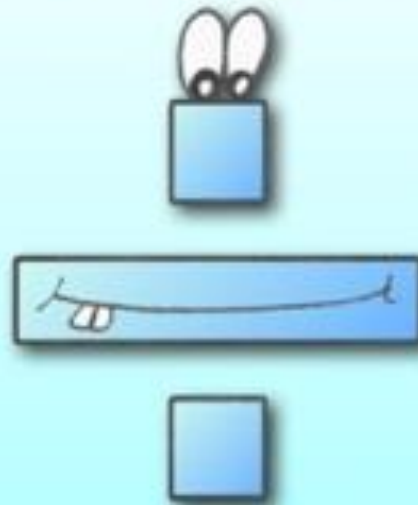
divide   remainder

share   share equally

groups of   divided by

repeated   each

subtraction

Resources/Pictures

Written Methods

Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.
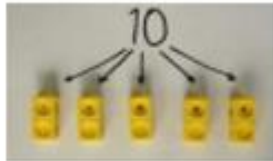
Use a number line to show jumps in groups. The number of jumps equals the number of groups.

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

$$10 \div 5 = 2$$

(sharing and grouping)

$5 \times 3 = 15$
$3 \times 5 = 15$ (dividing with
$15 \div 5 = 3$ arrays)
$15 \div 3 = 5$

Students can then progress onto dividing using numberlines (with no remainders)

(division using number lines – short division)

Eg $15 \div 3 = 5$

$0 ---- 5 ---- 10 ---- 15$

(1×5) (1×5) (1×5)

$= 3$ lots of 5

$15 \div 3 = 5$ (as $5 \times 3 = 15$)
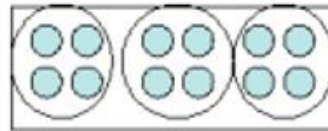
Divide objects between groups and see how much is left over

$364 \div 3 =$

Draw dots and group them to divide an amount and clearly show a remainder.

(short division with remainders)

$29 \div 8 = 3$ REMAINDER 5

dividend divisor quotient   remainder

Division

Hundreds	Tens	Ones
100	10 10 10	1 1 1 1 1 1 1 1
	10 10 10 / 10 10 10 10 10	1 1 1 1 1 1 1 1
		1's blocks

23

6 ⟌ 1̸ 3 8
         0 1 1

23

6

138
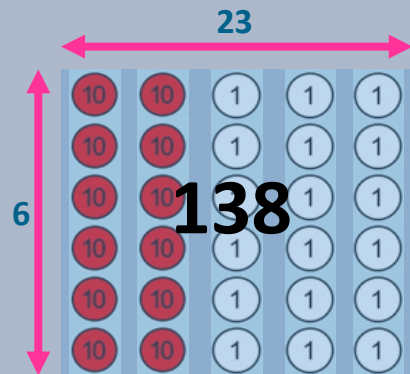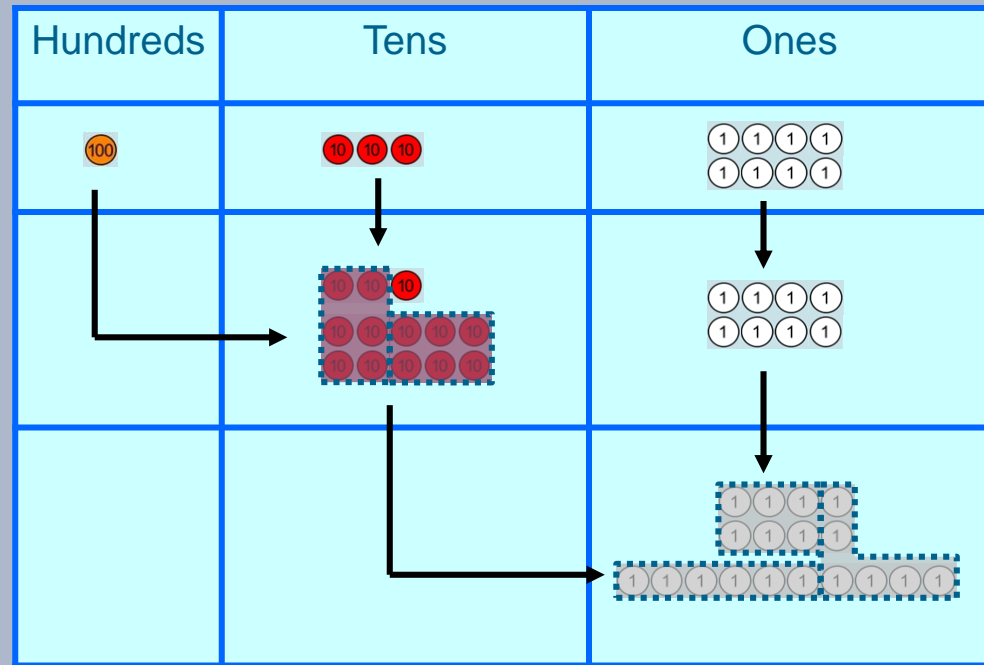
Written Method – Short Division
(otherwise known at the 'bus stop method'

Simple short division

Short division is sometimes called the "bus stop" method in schools, because of the way it is laid out.

To work out 488 ÷ 4:

Step 1:
$$\frac{1}{4\,|\,\underline{4}\ \ 8\ \ 8}$$
$\underline{4} \div 4 = 1$

Step 2:
$$\frac{1\quad 2}{4\,|\,4\ \ \underline{8}\ \ 8}$$
$\underline{8} \div 4 = 2$

Step 3:
$$\frac{1\quad 2\quad 2}{4\,|\,4\ \ 8\ \ \underline{8}}$$
$\underline{8} \div 4 = 2$

So 488 ÷ 4 = 122

To work out 876 ÷ 4:

Step 1:
$$\frac{2}{4\,|\,\underline{8}\ \ 7\ \ 6}$$
$\underline{8} \div 4 = 2$

Step 2:
$$\frac{2\quad 1}{4\,|\,8\ \ \underline{7}\ \ ^3 6}$$
$\underline{7} \div 4 = 1$ rem 3

Step 3:
$$\frac{2\quad 1\quad 9}{4\,|\,8\ \ 7\ \ ^3\underline{6}}$$
$\underline{36} \div 4 = 9$

So 876 ÷ 4 = 219

To work out 220 ÷ 4:

Step 1:
$$\frac{0}{4\,|\,\underline{2}\ \ ^2 2\ \ 0}$$
$\underline{2} \div 4 = 0$ rem 2

Step 2:
$$\frac{0\quad 5}{4\,|\,2\ \ ^2\underline{2}\ \ ^2 0}$$
$\underline{22} \div 4 = 5$ rem 2

Step 3:
$$\frac{0\quad 5\quad 5}{4\,|\,2\ \ ^2 2\ \ ^2\underline{0}}$$
$\underline{20} \div 4 = 5$

So 220 ÷ 4 = 55

Progression of Written Methods for Division

1. Using known subtraction facts to solve basic division calculations (usually mentally)
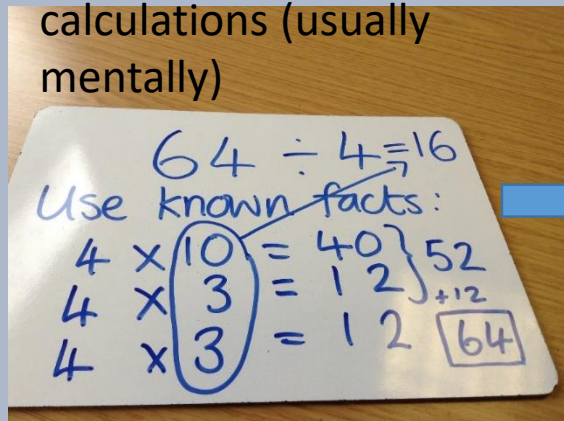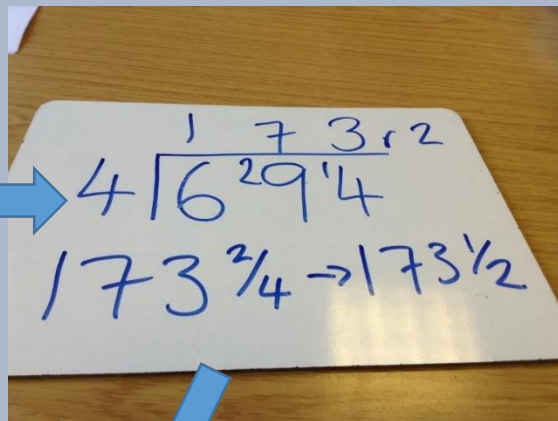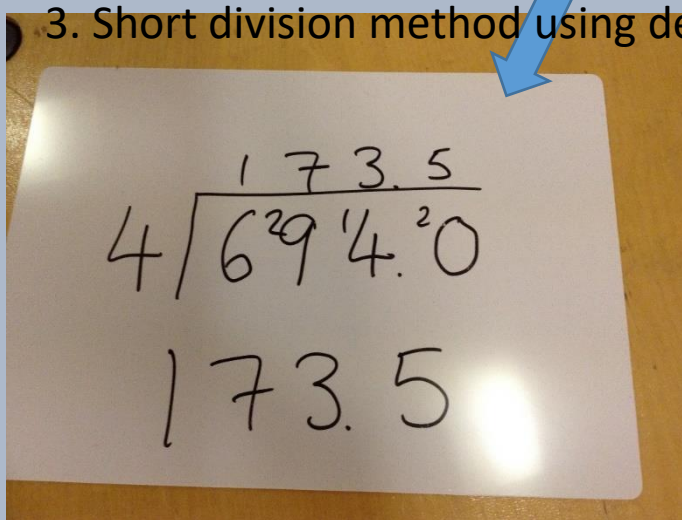

2. Short division method

3. Short division method using decimals

Now, have a go at this question on your whiteboards using one of the methods here, then try a different method:

$$853 \div 5 =$$

Maths Apps and Websites for Children

<u>Maths Websites for Parents</u> (free)
Oxford Owl includes a range of activities, top tips and eBooks to help your child with their maths at home.
http://www.oxfordowl.co.uk/maths-owl/maths

Nrich. A range of maths games, problems and articles on all areas of maths. Parents of Key Stage 1 should click 'stage 1' and parents of Key Stage 2 should click 'stage 2'.
http://nrich.maths.org/frontpage

Maths Dictionary for Parents and Children. This is key for maths vocabulary and will give the definitions and charts for a wide range of maths topics.
http://amathsdictionaryforkids.com/

<u>Maths Websites for Children</u> (free)
https://www.bbc.co.uk/bitesize/subjects/zjxhfg8   (Key Stage 1)
https://www.bbc.co.uk/bitesize/subjects/z826n39   (Key Stage 2)
http://www.ictgames.com/resources.html
http://www.ilovemathsgames.com/
http://www.mathsisfun.com/index.htm
http://www.primarygames.co.uk/

<u>Maths Apps for Children</u> (free)
<u>EYFS</u>
Jelly Bean Count – An app to practise counting (free)
Busy Things Feed the Monkey – An app for number recognition and counting (free)
(Busy Things Tunnel Trouble, Line Up, Shape Up etc are other games but cost 69p).
Shape Puzzle HD – An app for learning about shapes (free)
Toddler Puzzle Shapes - An app for learning about shapes. Available in many different languages (free)

<u>Key Stage 1</u>
Beebot – An app to aid children with directional language (free)
Number Lines – An app to aid children with counting, addition and subtraction using number lines (free)
Pet Bingo – An app to aid children with place value and the four operations, using a bingo game (free)
10 Minutes A Day Times Tables – An app to aid children with their times tables (free)

Times Tables Rock Stars

Next: **9 × 9**

56

27 ÷ 3

0 0

Type your answer, and hit enter!

7	8	9
4	5	6
1	2	3
Delete	0	Enter

Strategies/Activities for Learning Number Facts at Home

- Find out which number facts your child is learning at school (additional facts to 10, times tables, doubles etc.). Try to practise for a few minutes each day using a range of vocabulary.

• Have a 'fact of the day'. Pin this fact up around the house. Practise reading it in a quiet, loud, squeaky or funny voice. Ask your child over the day if they can recall the fact.

• Play 'ping pong' to practise complements with your child. You say a number. They reply with how much more is needed to make 10. You can also play this game with numbers totalling 20, 100 0r 1000. Encourage your child to answer quickly, without counting or using fingers.

• Throw 2 dice. Ask your child to find the total of the numbers (+), the difference between them (-) or the product of (x). Can they do this without counting?

• Use a set of playing cards (no pictures). Turn over two cards and ask your child to add or multiply the numbers. If they answer correctly, they keep the cards. How many cards can they collect in 2 minutes?

• Play Bingo. Each player chooses five answers (e.g. numbers to 10 to practise simple addition, multiples of 5 to practise the five times tables. Ask questions and if a player has the answer, they can cross it off. The winner is the first player to cross off all their answers.

• Give your child an answer. Ask them to write as many additional sentences as they can with the answer (e.g. 10 = +). Try with multiplication or subtraction.

• Give your child a number fact (e.g. 5 + 3 + 8). Ask them what else they can find out from this fact (e.g., 3+5=8, 8-5=3, 8-3=5, 50+30=80, 500+300=800, 5+4=9, 15+3=18). Add to the list over the next few days. Try starting with a multiplication fact as well.

Counting Ideas and Games

- Practise chanting the number names. Encourage your child to join in with you. When they are confident, try starting from different numbers - 4, 5, 6....

• Sing number rhymes together - there are lots of commercial songs and YouTube videos available.

• Give your child the opportunity to count a range of interesting objects (coins, pasta, shapes, buttons etc). Encourage them to touch and move each object as they count. Count things you cannot touch or see (more difficult!). Try lights on the ceiling, window planes, jumps, claps or oranges in a bag.

• Play games that involve counting (e.g. snakes and ladders, dice games, games that involve collecting objects).

• Look for numerals in the environment. You can spot numerals at home in the street or when out shopping. Cut out numerals from newspapers, magazines or birthday cards. Then help your child put the numbers in orders.

• Make mistakes when chanting, counting or ordering numbers. Can your child spot what you have done wrong?

• Choose a number of the week e.g. 5. Practise counting to 5 and on from 5. Count out groups of 5 objects (5 dolls, 5 bricks, 5 pens). See how many places you can spot the numeral 5.

Real Life Maths Examples

- Going shopping with your child to buy two or three items. Ask them to work out the total amount spent and how much change you will get.

• Buy some items with a percentage extra free. Help your child to calculate how much of the product is free.

• Plan an outing during the holidays. Ask your child to think about what time you will need to set off and how much money you will need to take.

• Use a TV guide. Ask your child to work out the length of their favourite programmes. Can they calculate how long they spend watching TV each day/week?

• Use a bus or train timetable. Ask your child to work out how long a train journey between two places should take? Go on the journey. Do you arrive earlier or later than expected? How much earlier/later?

• Help your child to scale a recipe up or down to feed the right amount of people.

• Work together to plan a party or meal on a budget.

Questions