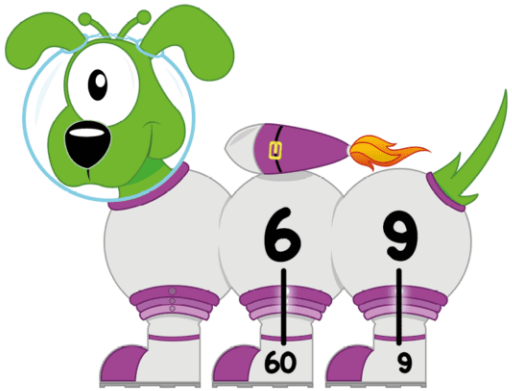
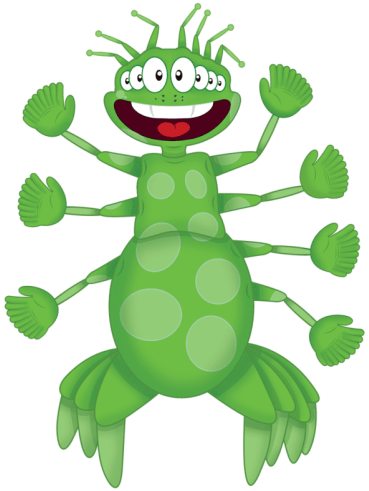
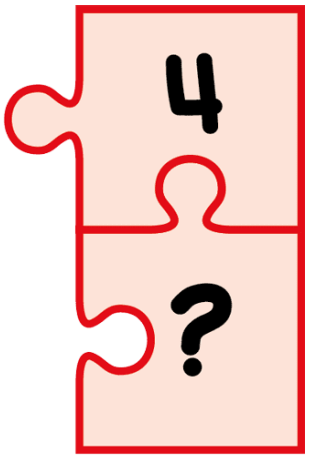
Big Maths







= 10

Why do we use Big Maths at St. Helen's?

* Clear progression from year to year
* Common methods taught and language used throughout the school
* Build on prior learning and ensure children are secure in their knowledge
* Objectives are clearly matched to National Curriculum objectives
* Clear links so evidence can be gathered easily to inform planning/assessment
* Improve mental maths skills and general numeracy across the school

CLIC

Big Maths is based upon the principle that there are 4 core skills that lie at the heart of numeracy.

These core skills form the platform for virtually all other maths skills and are affectionately known as CLIC ….

Counting
Learn Its
It's Nothing New
Calculations

How does CLIC work?

CLIC is fundamental to mathematical development as it is the learning sequence through which we all develop our numeracy skills.

Learn to count (C)

↓

Learn to remember totals as facts (L)

↓

Apply these facts to new situations through swapping the thing being counted (I)

↓

Apply the first three elements into a formal calculation (C)

It's Nothing New

'It's Nothing New' is the 'Glue' of CLIC.
For each 'It's Nothing New' step the teacher makes the learner conscious of two currently held ideas. They will then overlap these ideas and reveal how a third 'new' ideas must be true.

The message that there is 'no new maths' is a critical part of making children conscious of the learning process and helps build their maths confidence.

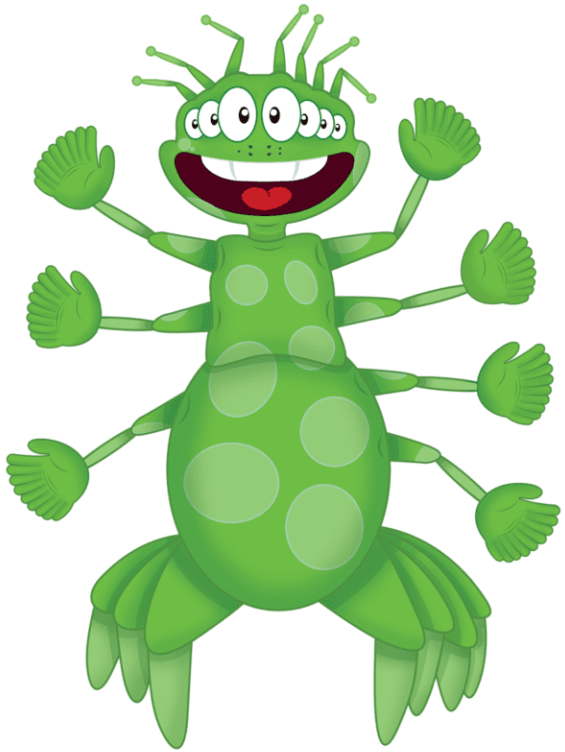
The 'It's Nothing New' session is typically a whole class session that uses mainly talk and Big Thought Boards (whiteboards). The teacher nudges forward with new concepts, taking the whole class with them as they go.

Meet Pim!

Pim is an alien from the planet CLIC.

This friendly alien is PIM, the 'principle of irrelevant matter'! That means that number facts stay the same and it doesn't matter what you are counting - dogs, chocolates, metres, boys, girls or even teachers!

Pim has 3 arms on one side and 4 arms on the other side. He has 7 arms in total. There are 3 legs on one side and 4 legs on the other… so he must have 7 legs. Pim has 3 ears and 4 ears, 3 nostrils and 4 nostrils, and he has 3 eyes and 4 eyes! So once children accept Pim's 3+4=7 (arms, eyes etc), they easily accept that it must be true for other 'Learn Its' facts. If '2 add 3 equals 5' then we can use Pim to communicate that 2 add 3 will always be 5, no matter what 'the thing' is.



Adding With Pim

There is no new maths involved when we add multiples of ten together.

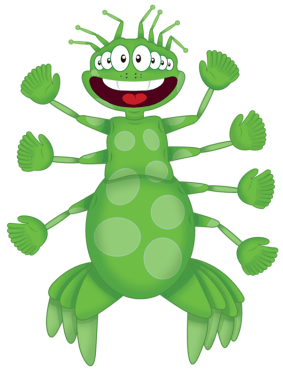
30 + 40 = 70

3 tens and 4 tens = 7 tens

So its nothing new that…

3 things and 4 things = 7 things

3 + 4 = 7



Fact Families

Basic Fact Family
(mum, dad & the 2 kids)

4 + 3 = 7

3 + 4 = 7 (switcher)

7 - 4 = 3 (opposite switcher)

7 – 3 = 4 (switcher)

Extended Fact Families
(Grandad & Grandma)

40 + 30 = 70 (it's nothing new)

30 + 40 = 70

70 – 40 = 30

70 – 30 = 40

IT'S NOTHING NEW SO CONTINUE THE PATTERN:

(Great Grandad & Great Grandma)

400 + 300 = 700

300 + 400 = 700

700 – 400 = 300

Meet POM

Pom is an alien, he lives with Pim on the planet CLIC.

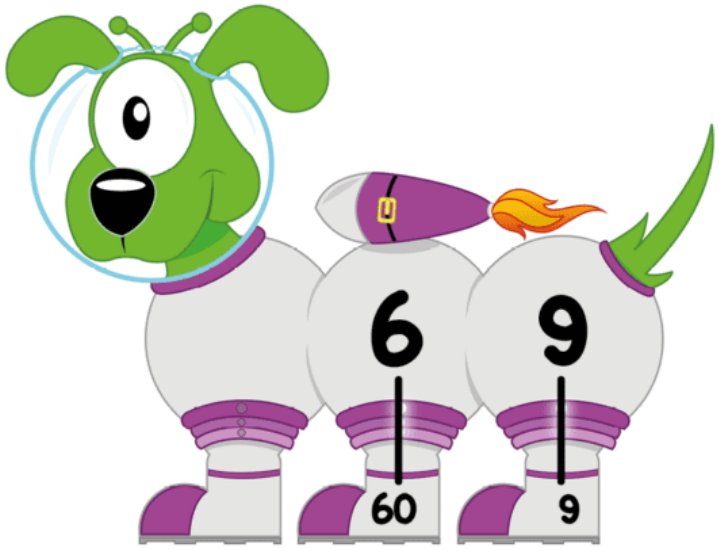
Pom helps children to learn 4 key mathematical words:
•multiple,
•factor,
•square,
•and prime.

We use Pom as a fun framework for presentation.
Put the product (answer) number in his tummy, then the factors can be recorded on the end of his body parts.
1 and the product itself (i.e. the number in question from his tummy) should be recorded in each eye.
Always write these two factors first, always in their special place.
Then any pair of factors that are discovered are written as a pair at the end of each arm. Check that each pair multiplied together equals the number in Pom's tummy!
If the number has a Square Root, this goes in his tail!

Meet Squiggleworth!

Squiggleworth is Pim's pet and he can be used to help children have fun while they practice partitioning numbers.

Each of the 10 digits (0 – 9) and each of the 26 letters in our alphabet are just squiggles on a bit of paper. They are marks that don't have any value in themselves. We learn to attach meaning to these squiggles and must help children do the same, so that when they see the squiggle '4', they think 'four' as a word and think of the amount that is 'four'! There are a number of steps that help children to learn the value of squiggles (place value) and Squiggleworth is there to make it friendly and fun. Each segment on Squiggleworth's body are for the digits of numbers to be written in, using his feet to show the number of zeros after each.



What is each squiggle worth?

Count Fourways

Count Fourways is an intergalactic traveller!

The 'four ways' are counting in 1s, 2s, 5s and 25s. Here we introduce the children to another Big Maths character, called Count Fourways. He is called Count Fourways since the children simply learn to count out loud in four crucial ways. Each of these four ways is built upon progressively and in alignment with the children's developing understanding of place value.

Learning to count out loud in four particular ways rapidly advances a child's numeracy. This is linked to the learning of x tables.

Use Pim principle to show children how to swap 2s for 20s, or 200s or 0.2s.

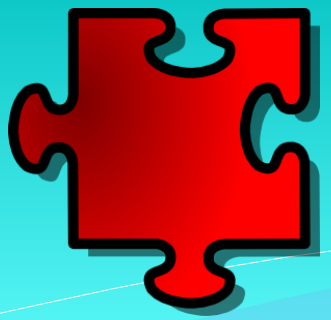
The four ways are: counting in 1s, 2s, 5s & 10s.

Children are also coached to count in ones and therefore 10s, 100s, 1000s etc.

As well as in 5s. So they can count in 50s, 500s, 5000s etc.

Lastly in 2s, allowing children to count in 20s, 200s, 2000s etc.

Jigsaw Numbers



Jigsaw numbers are just number bonds. They total a special number in our number system, e.g. 10, 100 or 1000. Technically they are called complements but calling them 'jigsaw numbers' makes them far more accessible and memorable for children.

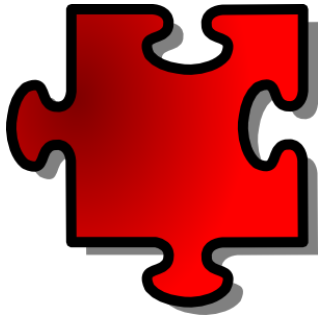
I know the missing decimal piece

I know the missing piece to 1000

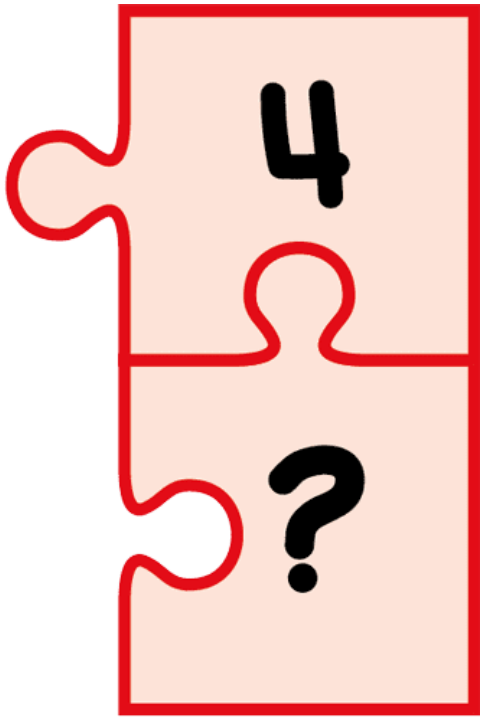
I now the missing piece to 100

I know the missing piece to the next multiple of 10

I know the missing piece to 10



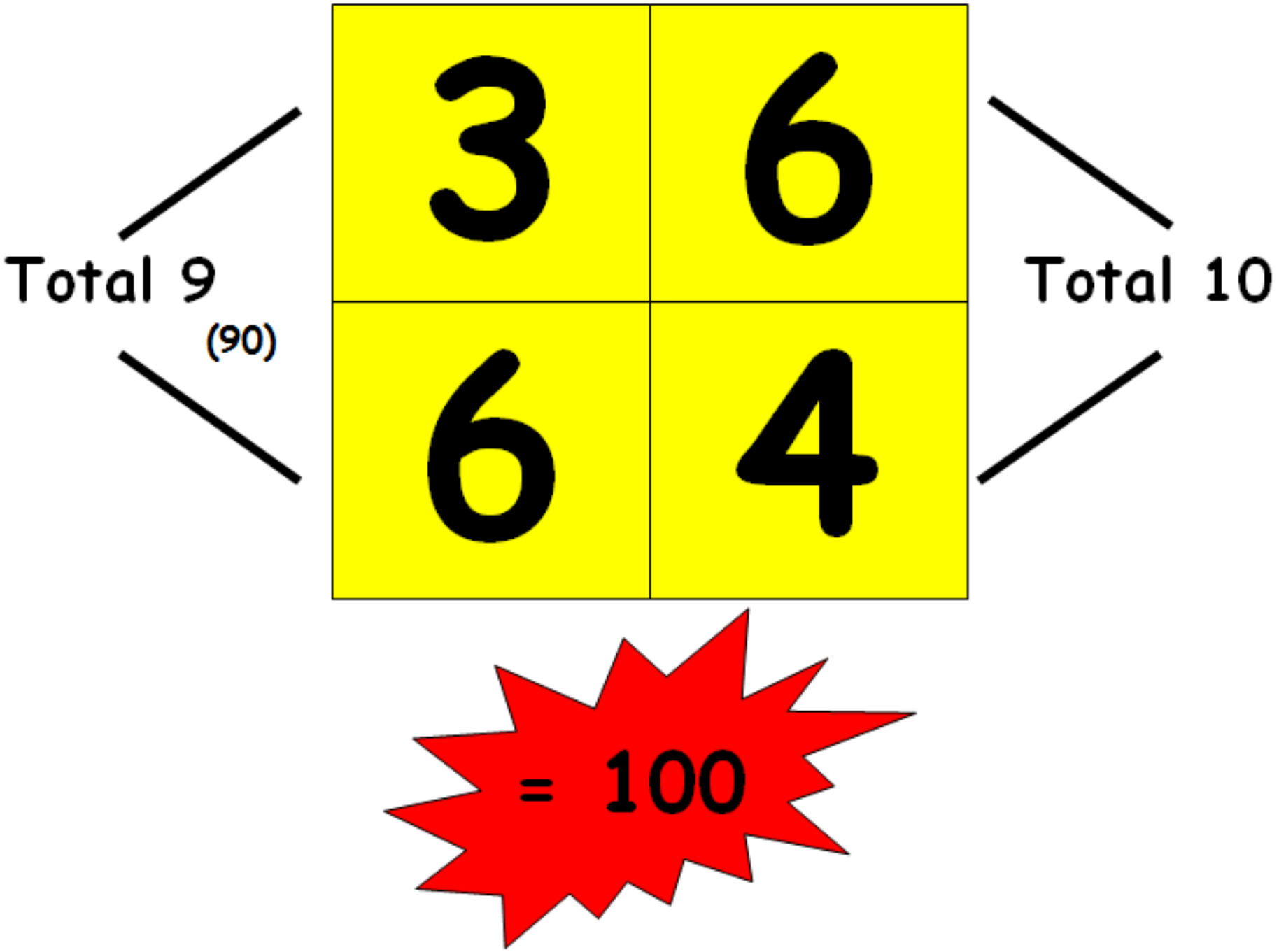
Jigsaw Numbers



Understanding can then be made through increasing the challenge further through reframing the questions:

- A subtraction question (10 – 4 = ?) or,
- A missing number box questions (4 + __ = 100), or
- Placing the questions into the context of money, or other units of measure (£10 – £4 = ?).

Read more and practice here:

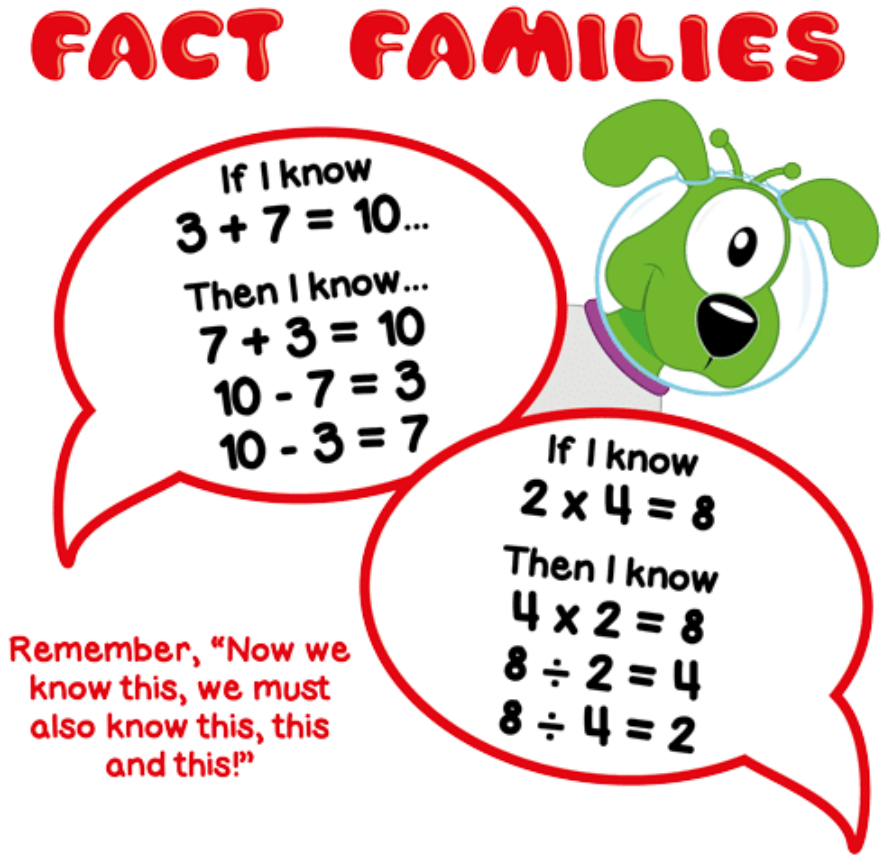

3
6
6
4
Total 9
(90)
Total 10
= 100

Fact Families

Fact Families show children a very pure form of 'It's Nothing New'. In other words, 'Now we know this, we must also know this, this and this.'

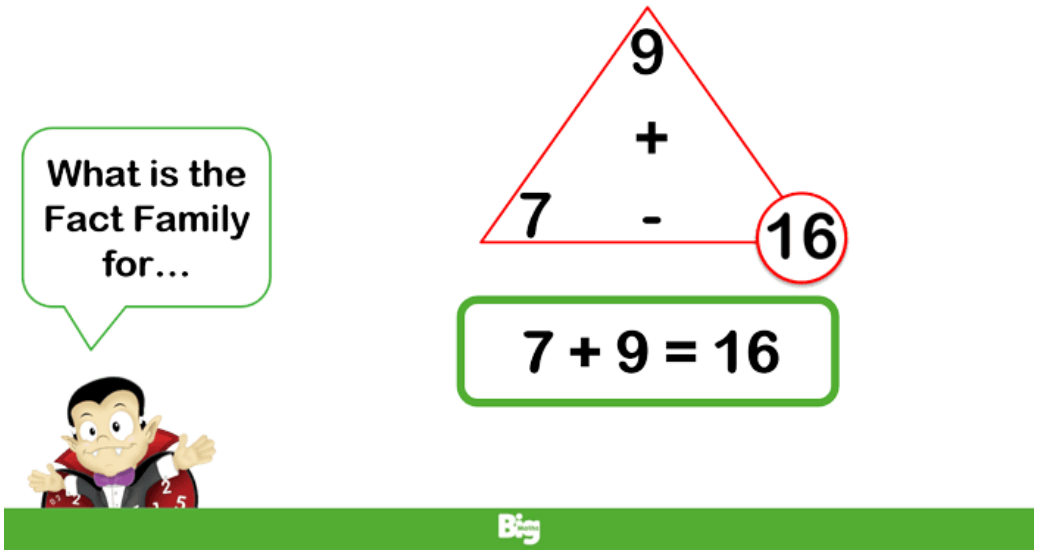
Children learn all addition, subtraction, multiplication, and division facts with instant recall through 1d/1d facts for addition and multiplication along with one other thing… *the Fact Family concept.*

If they know the addition or multiplication fact, they automatically know the subtraction and division facts.

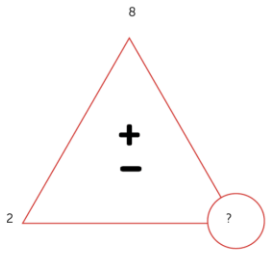


Fact Families cont…

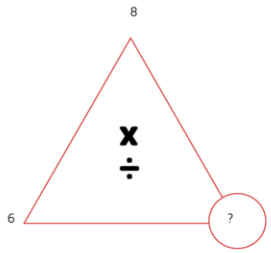
Thinking of Fact Families as ‘Fact Family Triangles’ enables children to become closer to establishing the lightning-fast connections between 3 numbers.



Addition Fact Triangle



Multiplication Fact Triangle



Read more here:

Coin Multiplication

Children in year 2 start by completing a 1 & 10 Coin Card

Then a 1, 2, 5, & 10 Coin Card

In later years, they then progress onto the full Coin Card

X 14	
1	14
2	28
5	70
10	140

This uses the taught & embedded principles of 10x bigger, doubling & halving.

Coin Multiplication cont…

Coin Multiplication takes a given number (usually a 2 digit number) and multiplies it by 1, 2, 5, 10, 20, 50 and 100.
If we add 200 then this covers all of the coin denominations that we use.

Children are shown how all of these multiples can be found by:

- Multiplying by
- Halving and doubling

Read more…

Meet Mully

Mully Multiple

Meet ‘Mully Multiple’! He is known as Mully for short. Mully likes to explore and to hide. He likes to hide behind the biggest multiple of a number he can find.

‘Where’s Mully?’ is a Big Maths game where the objective is to find where Mully is hiding. It extends children’s knowledge of multiples and how known multiples can be added to other known multiples to find new multiples. Children playing ‘Where’s Mully?’ are actually learning to become proficient at division!

Calculations

After the Counting, Learn Its & It's Nothing New comes the 4 calculations:

The FAB method Progress.

Addition
Subtraction
Multiplication
Division

F = **Full written** methods. Counting using a number line or objects.

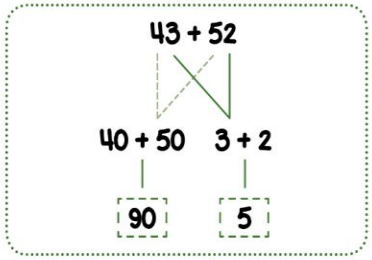
A = **Abridged** (Also known as 'almost there') Taking away full Workings and using short cuts.

B = **Brain** Calculating solely in their heads – no jottings or written Methods.

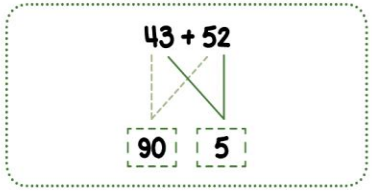
Super-FAB is really good at focusing on holding numbers in his head, doing something else, and then coming back to those numbers again!

Addition calculation

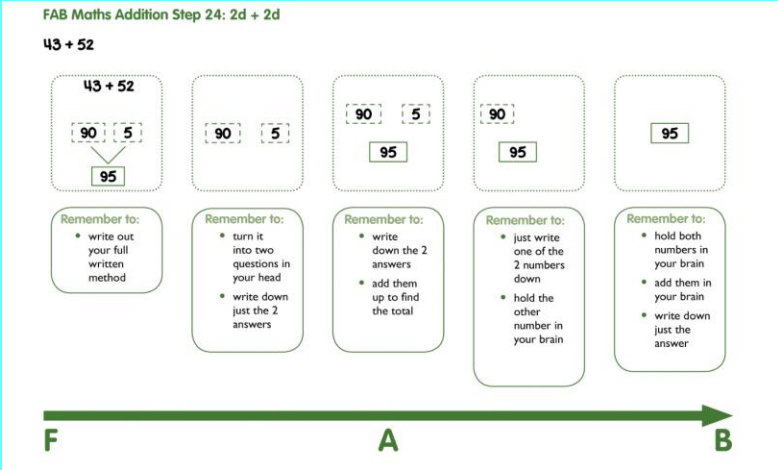
- F - the full written version - the partitioning and the 2 'new' questions are written out



- A - the abridged written version - here the separate totalling of the tens and the units is completed entirely mentally but their totals are recorded to aid the final addition. Initially with just the two sub-totals, and then with the 2 sub-totals and the answer, and then with the one of the sub totals and the final total (i.e. one of the sub totals is held in the brain) and finally just the answer.



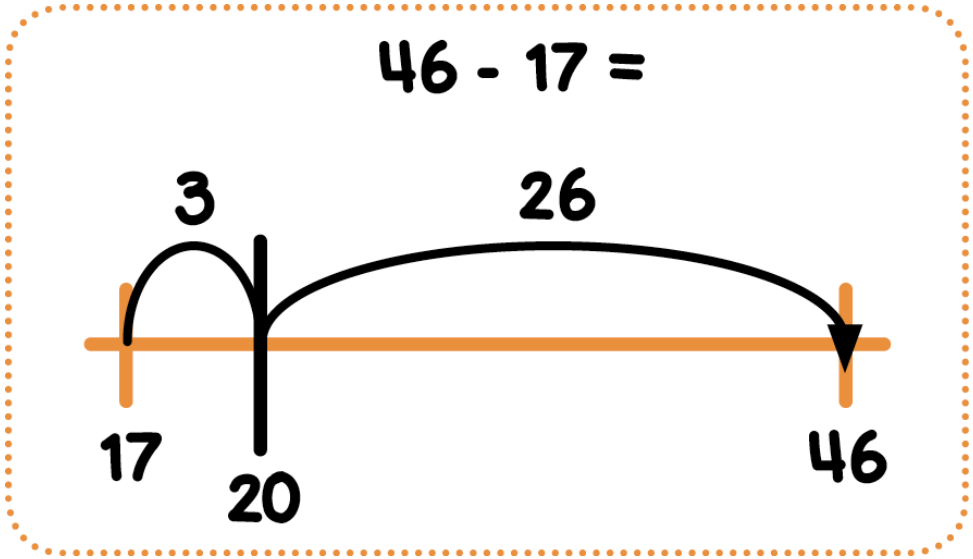
- B - the brain only, mental, version - just the final total is recorded.



Subtraction calculation

Remember To:

- Show the gap on a number line
- Write in the next multiple of 10
- Jump to the next multiple of 10 using Jigsaw Numbers
- Jump from the multiple of 10 to the target number



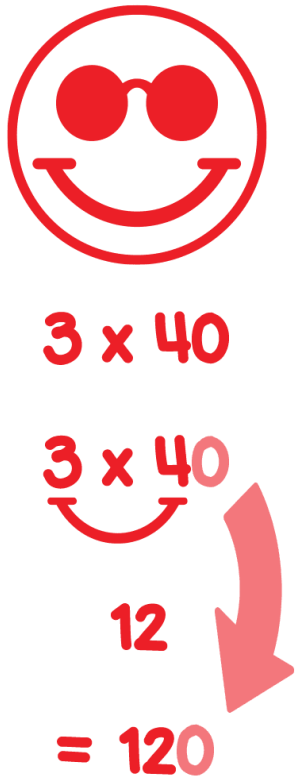
Multiplication calculation

Smile Multiplication

As children begin to multiply multiples of 10, 100 etc. the zeros can look very complicated. Smile Multiplication simplifies this, reminding them to 'do the tables bit', count the zeros, then put the zeros on the answer. A lot easier! Smile Multiplication works for decimals as well!

Remember To:

- swap ones for tens
- do the tables bit
- count the zeros
- add the zeros to your answer



Column Methods

Big Maths has the principle of learning key methods mentally.

It is vital that children can mentally use and apply numbers and understand how the system works.

Once this is embedded, through the previous calculations, progress moves towards formal column methods for addition, subtraction, multiplication and divison. Initially, there is no carrying over or borrowing.

Addition

Step 1
I can solve a 2d + 2d

Step 2
I can solve any 2d + 2d

Step 3
I can solve a 3d + 2d

Step 4
I can solve any 3d + 2d

Step 5
I can solve a 3d + 3d

Step 6
I can solve any 3d + 3d

Step 7
I can solve any 4d + 2d / 3d

Step 8
I can solve any 4d + 4d

Step 9
I can use Column Addition for several numbers

Step 10
I can solve any 5d + 5d

Step 11
I can add numbers with 1dp

Step 12
I can add numbers with 2dp

Step 13
I can add numbers with 3dp

Step 14
I can add numbers with mixed amounts of decimal places

$$\begin{array}{r} 442 \\ +\ 36 \\ \hline 478 \end{array}$$

$$\begin{array}{r} 8686 \\ +\ 6549 \\ \hline 15235 \\ 1\ 1\ 1 \end{array}$$

$$\begin{array}{r} 18.7 \\ +\ 56.4 \\ \hline 75.1 \\ 1\ 1 \end{array}$$

Subtraction

Step 1
I can solve a 2d - 2d

Step 2
I can solve any 2d - 2d

Step 3
I can solve a 3d - 2d

Step 4
I can solve any 3d - 2d

Step 5
I can solve any 3d - 3d

Step 6
I can solve any 4d - 2d or 3d

Step 7
I can solve any 4d - 4d

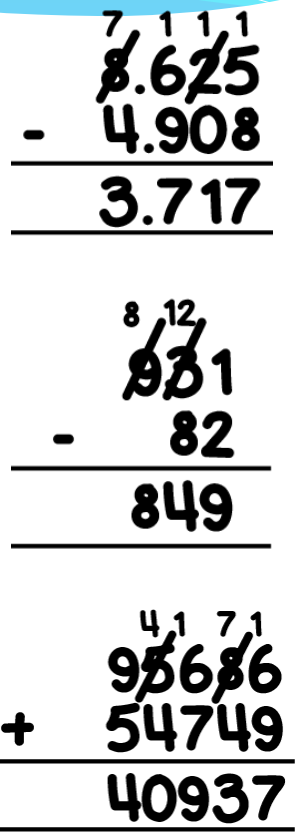
Step 8
I can solve any 5d - 5d

Step 9
I can subtract numbers with 1dp

Step 10
I can subtract numbers with 2dp

Step 11
I can subtract numbers with 3dp

Step 12
I can subtract numbers with mixed amounts of decimal places



Multiplication

Step 1
I can solve a 2d x 1d

Step 2
I can solve any 2d x 1d

Step 3
I can solve any 3d x 1d

Step 4
I can solve any 2d x 2d

Step 5
I can solve any 3d x 2d

Step 6
I can solve any 4d x 1d

Step 7
I can solve any 4d x 2d

Step 8
I can solve any 1d.1dp x 1d

Step 9
I can solve any 1d.2dp x 1d

$$\begin{array}{r} {\scriptstyle 5\ 3} \\ 385 \\ \times\ \ 6 \\ \hline 2310 \end{array}$$

Step 10
I can solve any 1d.1dp x 2d

$$\begin{array}{r} {\scriptstyle 3} \\ 85 \\ \times\ 16 \\ \hline 510 \\ 850 \\ \hline 1360 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1} \\ 5.2 \\ \times\ 36 \\ \hline 31.2 \\ 156.0 \\ \hline 187.2 \end{array}$$

Step 11
I can solve any 1d.2dp x 2d

Division

Step 1
I can solve a 2d ÷ 1d (using x2, 3, 4, 5) with no remainders inside the question

Step 2
I can solve 2d ÷ 1d (using x2, 3, 4, 5) with no remainders in the answer

Step 3
I can solve 2d ÷ 1d (using any table) with no remainders in the answer

Step 4
I can solve a 3d ÷ 1d (using any table) with no remainders in the answer

Step 5
I can solve a 4d ÷ 1d (using any table) with no remainders in the answer

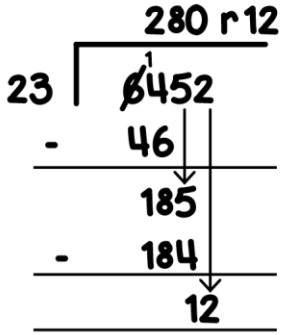
Step 6
I can solve any 2d ÷ 1d and 3d ÷ 1d with remainders

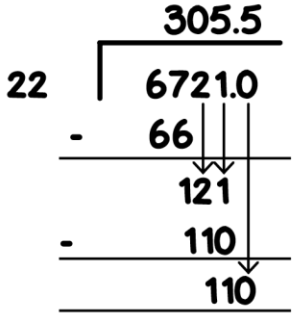
Step 7
I can solve any 4d ÷ 1d and interpret the context of the remainder

Step 8
I can solve any 3d ÷ 2d

Step 9
I can solve any 4d ÷ 2d and show the remainder as a fraction

Step 10
I can solve division with decimal places in the answer





The Challenge!

Big Maths Beat That – timed challenge where children answer 'Learn Its' questions. The aim is to beat their previous score.

CLIC test – A test based on the key areas of CLIC.

From this, areas of uncertainty are identified. These elements of CLIC are then worked on and progress made

Beat that… timed.

Big Maths BEAT THAT!

LEARN IT'S Challenges!

Steps 8, 9 & 10

Name:
Class:
Date:

Step 8

9 x 5 =	3 x 5 =
6 + 5 =	5 x 8 =
5 + 4 =	5 x 5 =
5 x 6 =	8 + 7 =
8 + 9 =	5 x 7 =
1 x 5 =	5 x 4 =
5 x 2 =	7 + 6 =
10 x 5 =	

Step 9

3 x 2 =	6 + 8 =
8 + 5 =	2 x 4 =
2 x 2 =	5 x 2 =
9 + 5 =	2 x 6 =
8 x 2 =	2 x 7 =
7 + 9 =	6 + 9 =
1 x 2 =	2 x 9 =
7 + 5 =	10 x 2 =

Step 10

3 x 1 =	6 x 3 =
5 x 3 =	3 x 7 =
3 x 3 =	10 x 3 =
3 x 4 =	9 x 3 =
2 x 3 =	8 x 3 =

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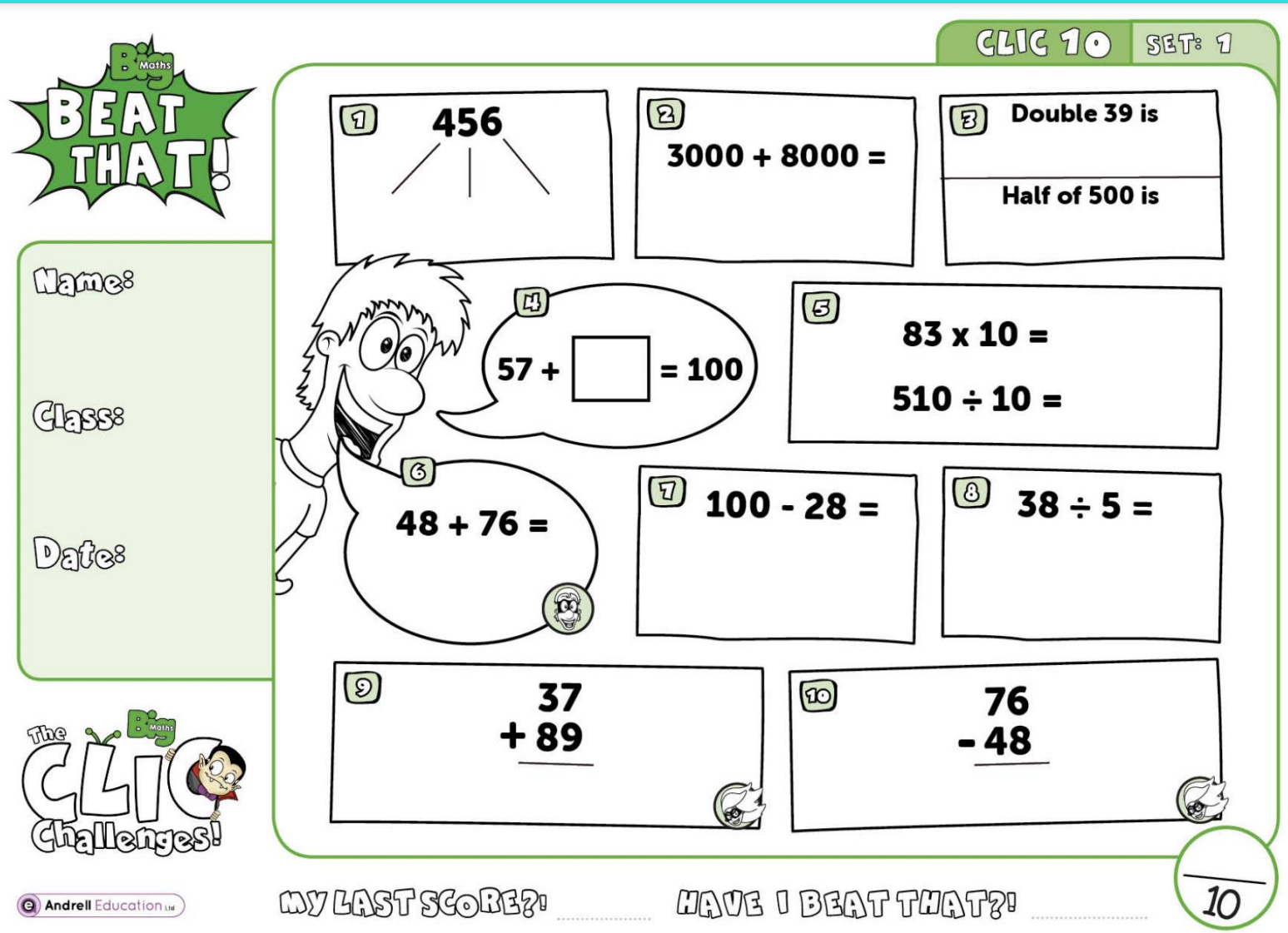
MY BEAT THAT! SCORE WAS .....

SET: 1

Score:

CLIC test… non timed



Outer Numeracy

These 4 operations are then taken into what we call ‘outer numeracy’.

This is when they apply what they know using money, measures, and real-life worded sentence problems.

There are 588 apples in one basket and 653 apples in another basket. How many apples are there altogether?

Pim has 887g of potatoes on the weighing scales. He adds 321g more. What is the weight on the scales?

How can I support my child?

Help your child to practice their 'Learn Its'/ times tables at home.

Use maths with your child when out & about & at home. Let them pay for things, work out change, cook using measures. Share out sweets and divide pizzas into slices.

Ask your child to tell you about Big Maths.

Praise! Celebrate the successes.