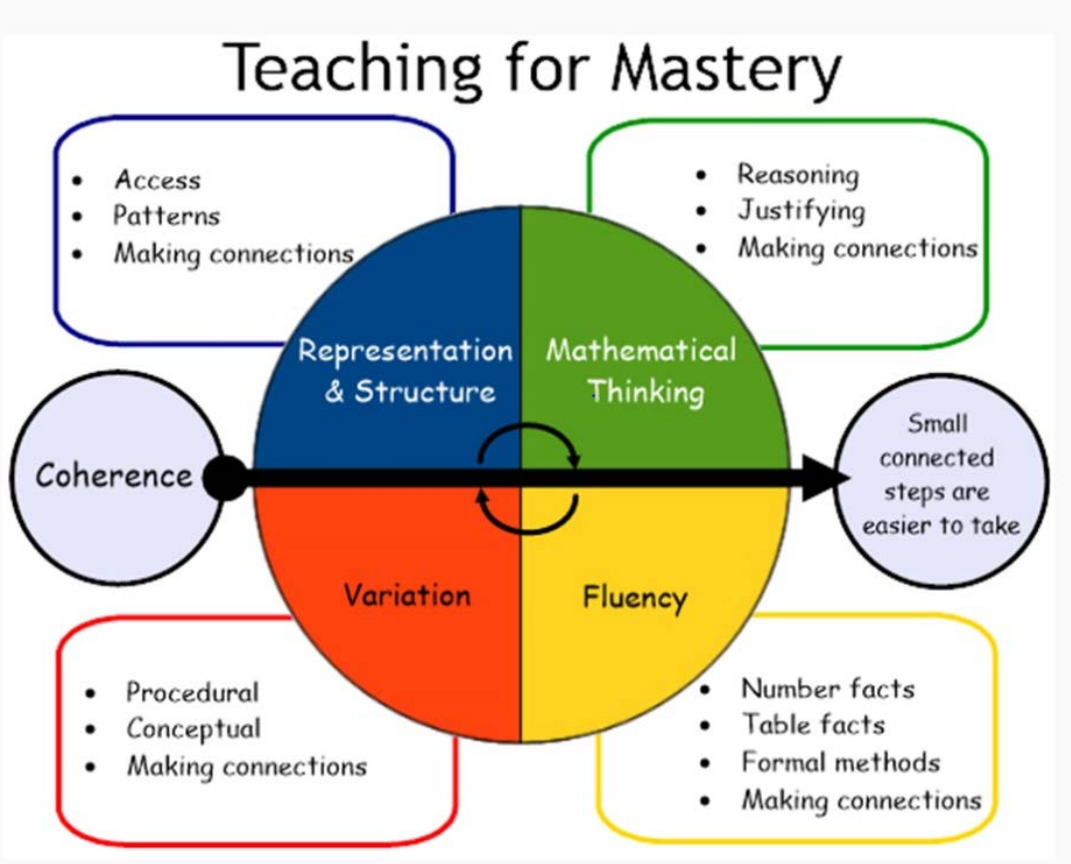
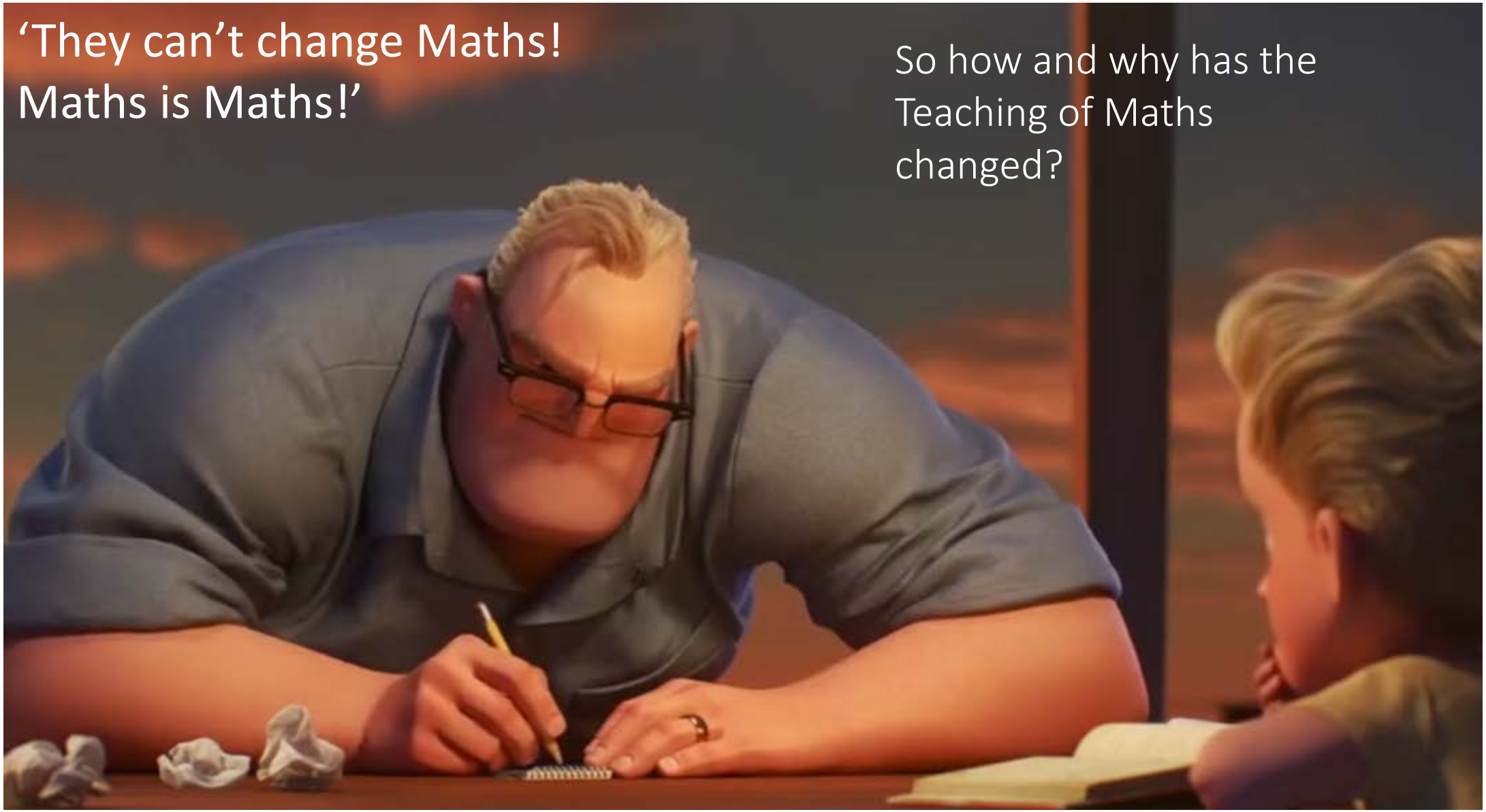
Welcome to a presentation on Maths at St Francis of Assisi Primary School

Teaching for Maths Mastery so that children develop strong foundations in Maths on which they can build a deep understanding.




‘They can’t change Maths!
Maths is Maths!’
So how and why has the Teaching of Maths changed?

With the support of the government and using very robust research, many schools are teaching a Mastery approach in maths.

3 TYPES OF LEARNING

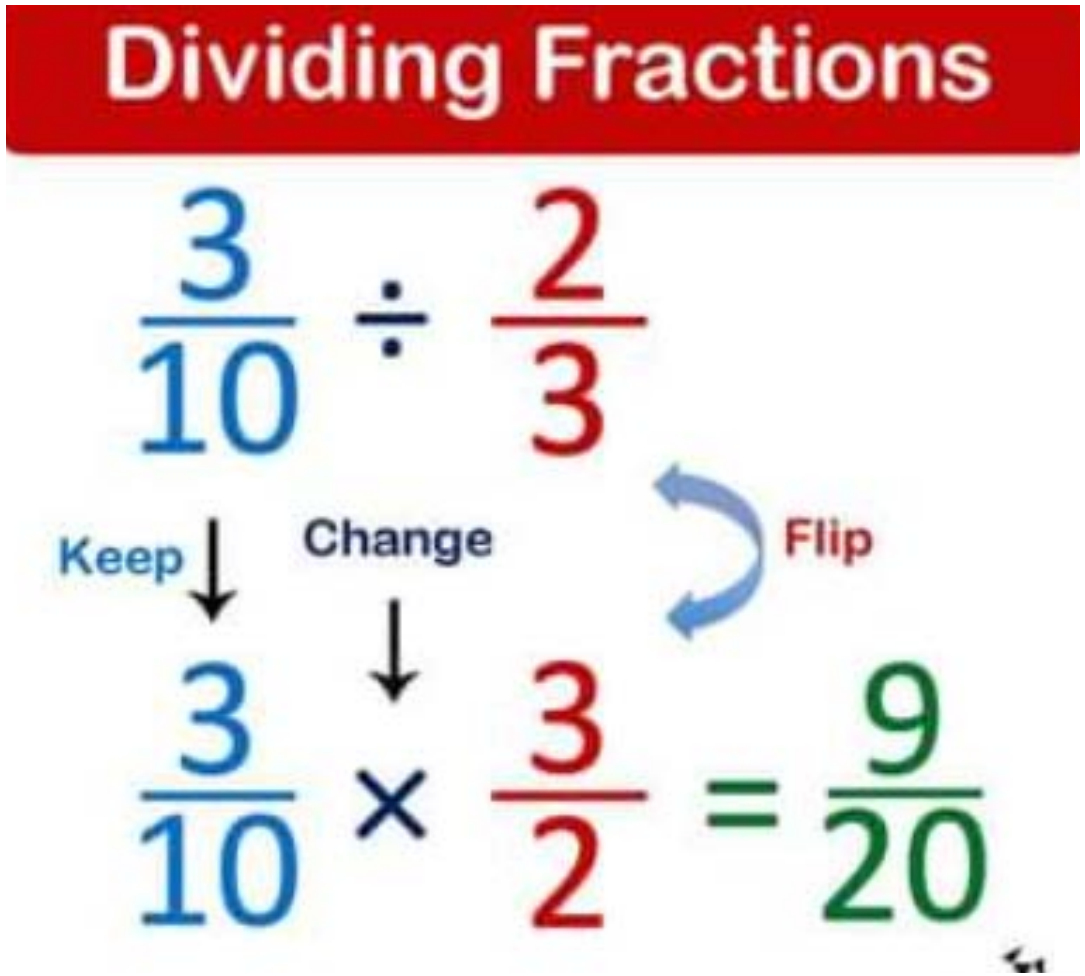
There are three types of learning:

1. Shallow learning – surface, temporary, often lost
2. Deep learning – it sticks, can be recalled and used
3. Deepest learning – can be transferred and applied in different contexts

"In mathematics, you know you've mastered something when you can apply it to a totally new problem in an unfamiliar situation." – Dr Helen Drury, Director of Mathematics Mastery.

Maths mastery is a teaching and learning approach that **aims for pupils to develop *deep understanding* of maths rather than being able to memorise key procedures or resort to rote learning.**

We want children to understand maths and not follow a procedure that has no real meaning for them. To remember how to do something in maths is far removed from understanding why we do it.



39 + 39

If we think about the many ways that this can be solved, it shows us that in maths, the right answer is only one of the aspects of this question. Can the children choose an efficient method?

Often children will think they need to follow a procedure and come up with an answer that is not reasonable.

39 +

39

618

Much better to add 40 and 40 and subtract 2!

An 8 year old boy was asked: 'If a baby was born in 1998, how old was it on its birthday in 2001?'
He answered 3 confidently.

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He answered 3 confidently.

The same boy was later given the calculation 2001-1998. He went onto auto-pilot and wrote

```
  2001
- 1998
  1997
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Sarah knows all of her times table facts up to 12 x 12 and has all of her stickers on the class wallchart.

Her teacher asks her what 13 x 12 is.

She says, “I don’t know! It doesn’t exist!”

Of course knowledge of times tables is important but here we have an example of someone with limited knowledge – they know 12 x 12 but do they have a clear understanding of the concept of multiplication?

So how to we teach children to have this deep understanding in maths?

First by the atmosphere we promote

- **We approach maths with a growth mind set**
- **We value mistakes as part of the learning journey**
- We are involved in our learning
- We communicate our ideas in maths
- We explain, prove and justify our answers
- We look for efficient methods to solve problems
- We are respectful of the ideas of others

How do the children learn maths?

We aim to teach so that the children understand how the different areas of maths are interconnected and we build their conceptual and procedural understanding through

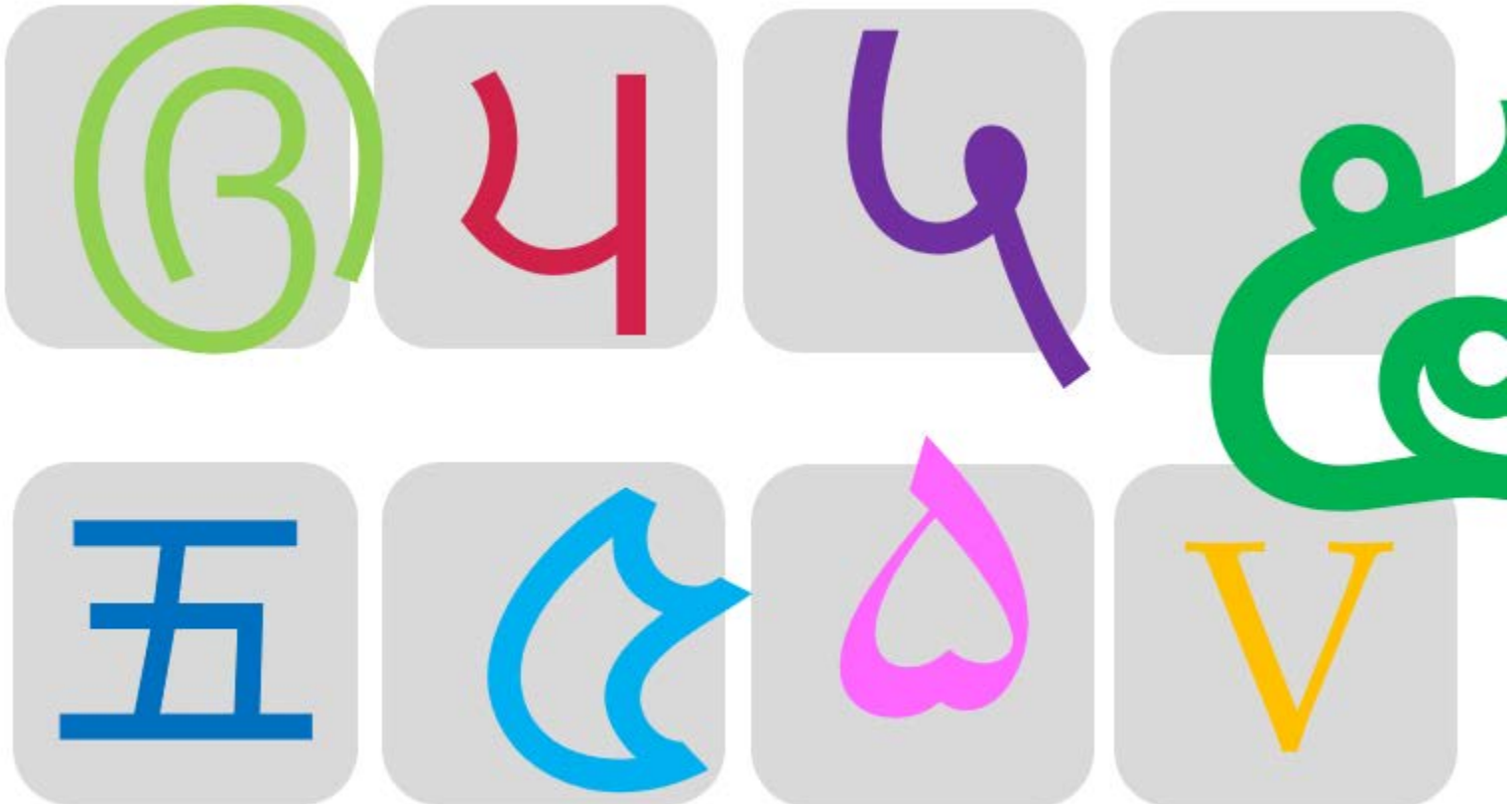
A CPA approach – using concrete materials, pictorial images and the abstract to develop a deep understanding

A focus on reasoning

Talking about maths

Developing their fluency and confidence with mathematical methods and number facts.

Exploring the structure of maths so that links can be made

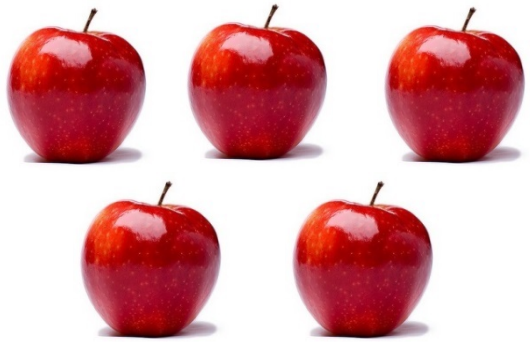


Symbols are meaningless until we bring meaning to them and so we help children through exposure to a variety of images, resources and models of maths/

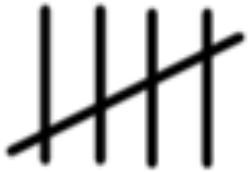
Multiple representations

Concrete

The DOING



Demonstrating depth



Pictorial

The SEEING

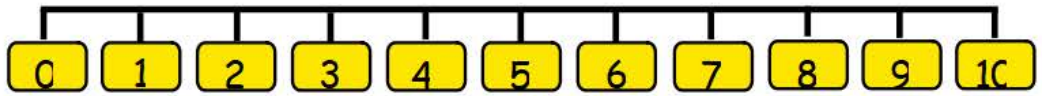
Abstract

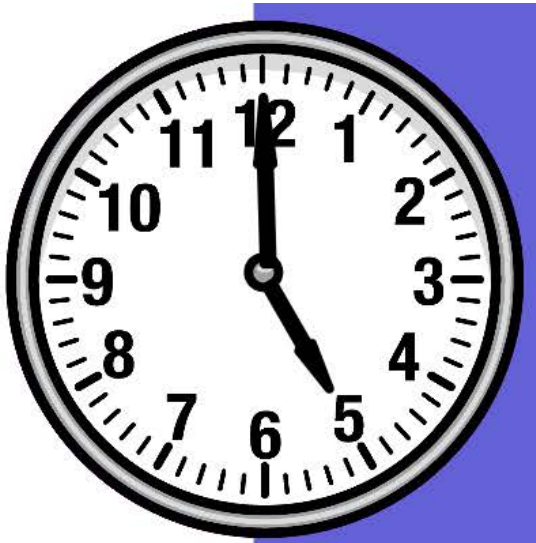
The SYMBOLIC

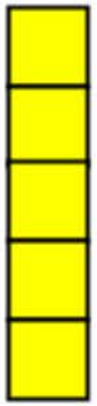
5

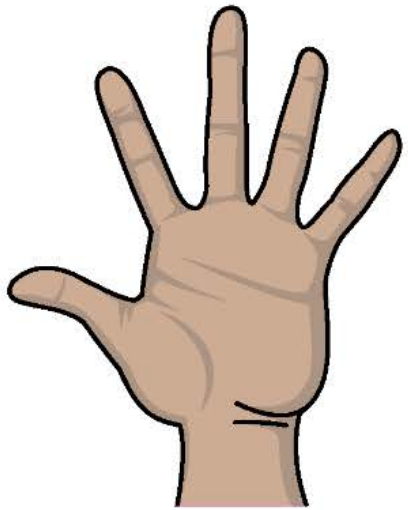
/‘faɪv/

five









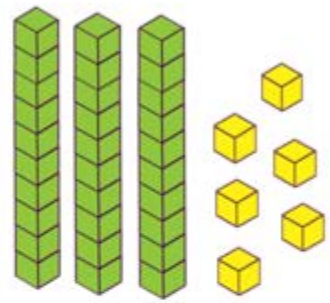
5

Do children have a limited understanding of 5 or can they see it in a variety of ways? 5 is not just 5 it is 4 and 1 etc

Talk Task

What does each representation of 36 reveal about the number?

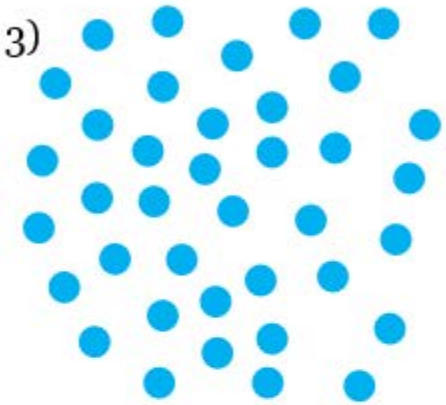
1)



2)

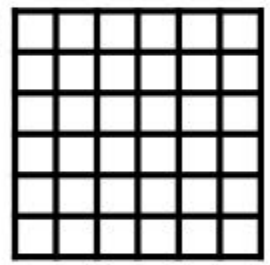
Tens	Ones
3	6

3)

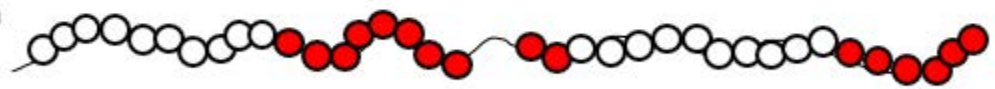


4)

5)



6)



Conceptual understanding

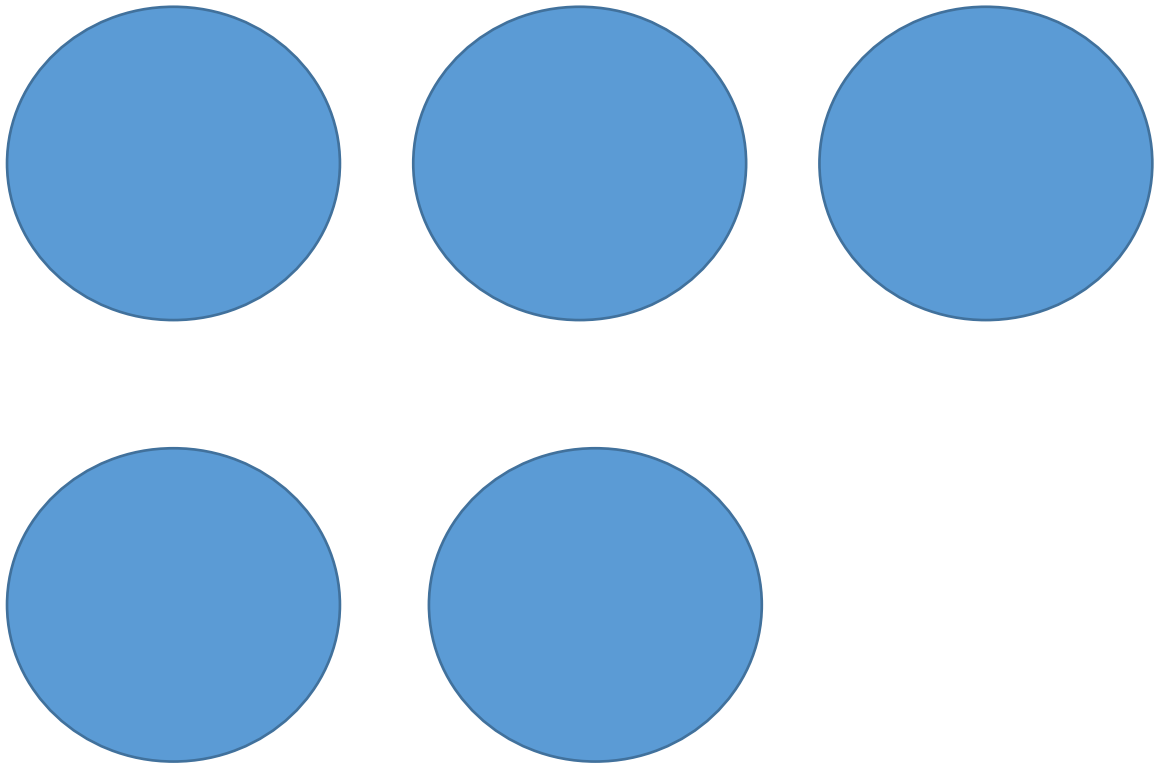
Pupils deepen their understanding by representing concepts using objects and pictures, making connections between different representations and thinking about what different representations stress and ignore.

Can you think of other representations?

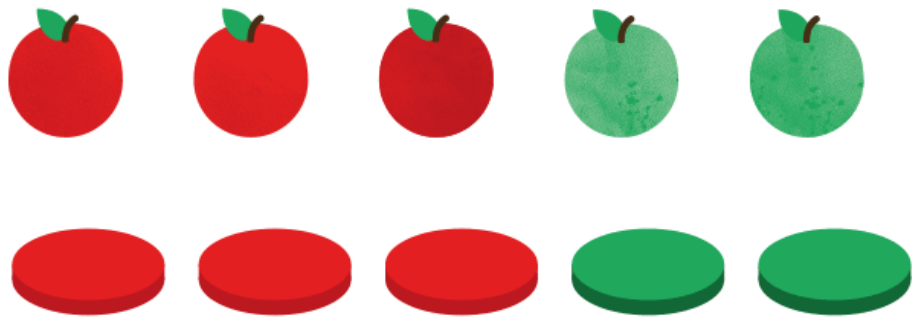
The concrete

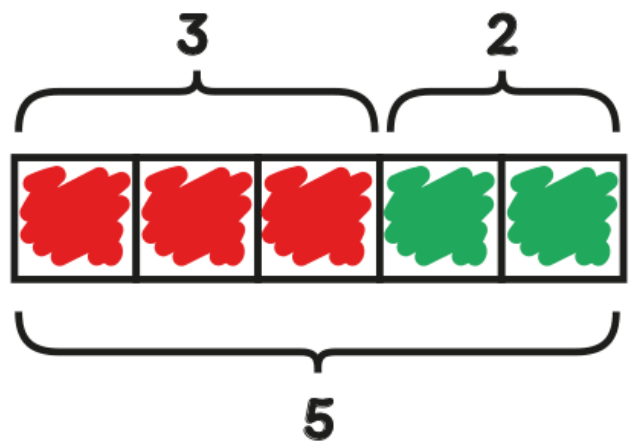
- Counters
- Dienes
- Place value counters
- Numicon
- Lots more…

There are many resources that children use to develop this deep understanding of number.



Even early on, children subitise (see smaller numbers within a set) and this can build into understanding number. Do you see 3 + 2 = 5 4 + 1 =5 and even 5 – 3 = 2. Already this image is leading children to make connections in Maths.





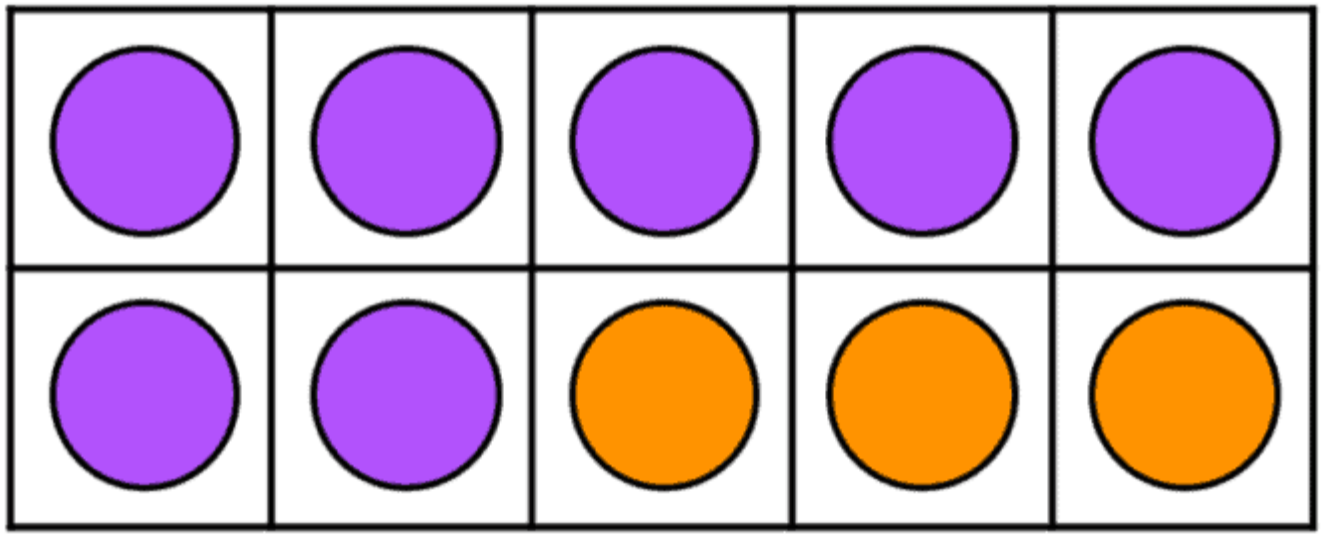
$3 + 2 = \boxed{5}$

This shows how we move from the concrete to the pictoral and the abstract.

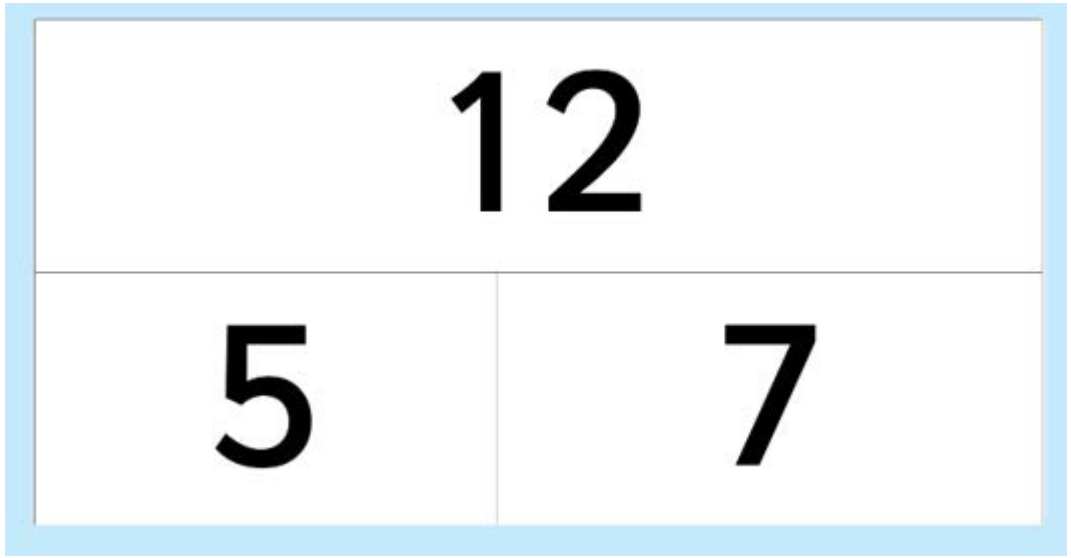
How maths is connected?

When is an elephant not an elephant?

When we only see a small part of it would we know it was an elephant?! We want children to know that all areas in maths are connected.



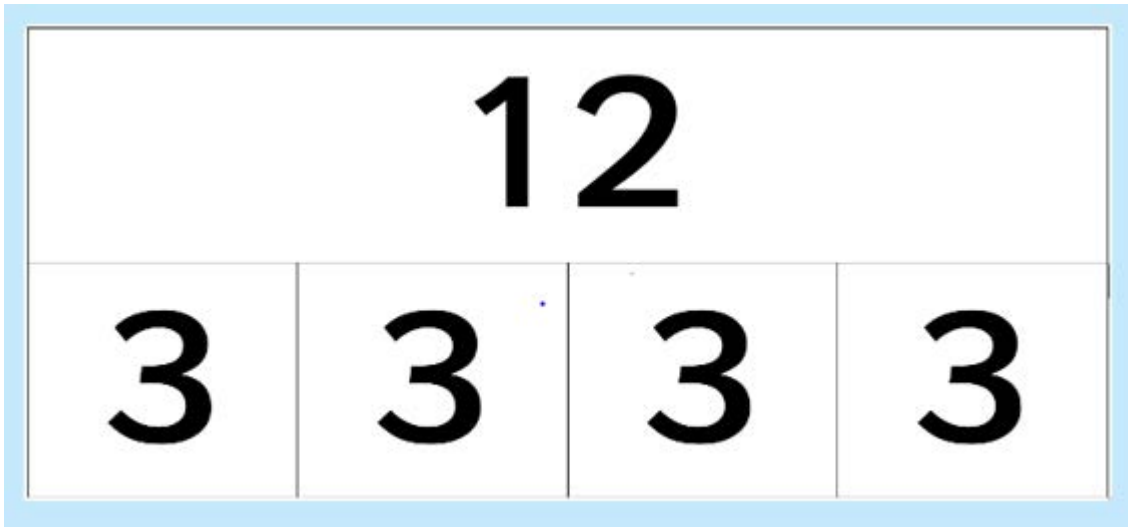
The ten frame is an important model to develop children's understanding – we can use it with young children but also with older children. What if the whole was 10 what would each counter represent? What if the whole was 1000?



The first part whole image shows us that 12 is the whole and 5 and 7 are the parts.
So

5 + 7 = 12 12 – 7 = 5
7 + 5 = 12 12 – 5 = 7
12 = 5 + 7 5 = 12- 7
12 = 7 + 5 7 = 12 - 5

The relationship between addition and subtraction is clear.



The second part whole also shows that 12 is the whole but now it is made of 4 equal groups of 3
So now not only can we see addition and subtraction, we can see

3 x 4 = 12 12 ÷ 3 = 4
4 x 3 = 12 12 ÷ 4 =3
12 = 3 x 4 3 = 12 ÷ 4
12 = 4 x 3 4 = 12 ÷ 3

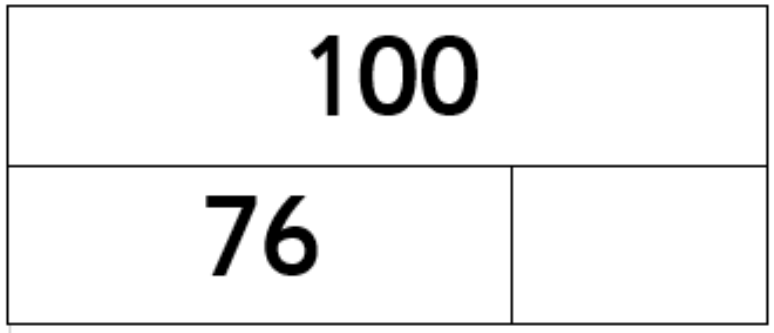
The part whole model is a wonderful way to see mathematical connections.

We can even see that ¼ of 12 is 3

I have saved £100 and want to spend £76 on a second hand bike.

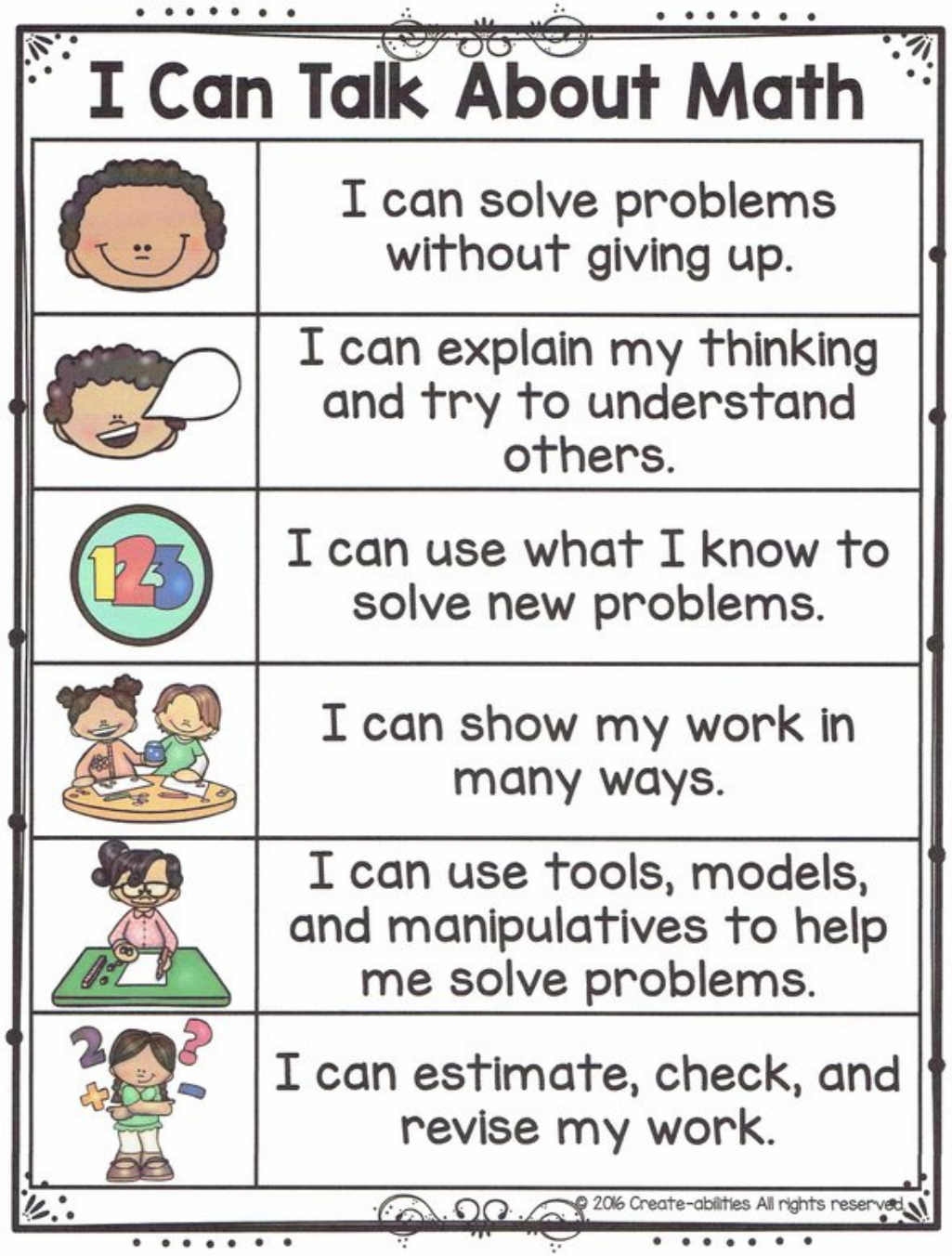
How much will I have left?

If I think about what I know and what I don't know, the part whole model will support me in solving this problem.



Missing parts are the first step to algebra ☺

Maths Talk is a very important part of our Maths lessons
Talking about number- allowing children to discuss, compare and evaluate their ideas and approaches leads to a deeper understanding in maths



The first table shows the skills wanted by employers 50 years ago.

The second table shows the top skills wanted now!

All of these can be developed through Number Talk.

1	Writing
2	Computational Skills
3	Reading Skills
4	Oral Communications
5	Listening Skills
6	Personal Career Development
7	Creative Thinking
8	Leadership
9	Goal Setting/Motivation
10	Teamwork
11	Organizational Effectiveness
12	Problem Solving
13	Interpersonal Skills

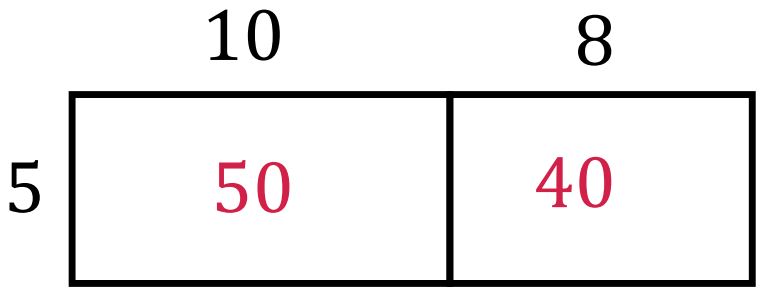
1	Teamwork
2	Problem Solving
3	Interpersonal Skills
4	Oral Communications
5	Listening Skills
6	Personal Career Development
7	Creative Thinking
8	Leadership
9	Goal Setting/Motivation
10	Writing
11	Organizational Effectiveness
12	Computational Skills
13	Reading Skills

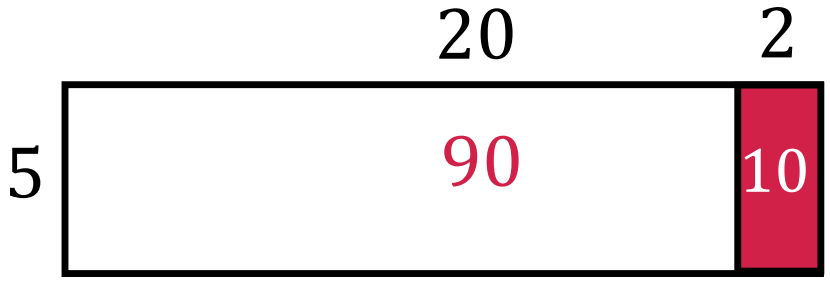
Number Talk allows children to compare and consider the efficiency of different ways to solve calculations and problems.

18×5 – some possibilities

$$10\times5 + 8\times5$$

This can also be written as: $5(10+8)$



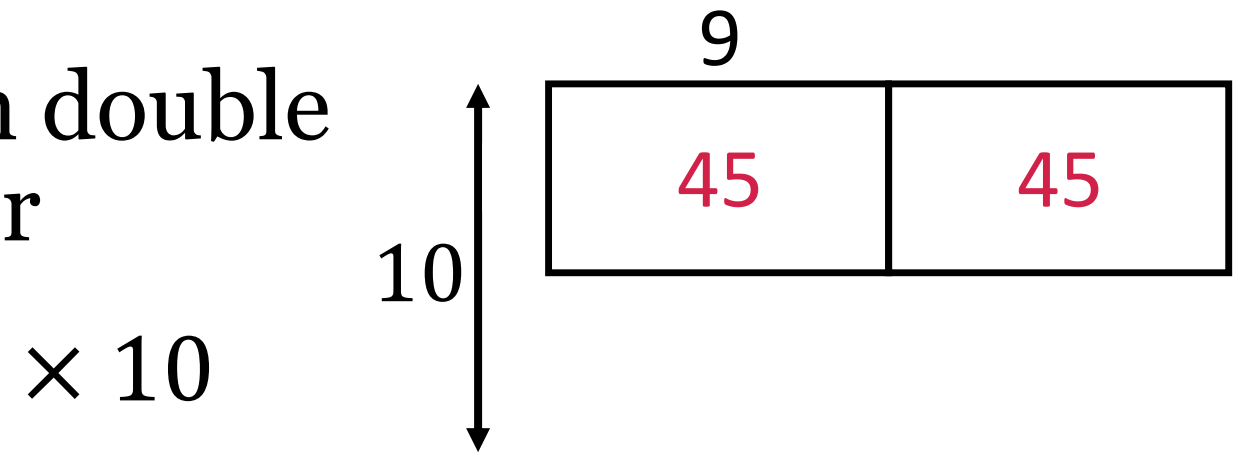


$$20\times5 - 2\times5$$

This can also be written as: $5(20-2)$

9×5 , then double the answer

$$18\times5 = 9\times10$$



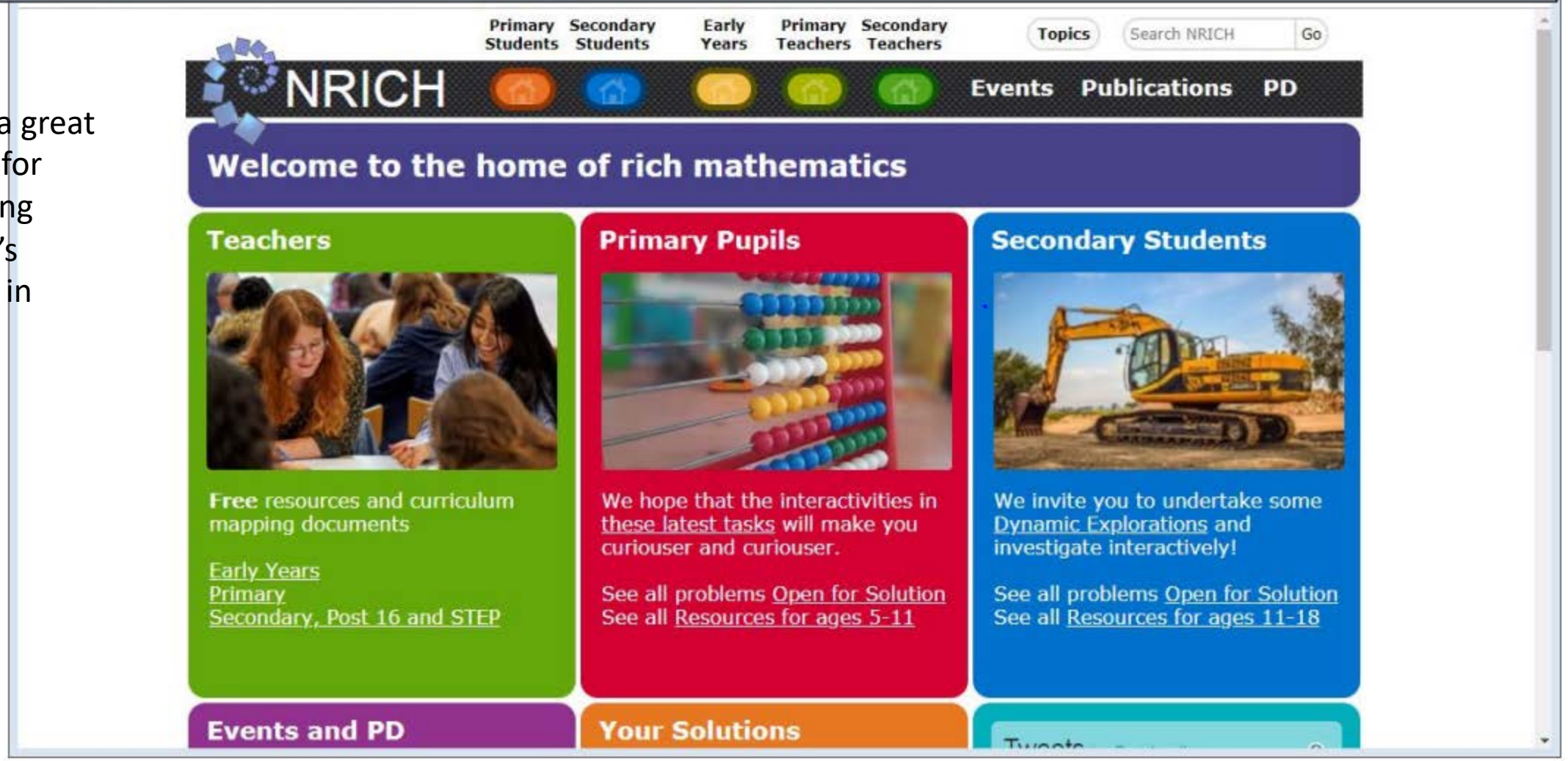
What research says...

High attaining children typically develop **fluency** in arithmetic relatively quickly. The main focus for ensuring they are challenged therefore needs to be within **mathematical reasoning and problem solving.**

- Mathematics Matters Report 2007

Rich Tasks & Problem Solving

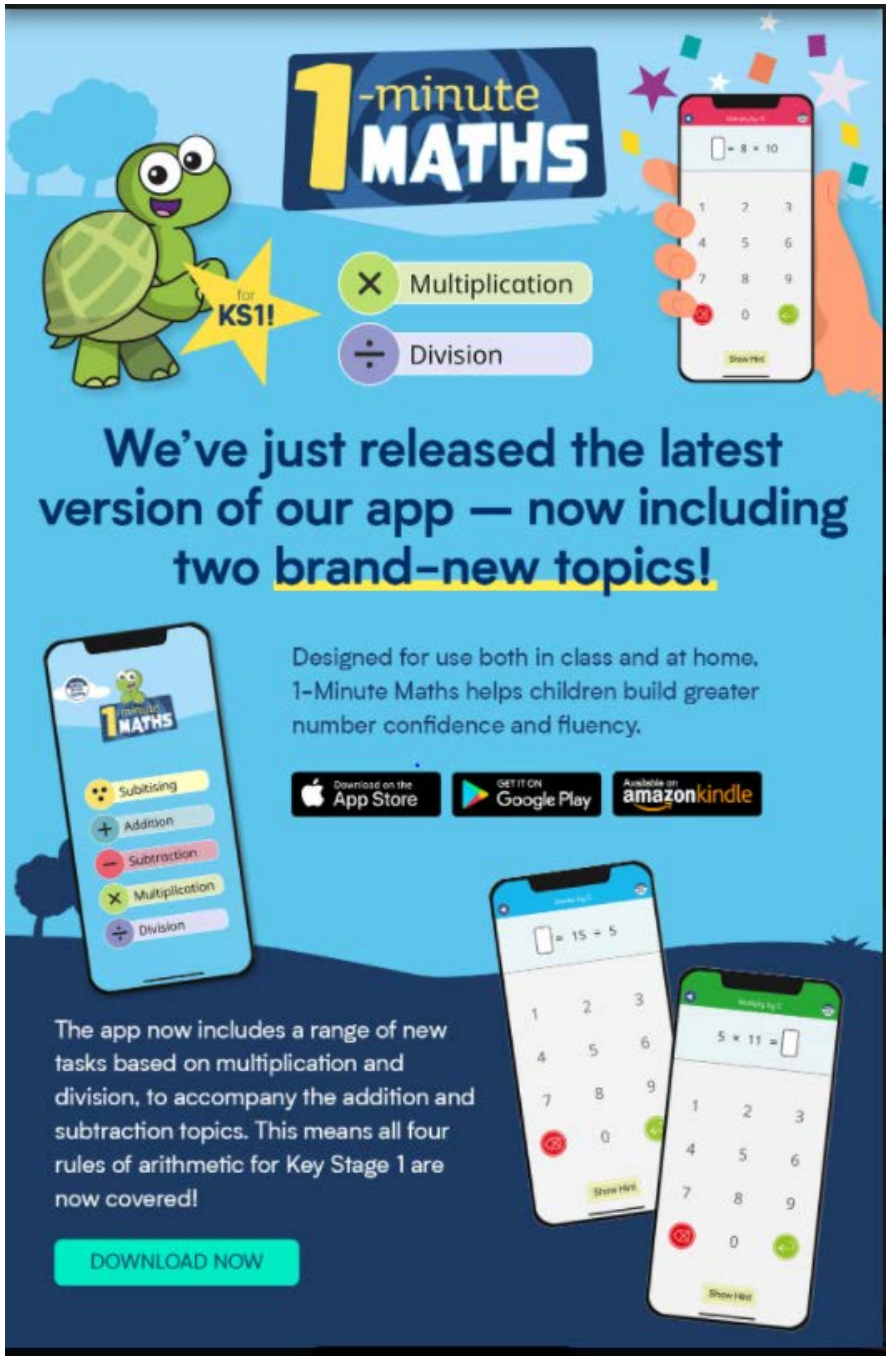
Nrich is a great website for deepening children's thinking in Maths.



How to help your children….

- **Make the most of shopping trips and other outings** – talk about spending money and calculating change. Does your child understand the offers they see on signs or adverts in shops?
- **Maths is a broad subject, and encompasses topics like measure and shape!** Can your child recognise shapes in their everyday surroundings? Can they tell the time, or use weighing scales?
- **Think about how you can involve your child in everyday problem solving.** You may be planning a party, or cooking dinner. Many tasks involve sharing, or using fractions!

A recommended (and free) app!



Thank you

- Thank you so much for taking the time to read this presentation and I hope that it has been useful.