

Teaching Mathematics at Lanchester EP



National Curriculum aims for pupils to

- Become **fluent** in the fundamentals of mathematics, including 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 routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions



We follow the White Rose approach to teaching Maths

This is a Maths Mastery Scheme

Maths Mastery originated in China and Asia. These are among the highest achieving maths nations in the world.

What is Mastery?



What does it mean to master something?

- I know how to do it
- It becomes automatic and I don't need to think about it- for example driving a car
- I'm confident at doing it
- I can show someone else how to do it.

Mastery in Maths



There are three levels of learning:

Shallow learning: surface, temporary, often lost

Deep learning: it sticks, can be recalled and used

Deepest learning: can be transferred and applied in different context

The **deep** and **deepest** levels are what we are aiming for by teaching maths using the Mastery approach. A mathematical concept or skill has been mastered when a child can show it in **multiple ways**, using the **mathematical language** to explain their ideas, and can independently apply the concept to new **problems** in unfamiliar situations.

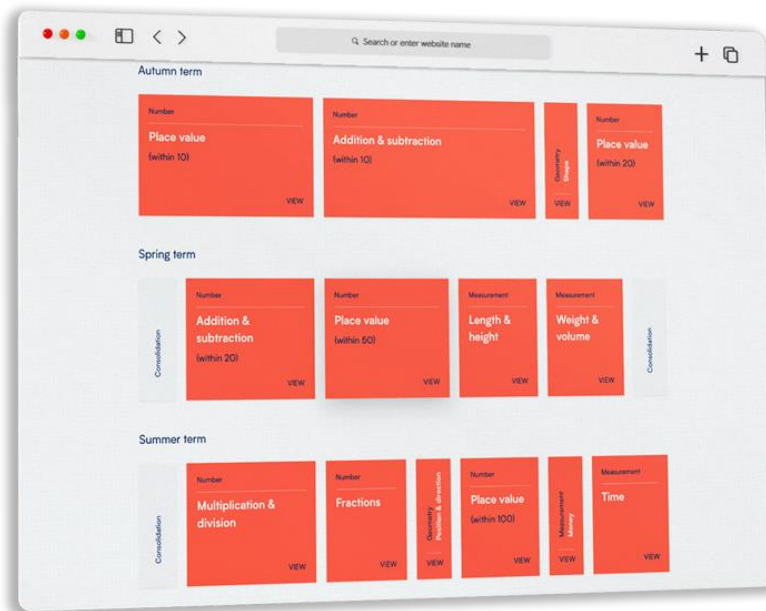
At each stage of learning, children should be able to demonstrate a deep, conceptual understanding of the topic and be able to build on this over time.

White Rose Structure

Blocks of learning

Each year comprises individual blocks of learning about a particular topic. Autumn Block 2, for example, focuses on addition and subtraction.

You'll notice that we spend lots of time building strong number skills in Key Stage 1, Key Stage 2.



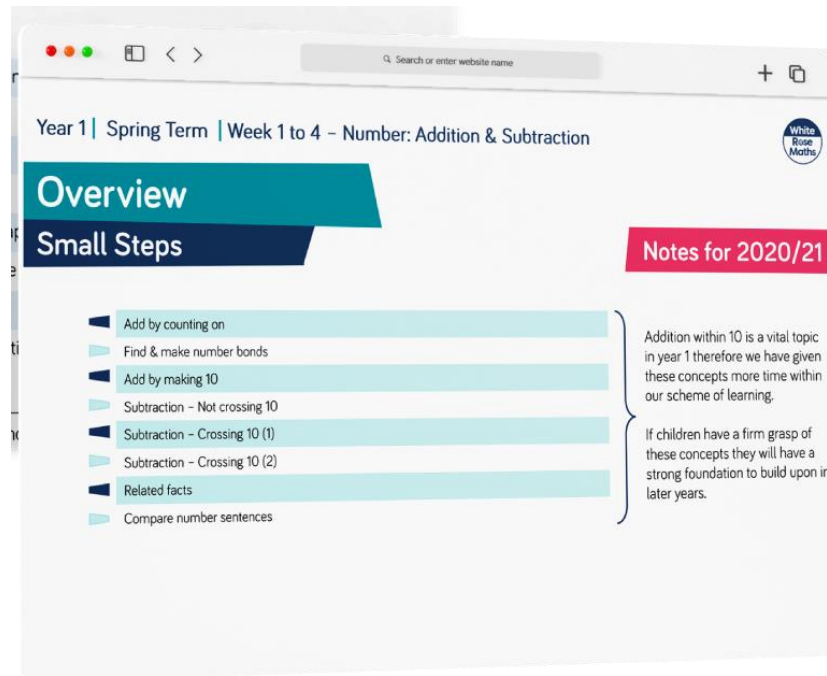
These essential core skills lay a solid foundation for more complicated learning later on.

Sometimes schools might be a little behind or ahead of the scheme schedule. That's fine; we deliberately build flexibility into our schemes to allow for these variations.

The small steps

Each block of knowledge is divided into a series of small learning steps. Together, these small steps cover all the curriculum content that your child needs to know.

Brain science tells us that your child will remember more by learning maths in small, related chunks. We also used the best available research to map out the crucial learning steps that will help your child to understand what they are learning clearly.

A screenshot of a web browser displaying a page from MathsHUBS. The page title is "Year 1 | Spring Term | Week 1 to 4 - Number: Addition & Subtraction". The main heading is "Overview" with a sub-heading "Small Steps". A list of learning steps is shown, including "Add by counting on", "Find & make number bonds", "Add by making 10", "Subtraction - Not crossing 10", "Subtraction - Crossing 10 (1)", "Subtraction - Crossing 10 (2)", "Related facts", and "Compare number sentences". A red box on the right contains the text "Notes for 2020/21".

Year 1 | Spring Term | Week 1 to 4 - Number: Addition & Subtraction

Overview

Small Steps

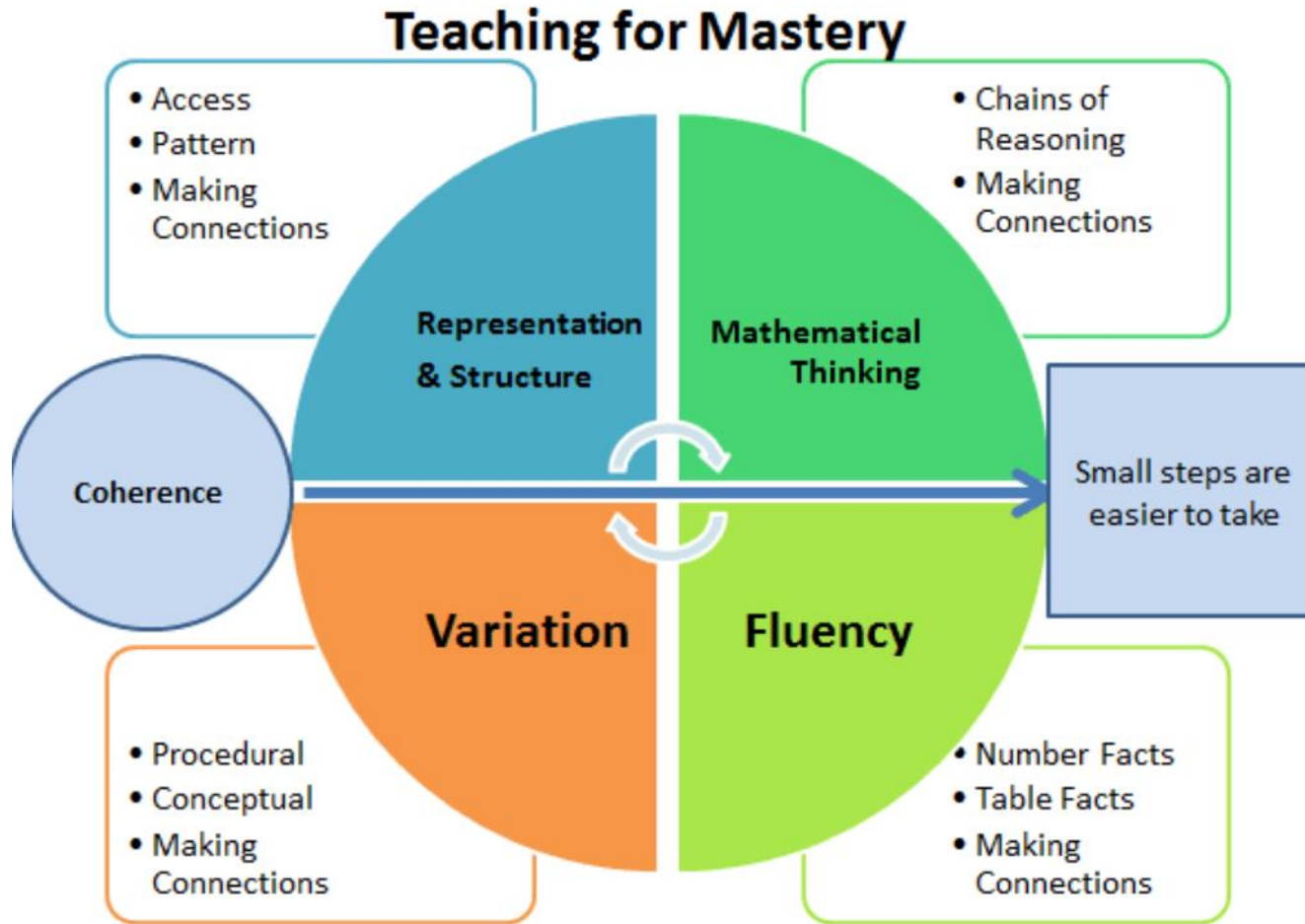
- ▶ Add by counting on
- ▶ Find & make number bonds
- ▶ Add by making 10
- ▶ Subtraction - Not crossing 10
- ▶ Subtraction - Crossing 10 (1)
- ▶ Subtraction - Crossing 10 (2)
- ▶ Related facts
- ▶ Compare number sentences

Notes for 2020/21

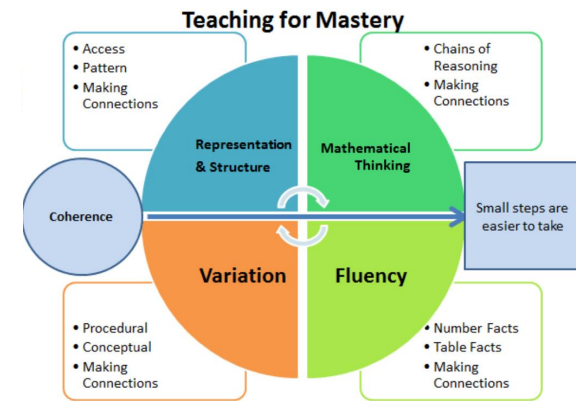
Addition within 10 is a vital topic in year 1 therefore we have given these concepts more time within our scheme of learning.

If children have a firm grasp of these concepts they will have a strong foundation to build upon in later years.

The 5 big ideas



1. Coherence



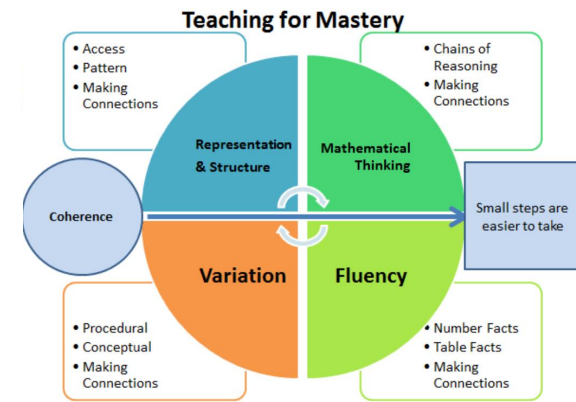
The flow of the lesson.

Connecting new ideas to concepts that have already been understood.

A focus on mathematical relationships and making connections.

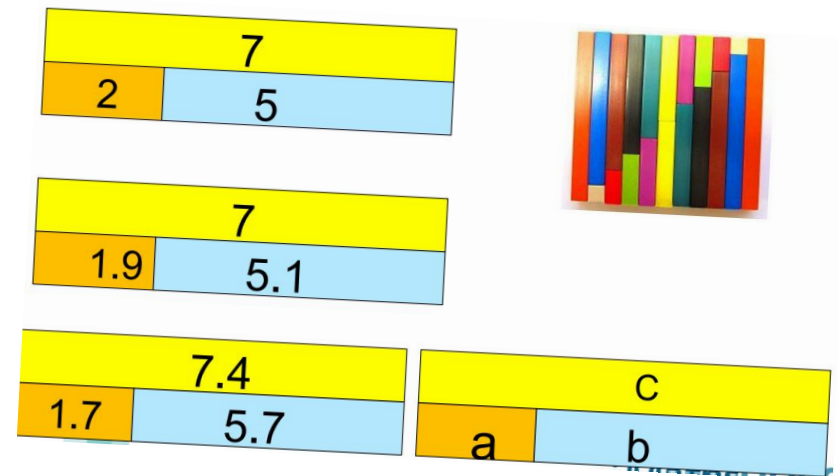
Coherence describes the journey throughout the lesson.

2. Representation/Structure

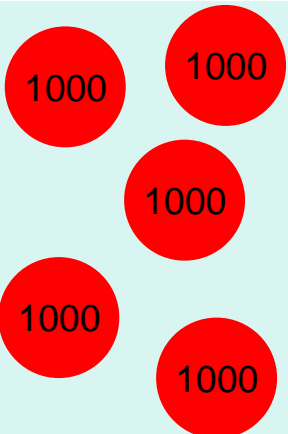
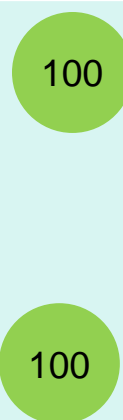

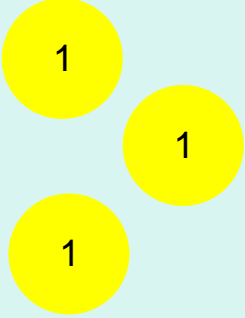


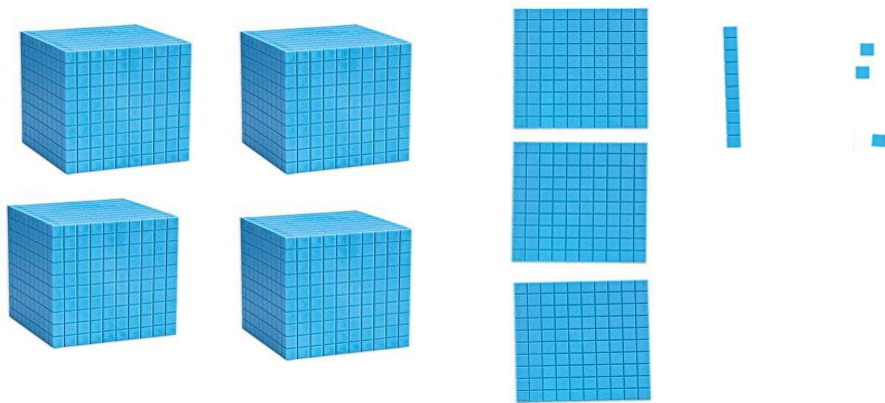
Many representations are used in lessons to explore the structure of maths.

Mathematics is an abstract subject, representations have the potential to provide access and develop understanding.



Ten Thousands	Thousands	Hundreds	Tens	Ones
				

Ten Thousands	Thousands	Hundreds	Tens	Ones
				



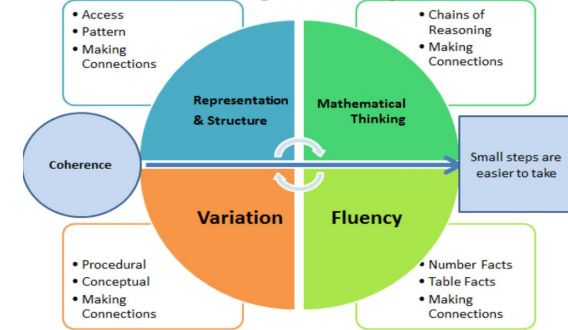
hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens	units	• decimal	tenths	hundredths	thousandths	ten thousandths
					4	3	1	3					

1,000,000	2,000,000	3,000,000	4,000,000	5,000,000	6,000,000	7,000,000	8,000,000	9,000,000
100,000	200,000	300,000	400,000	500,000	600,000	700,000	800,000	900,000
10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

$$4000 + 300 + 10 + 3 = 4313$$

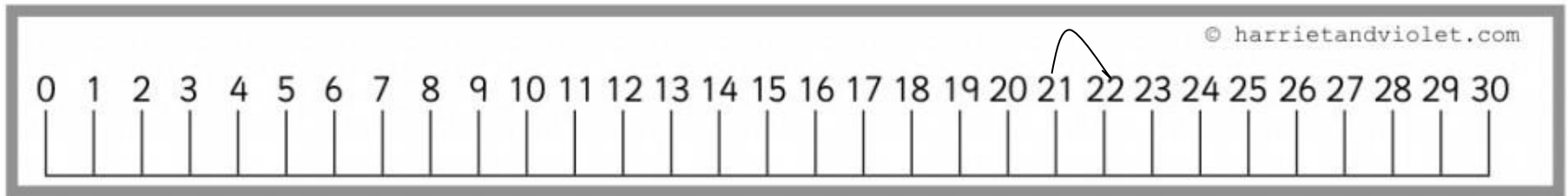
Four thousand add three hundred add ten add three equals four thousand three hundred and thirteen.

3. Mathematical Thinking



Making connections between ideas. Children are encouraged to be active in their maths, discussing, reasoning and solving problems.

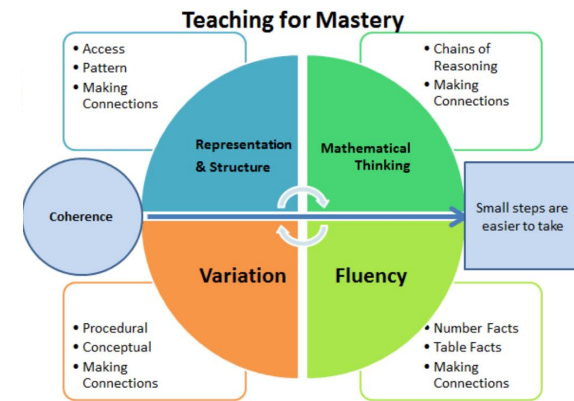
Thinking about relationships between ideas in maths. E.g. Addition/subtraction.



From these two numbers children can make connections between mathematical ideas. Think of all the vocab you can get out of this.

- $21+1=22$
- $1+21=22$
- $22-1=21$
- $22-21=1$
- 1 more than $21 = 22$
- 1 less than $22 = 21$
- $21+1= 22$
- $22-1=21$
- $22=21+1$
- $21=22-1$
- $22=1+21$
- Find the difference
- How many tens, how many ones
- Twenty one add one equals twenty two
- Etc.

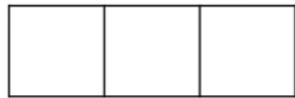
4. Variation



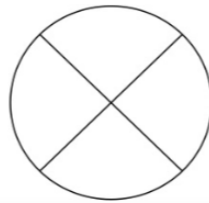
Conceptual Variation

Varying the way a concept is presented to extract the essential features

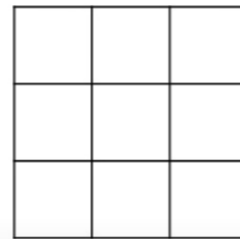
Illustrate these fractions on the diagram.



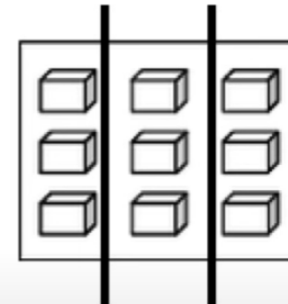
$$\frac{2}{3}$$



$$\frac{1}{4}$$



$$\frac{4}{9}$$



$$\frac{2}{3}$$

5. Fluency

Quick and efficient recall of facts and procedures (times tables, number bonds, doubles etc.)

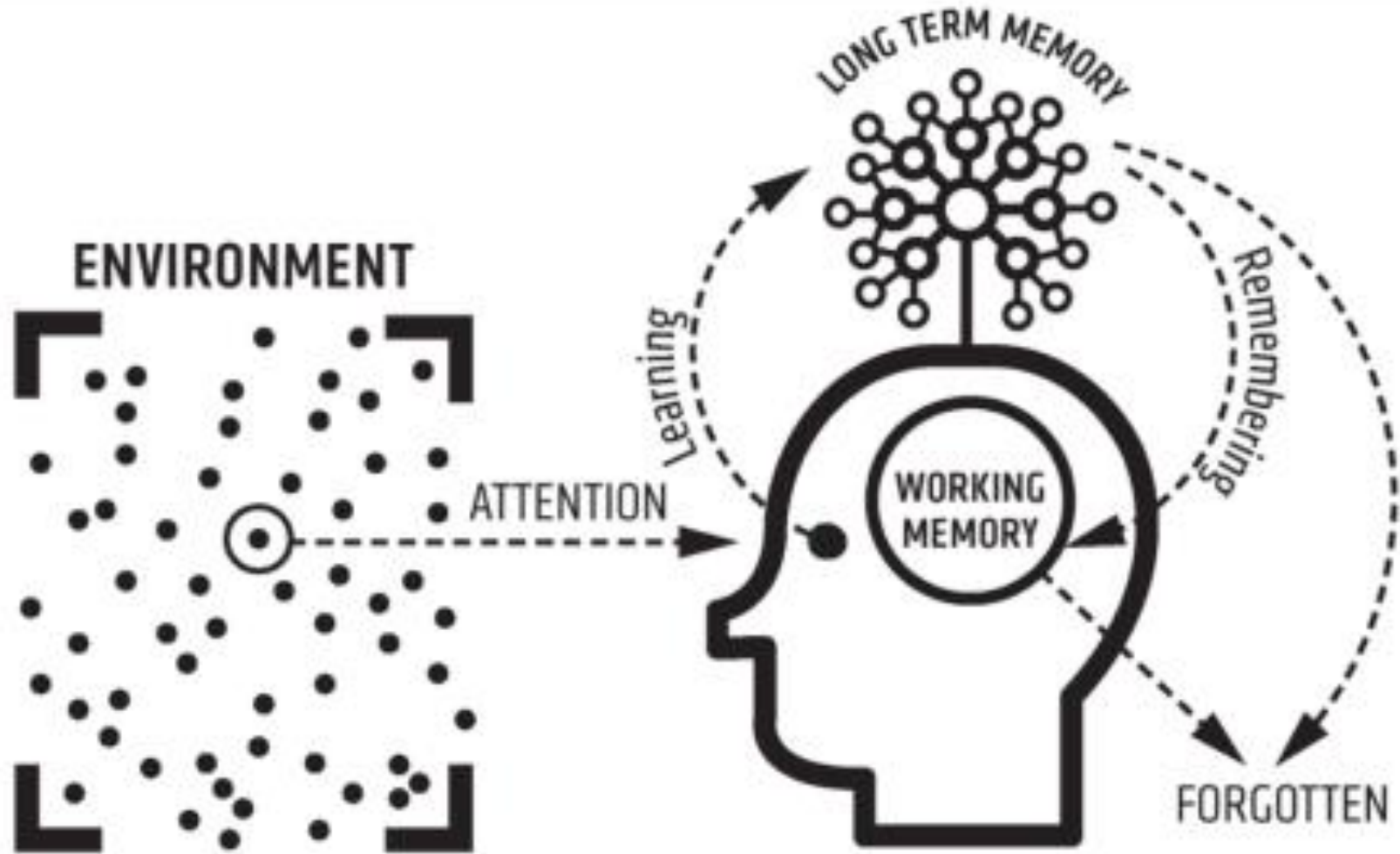
This is the big one. Our children need to be fluent in these simple facts.

		Adding 1		Bonds to 10		Adding 10		Bridging/ compensating		Y1 facts		
		Adding 2		Adding 0		Doubles		Near doubles		Y2 facts		
+		0	1	2	3	4	5	6	7	8	9	10
0		0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1		1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	1 + 10
2		2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8	2 + 9	2 + 10
3		3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7	3 + 8	3 + 9	3 + 10
4		4 + 0	4 + 1	4 + 2	4 + 3	4 + 4	4 + 5	4 + 6	4 + 7	4 + 8	4 + 9	4 + 10
5		5 + 0	5 + 1	5 + 2	5 + 3	5 + 4	5 + 5	5 + 6	5 + 7	5 + 8	5 + 9	5 + 10
6		6 + 0	6 + 1	6 + 2	6 + 3	6 + 4	6 + 5	6 + 6	6 + 7	6 + 8	6 + 9	6 + 10
7		7 + 0	7 + 1	7 + 2	7 + 3	7 + 4	7 + 5	7 + 6	7 + 7	7 + 8	7 + 9	7 + 10
8		8 + 0	8 + 1	8 + 2	8 + 3	8 + 4	8 + 5	8 + 6	8 + 7	8 + 8	8 + 9	8 + 10
9		9 + 0	9 + 1	9 + 2	9 + 3	9 + 4	9 + 5	9 + 6	9 + 7	9 + 8	9 + 9	9 + 10
10		10 + 0	10 + 1	10 + 2	10 + 3	10 + 4	10 + 5	10 + 6	10 + 7	10 + 8	10 + 9	10 + 10

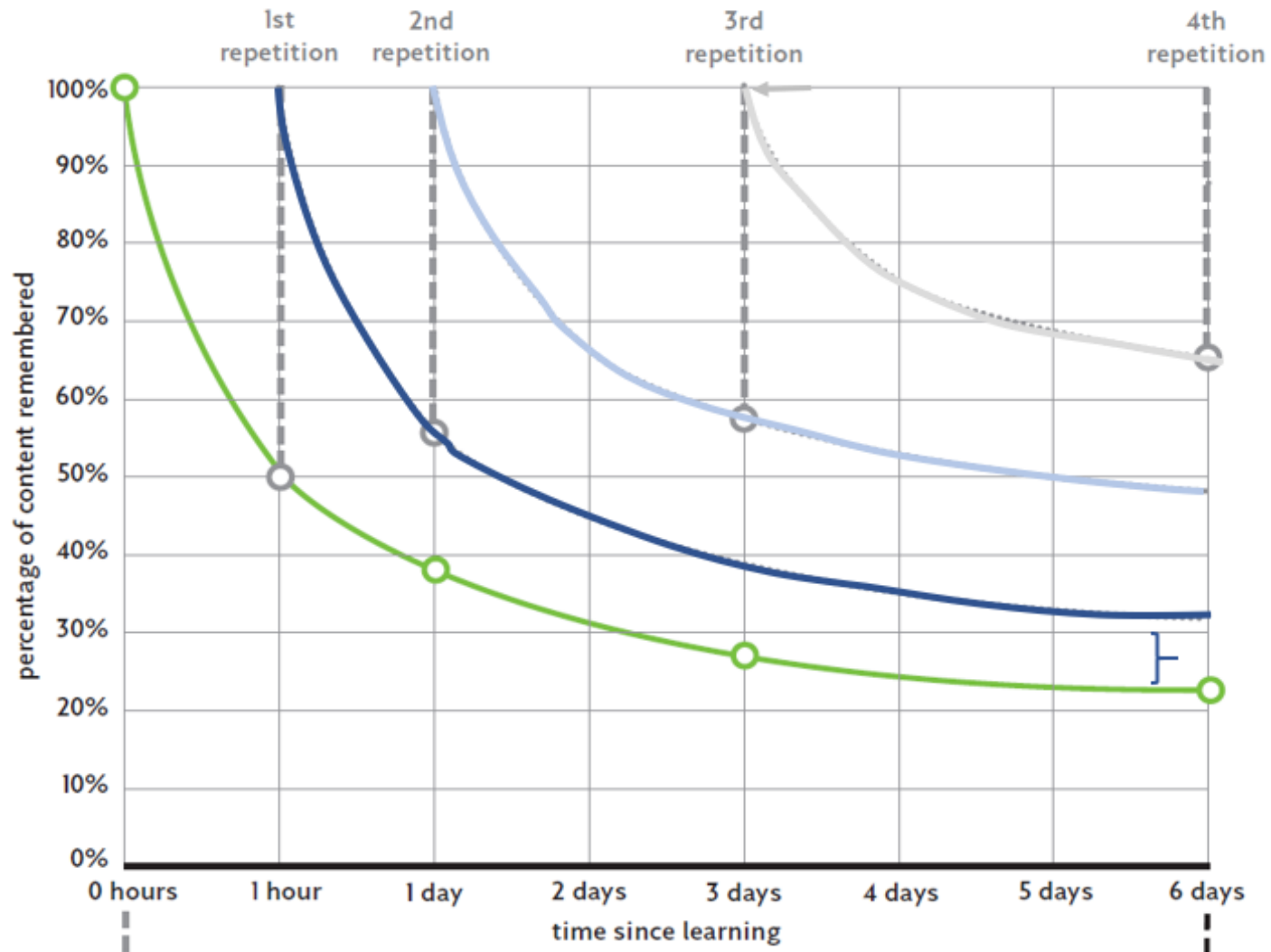
5. Fluency

How do we learn?





5. Fluency



5. Fluency

Fact fluency is important to free up space in children's working memory.

It is built from repeated practice and by that we mean repeated, repeated, repeated and repeated.

How to build fluency:

- Quick fire repeated practise
- All at once finger counting
- Experience with multiple representations (building number sense)
- Times Table Rockstars/Numbots
- Chants/songs (not just as one long lyric though – although this might be the first step)
- Quizzes
- Number talk
- Maths games (as long as they're quick and secure knowledge children already have)



Key Instant Recall Facts.



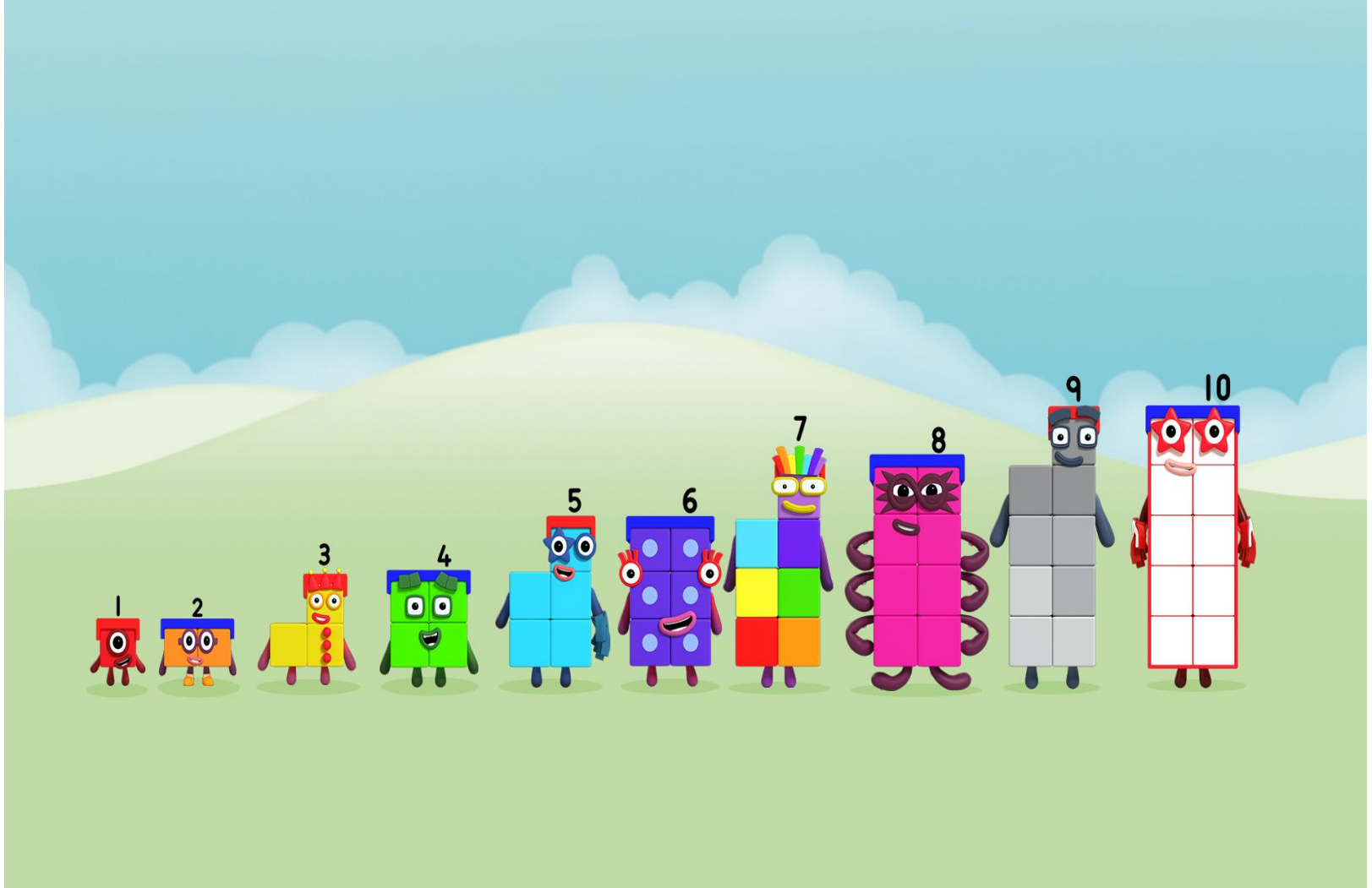
Term	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn1	Name numbers to 10 and compare 2 numbers by saying which is more or less.	Read and write numbers 1-10 in numerals and words	Recite the number names in order up to 100. Know number bonds to 20	Know number bonds for all numbers up to 20 Count in 50's and 100's	Know number bonds to 100 Count in 25's and 100's	Recall multiples of times tables, up to 12x12, in any order, including missing numbers and related division facts	Use the recall of multiples of all times tables up to 12x12 and related division facts to recall new facts
Autumn2	Recognise quantities without counting, up to 5 (<i>subitising</i>)	I can add 0 and 1 to a number I can add 2 to a number	Know doubles and halves of numbers to 20 I know near doubles to 10.	Count in 3's Know the multiplication and division facts for the 3 times table up to 12x3	Count in 6's Know the multiplication and division facts for the 6 times table up to 12x6	Derive and recall factor pairs of a number up to 100 e.g. (56 (1x56, 2x28, 4x14, 7x8))	Recall fraction, decimal and % equivalents
Spring 1	Recall 'one more' facts, with numbers 1 to 10	Know number bonds to 10. Know even and odd numbers to 20.	Count in 2's I know the multiplication and division facts for the 2 x table (up to 12 x 2)	Count in 4's Know the multiplication and division facts for the 4 times table	Count in 9's and 11's Know the multiplication and division facts for the 9 and 11 times table up to 12x9 and 12x11.	Identify prime numbers up to 20 Recall square numbers up to 144 and their square roots.	Recall '0.1, 0.01 and 0.001 more and less facts, with numbers up to 3.d.p.
Spring 2	Partition numbers to 5 into 2 groups	Count in 2's to 20 Count in 10's to 100 Count in 5's to 50	Count in 5's and 10's I know the multiplication and division facts for the 10 and 5 times table (up to 12x5 and 12 x 10)	Count in 8's Know the multiplication and division facts for the 8 times table up to 12 x 8	Count in 7's Know the multiplication and division facts for the 7 times table up to 12 x 7	Recall fraction, decimal and % equivalents of the fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, tenths and fifths.	Derive and recall what must be added to a decimal, with ones, tenths and hundredths to make the next whole number (7.26 + ? = 8)
Summer 1	Recall number bonds of numbers 0-10 including partitioning facts	I can add 10 to a number	Count in 3's to 36	Count up and down in tenths Know decimal equivalent to tenths	Recognise decimal equivalents of the fractions $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ Tenths and hundredths .	I know decimal number bonds to 1 and 10	
Summer 2	Recite number names to order to 20.	I know doubles and halves of numbers to 10 I know near doubles to 5	To begin to know the 3 times table and multiplication and division facts.	Multiply and divide 1 digit numbers by 10	Multiply and divide 1 and 2 digit numbers by 10 and 100	Use the recall of multiples of all times tables up to 12x12 and related division facts to recall new facts	

Mastering Number

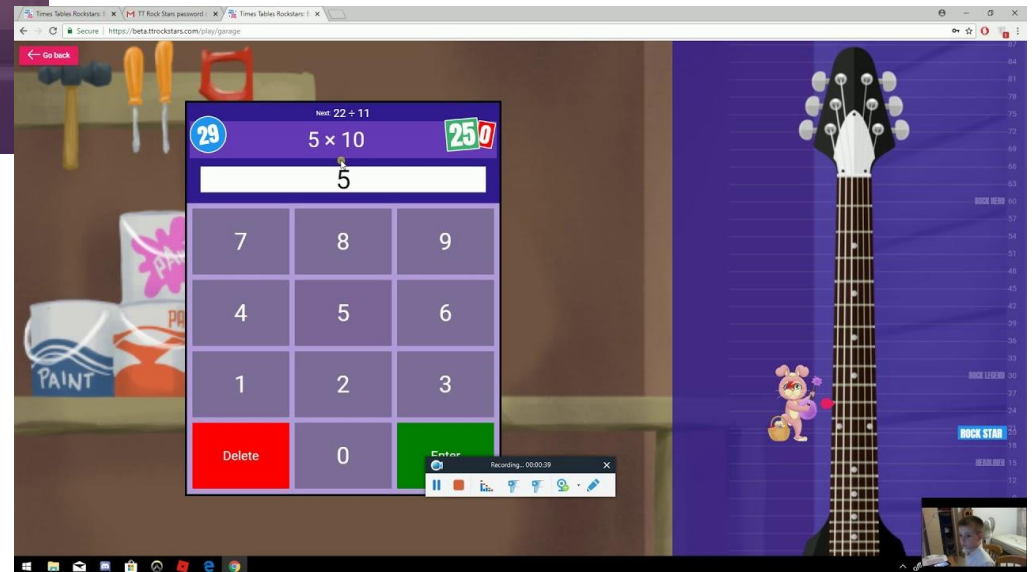
[Home](#)[Events](#)[Event Search](#)[Applications](#)[Surveys](#)[Resources](#)[My Profile](#)[Log out](#)A photograph of several young students in school uniforms sitting around a table, engaged in a hands-on learning activity. They are using colorful sticks and beads to create mathematical models. The text "MASTERING NUMBER" is overlaid in white, bold, sans-serif font across the center of the image.

MASTERING NUMBER

Below is a full listing of all currently available materials for the Mastering Number Programme. Filter by year group to access the materials.



Times Tables



Year 4 Times Table Check

- June 2024**
- Online test taken on a computer**
- 25 questions on all times tables up to 12x12**

How can you help at home?

Maths learning can take place anywhere! Maths is all around us, so look for opportunities for you to do some problem solving together, making connections between what your child is learning at school and the world around them.

Follow a recipe: work together to find the quantities needed, then discuss how you would halve or double the recipe, which could lead to a discussion on ratio of ingredients.

Talk about the weather forecast: is the temperature today higher or lower than yesterday's? What do the numbers mean?

Shopping: discuss the cost of items and how the cost might change if you buy two items instead of one. Let your child count out the coins when paying and discuss the change you should get back. Coins can be used to explore addition, subtraction, multiplication and division.

Planning an outing: discuss how long it takes to get to the park. Work out what time you need to leave the house to reach there at a certain time. Discuss what shapes can be seen at the park.

Growth Mindset in Maths

- Growth Mindset is very closely linked with Mastery and fosters:
 - A belief that effort creates success
 - A belief that skill and ability can be increased over time
 - A belief that mistakes are viewed as an opportunity to learn and develop
 - A belief that it builds resilience – don't give up easily
 - A belief that we should think about how we learn, not just what we learn

**Any
Questions?**