Teaching Mathematics at Lanchester EP

Today's session:

- The Mastery approach.

- What the Mastery approach looks like at Lanchester EP.

- What you can do to help your children at home.

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

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:

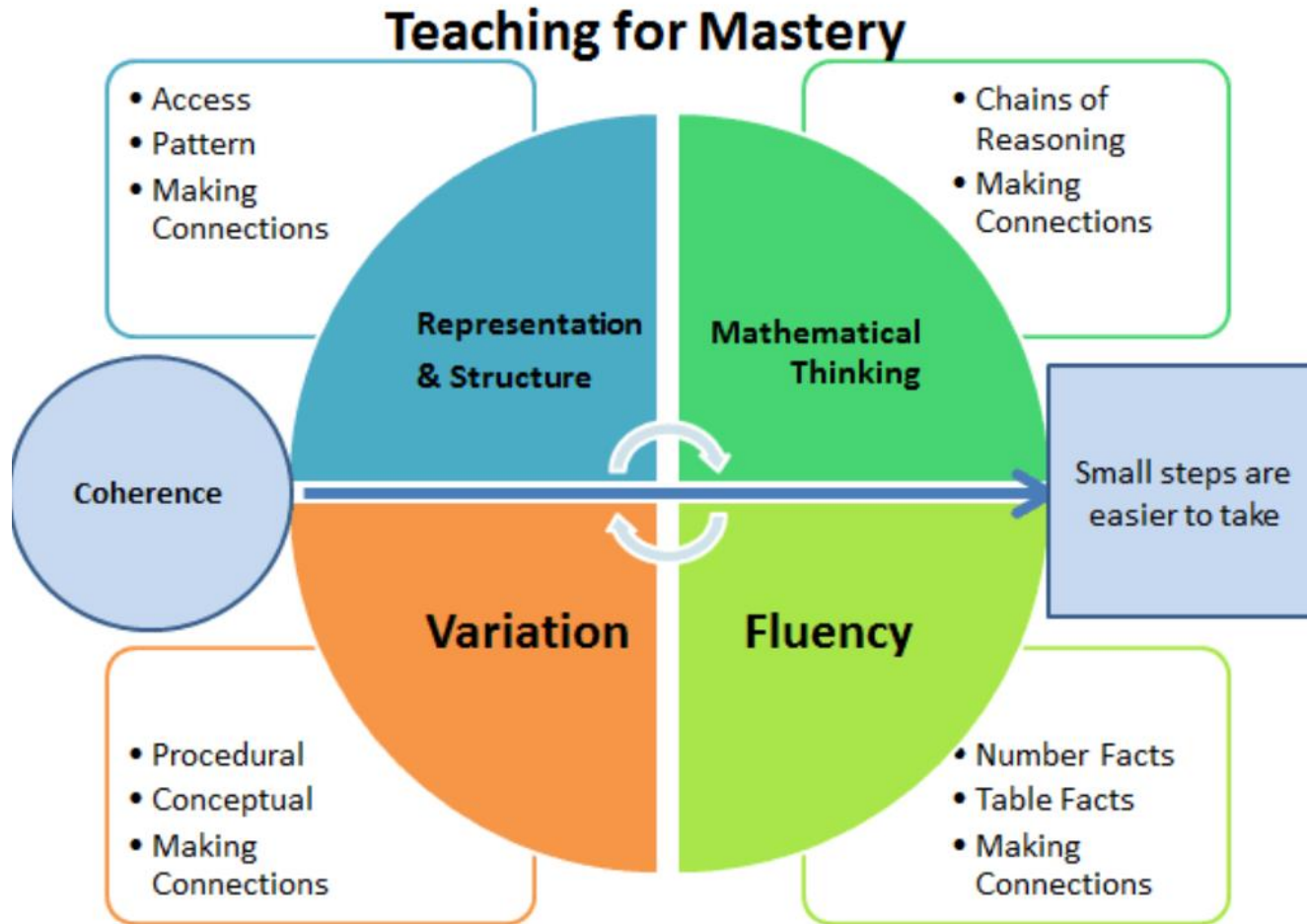**Shallow learning**: surface, temporary, often lost

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.

The 5 big ideas

Teaching for Mastery

- Access
- Pattern
- Making Connections

- Chains of Reasoning
- Making Connections

Representation & Structure

Mathematical Thinking

Coherence

Small steps are easier to take

Variation

Fluency

- Procedural
- Conceptual
- Making Connections

- Number Facts
- Table Facts
- Making Connections

Our Approach to Teaching for Mastery at Lanchester EP

Maths in EYFS

- NCETM Mastering Number is used for teaching a deep knowledge and understanding of number.

- White Rose is used for wider maths: shape, space and measure.

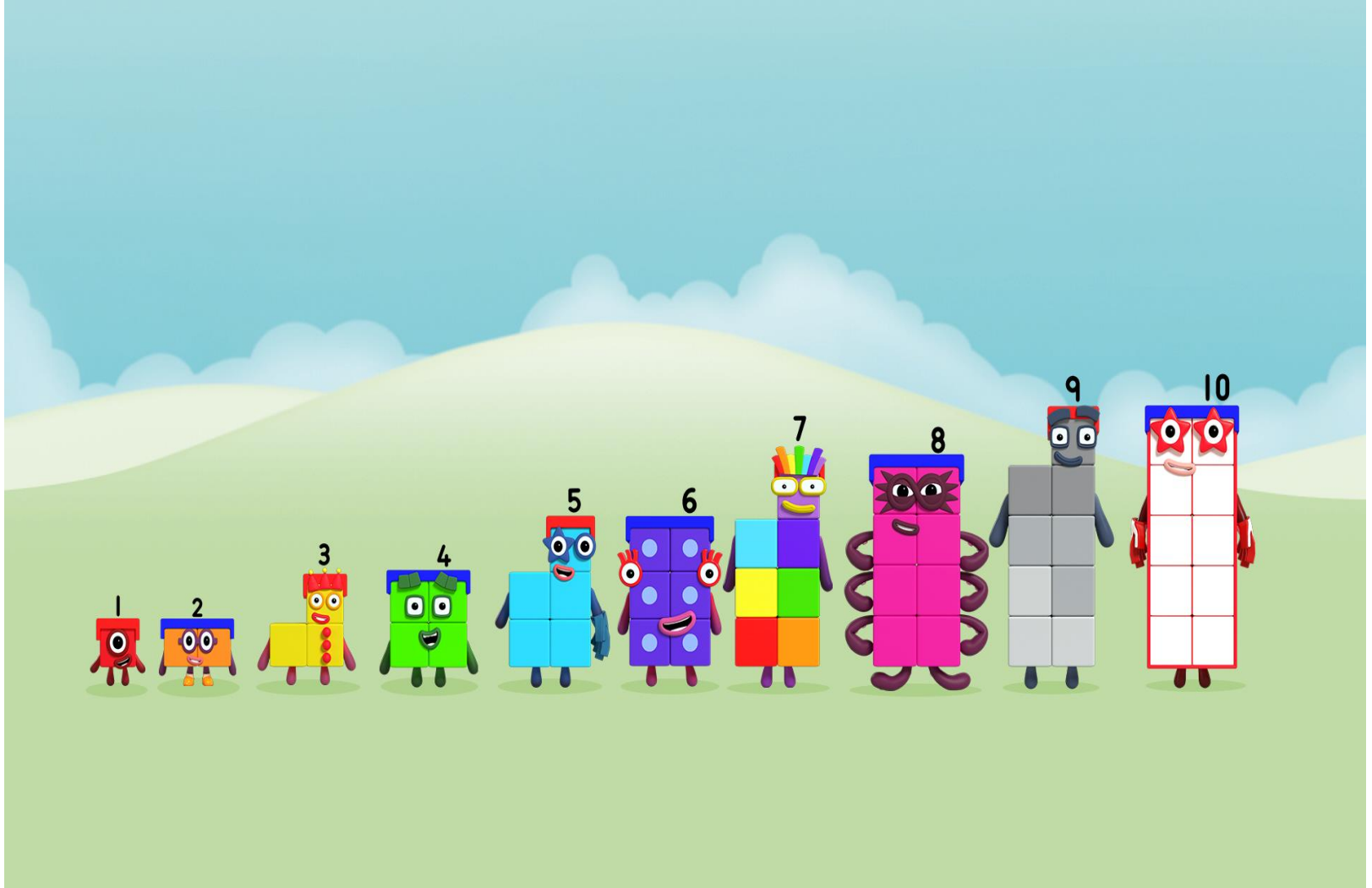- Discreet maths lessons and continuous provision.

Maths in KS1

- White Rose is used for teaching the full curriculum.

- Basic Skills Blasts are used to increase fluency with number.

- NCETM Mastering Number is used as a whole class intervention

Mastering Number

Maths in KS2

- White Rose is used for teaching the full curriculum.

- Basic Skills Blasts are used to increase fluency with number.

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.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number **Place value** FREE TRIAL			VIEW	Number **Addition and subtraction**			VIEW	Measurement **Area** VIEW	Number **Multiplication and division A**		VIEW	Consolidation
Spring term	Number **Multiplication and division B**			VIEW	Measurement **Length and perimeter**		VIEW	Number **Fractions**			VIEW	Number **Decimals A**		VIEW

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.

Small steps

Step 1	Represent numbers to 1,000
Step 2	Partition numbers to 1,000
Step 3	Number line to 1,000
Step 4	Thousands
Step 5	Represent numbers to 10,000
Step 6	Partition numbers to 10,000
Step 7	Flexible partitioning of numbers to 10,000
Step 8	Find 1, 10, 100, 1,000 more or less

Basic Skills Blast

MathsHUBS

Year 4 Autumn Term							
Counting		**Key Fact Recall**		**Mental Calculation**		**Formal Methods of Calculation**	
Autumn Term 1	**Autumn Term 2**	**Autumn Term 1**	**Autumn Term 2**	**Autumn Term 1**	**Autumn Term 2**	**Autumn Term 1**	**Autumn Term 2**
Count backwards through zero to include negative numbers Count forwards and backwards, in multiples 25, from zero or any other multiple Count forwards and backwards, in multiples 1000, from zero or any other multiple Count forwards and backwards, in multiples of 6, from zero, or any other multiple, up to 12x6,	Count forwards and backwards, in multiples of 7, from zero, or any other multiple, up to 12x7	Know number bonds to 100 Count in 25's and 1000's	Count in 6's Know the multiplication and division facts for the 6 times table up to 12x6	Add near addition doubles of multiples of 10, with a difference of 20 (partition, double and adjust) Add a near multiple of 100 (140+150) Subtract a near multiple of 100 (390-370) Add a near multiple of 10 or 100 to any two-digit or three-digit number (235+198) Subtract a near multiple of 10 or 100 from any two-digit or three-digit number (535-198) Add a pair of two-digit numbers or three-digit multiples of 10 (38+86, 350+360) Subtract a pair of two-digit numbers or three-digit multiples of 10 (86+-39, 390-360)	Multiply numbers, up to 20, by a one-digit number Multiply a multiple of 10, up to 100, by a one-digit number (90x6) Multiple a one-digit by 100 Multiple a two-digit by 100 Multiply a three-digit by 10 Multiply a three-digit by 100 Divide numbers by 10 (whole number answers) Divide numbers by 100 (whole number answers) Multiply by 6, 7 & 9 Divide by 6, 7 & 9 Find the remainder after dividing a two-digit number by a one-digit number Multiply two-digit numbers by 4, using doubles (26x4=double 26, double 52) Divide two-digit numbers by 4, using doubles (96÷4=halve 96, halve 48) Multiply two-digit numbers by 5, using x10 and halve (32x5 = (32x10) ÷2 or (32÷2) x10) Multiply two-digit numbers by 20, using x10 and double (32x20 = (32x10) x2 or (32x2) x 10)	Add numbers with up to 4 digits using a formal written method (column addition) Subtract numbers with up to 4 digits using a formal written method (column subtraction)	

Date	0	7	.	1	0	.	2	0	2	4

LC: Can I subtract two 4-digit numbers (one exchange)?

Basic Skills Blast

Counting	Complete the number line
1) 1 5 , 3 0 , 4 5 , _ _ , _ _ , _ _	
2) 1 3 , 2 6 , 3 9 , _ _ , _ _ , _ _	

Extension

Complete the Roman numeral number line

__, CI, CII, CIII, __ , __, __

Now, can you write this again using standard numerals.

Date	0	7	.	1	0	.	2	0	2	4

LC: Can I subtract two 4-digit numbers (one exchange)?

Basic Skills Blast

Fact Recall

3) $6 \times 9 =$

4) $4 \times 8 =$

5) $7^2 =$

6) $5 \times 11 =$

7) $7 \times 12 =$

8) $9 \times 13 =$

Extension

Use your related fact to work out the multiplications
If 3 x 9 = 27

Work out: 3 x 9000 = _____   and 30 x 90 = _____

Date: 0 7 . 1 0 . 2 0 2 4

LC: Can I subtract two 4-digit numbers (one exchange)?

Basic Skills Blast

Calculations

9)
```
    5  4  6  3
 +  4  1  4  3
 _____
 _____
```

10)
```
    4  3  7  5
 -  1  4  2  2
 _____
 _____
```

Extension

Complete the number bonds to 100

22 + ___ = 100

44 + ___ = 100

17 + ___ = 100

Date 0 7 . 1 0 . 2 0 2 4

LC: Can I subtract two 4-digit numbers (one exchange)?

Basic Skills Blast

Key Vocabulary

Partition

To split a number into component parts. Example: the two-digit number 38 can be partitioned into 30 + 8 or 19 + 19.

Place Value

The value of a digit that relates to its position or place in a number. Example: in 1482 the digits represent 1 thousand, 4 hundreds, 8 tens and 2 ones.

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 1000'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 (subitising)	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 ½, ¼, ¾, 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 ½, ¼ and ¾ 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	

Times Tables

Year 4 Times Table Check

- **June 2025**

- **Online test taken on an iPad**

- **25 questions at random 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.

The calculation policy is divided into four sections: addition, subtraction, multiplication and division. The calculation policy follows the same concrete, pictorial, abstract approach as our main schemes of learning.

Calculation policy

Updated September 2024

Addition

Year 3	• Add numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds. • Add numbers with up to three digits, using formal written methods of columnar addition. • Add fractions with the same denominator within 1 whole. • Calculate the time taken by particular events or tasks.
Progression of skills	**Key representations**
Add 1s, 10s or 100s to a 3-digit number Emphasis on mental strategies including number bonds and related facts. Prompt children to notice which digit changes.	The ones/tens/hundreds column will increase by … $444 + 5 =$ $444 + 50 =$ $444 + 500 =$ $777 + 2 =$ $777 + 20 =$ $777 + 200 =$ What patterns do you notice? $235 + 3 =$ $235 + 30 =$ $235 + 300 =$ $604 + 20 =$ $604 + 50 =$ $604 + 90 =$ $111 + \boxed{} = 118$ $111 + \boxed{} = 181$ $111 + \boxed{} = 811$
Add two numbers (no exchange) Mental strategies and introduction of formal written method.	… ones + … ones = … ones … tens + … tens = … tens … hundreds + … hundreds = … hundreds

Calculation policy

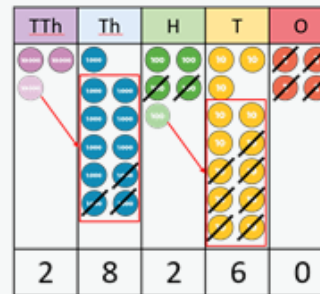| **Add integers up to 10 million**	
Encourage children to estimate and use inverse operations to check answers to calculations.	

Subtract whole numbers with more than 4 digits	
Encourage children to estimate and use inverse operations to check answers to calculations.	I can exchange 1 ... for 10 ...

Multiply numbers up to 4 digits by a 2-digit number	
	To multiply by a 2-digit number, first multiply by the ones, then multiply by the tens and then find the total.

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