Maths Mastery & Power Maths
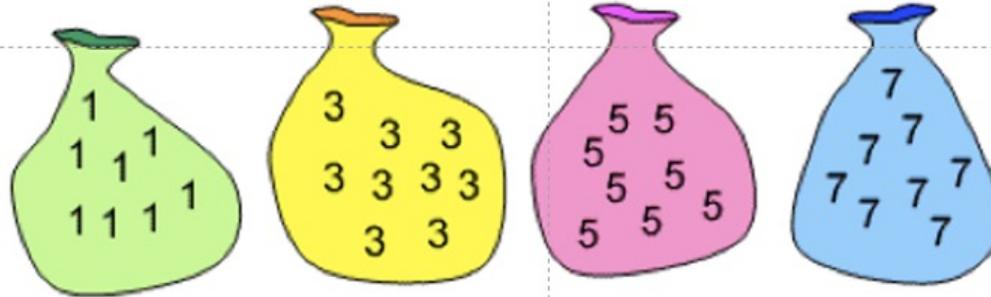
Objectives:

What is Mastery

White Rose and Power Maths

Structure of lessons

Rationale behind mixed ability classes

Growth mindset

Collaboration with other schools & the Maths Hub

Homework

Times tables check

Let's do some Maths...

Four bags contain a large number of 1s, 3s, 5s and 7s.

Pick any ten numbers from the bags above so that their total is 37.

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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 e.g. driving a car

I'm really good at doing it – painting a room, or a picture

I can show someone else how to do it

The National Curriculum (NC) change in 2014

The concept of Teaching for Mastery was introduced in 2014 with the (then) new National Curriculum

It was inspired by approaches developed in Singapore and Shanghai where children achieve better results than in the UK

The Mastery approach supports National Curriculum objectives, but spends more time reinforcing number before progressing to more difficult areas of mathematics.

Teaching for Mastery is

A belief that all children can achieve in Mathematics

A way of thinking

An approach to the delivery of the curriculum

Using manipulatives and pictorial representation to expose the structure of the mathematics

Small, carefully crafted steps resulting in a coherent learning journey

Fluency, reasoning and problem-solving for ALL

3. Some children, who feel confident, will be let loose. They'll be able to explore deeper into the woods, before returning to the group to continue on with the journey.

2. Some children will need a little additional support along the way
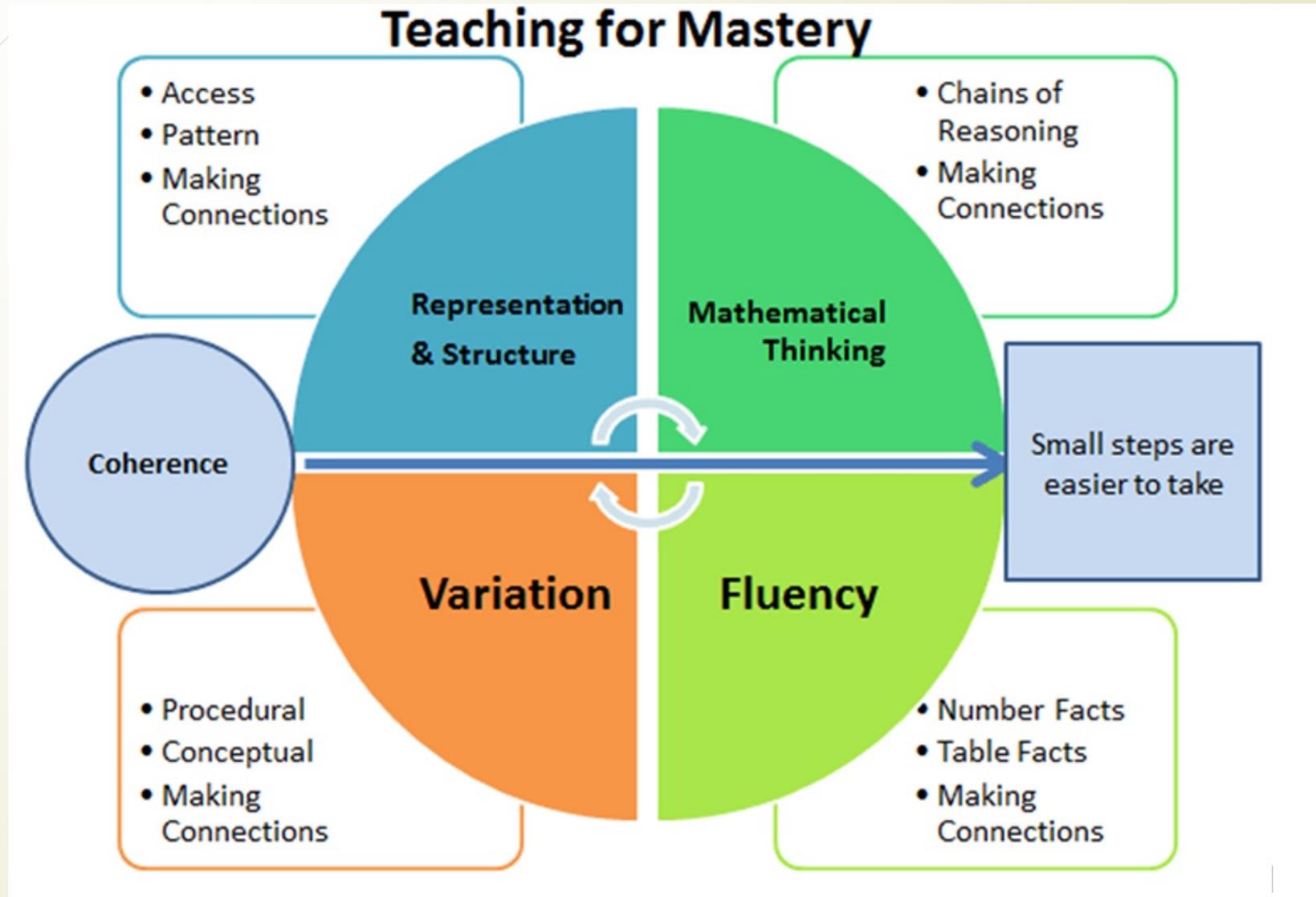
1. We ALL start the journey TOGETHER

4. Children will not be racing off ahead on a different journey.

5. Children will not be left behind alone and isolated.
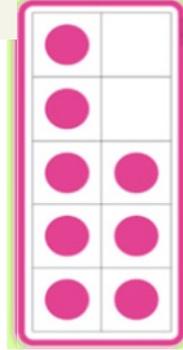
We're Going on a **Maths Hunt**

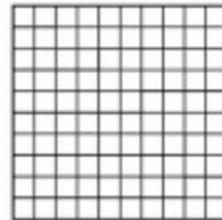# The 5 big ideas of Mastery

Structures and Representations

Bead strings

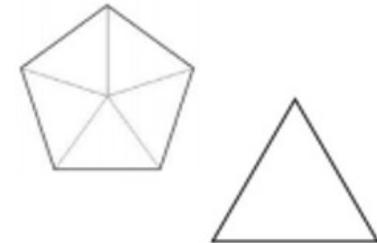Bar models

Fraction towers

100 grids

Number lines

Cuisenaire rods

Dienes blocks

Shapes

Multilink cubes

The C P A approach

Concrete – students should have the opportunity to use concrete objects and manipulatives to help them understand and explain what they are doing.

Pictorial – Students should then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.

Abstract – With the foundations firmly laid, students should be able to move to an abstract approach using numbers and key concepts with confidence.

$$3 + 1 = 4$$
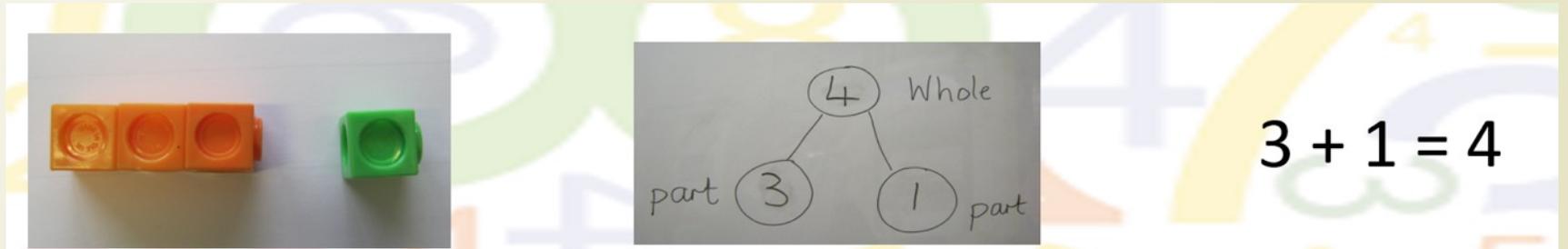
Mathematical thinking

**Types of question:**

Odd one out

Prove it

Is it right or wrong?

Sometimes, always, never

True or false

What patterns do you notice?

Does anyone disagree/agree with the process and solution?

Why do you disagree/agree?

How might you have done it differently?

Why did you do that? Does your strategy/solution make sense? Why?

Can you show/prove that the solution is correct/incorrect?

Coherence
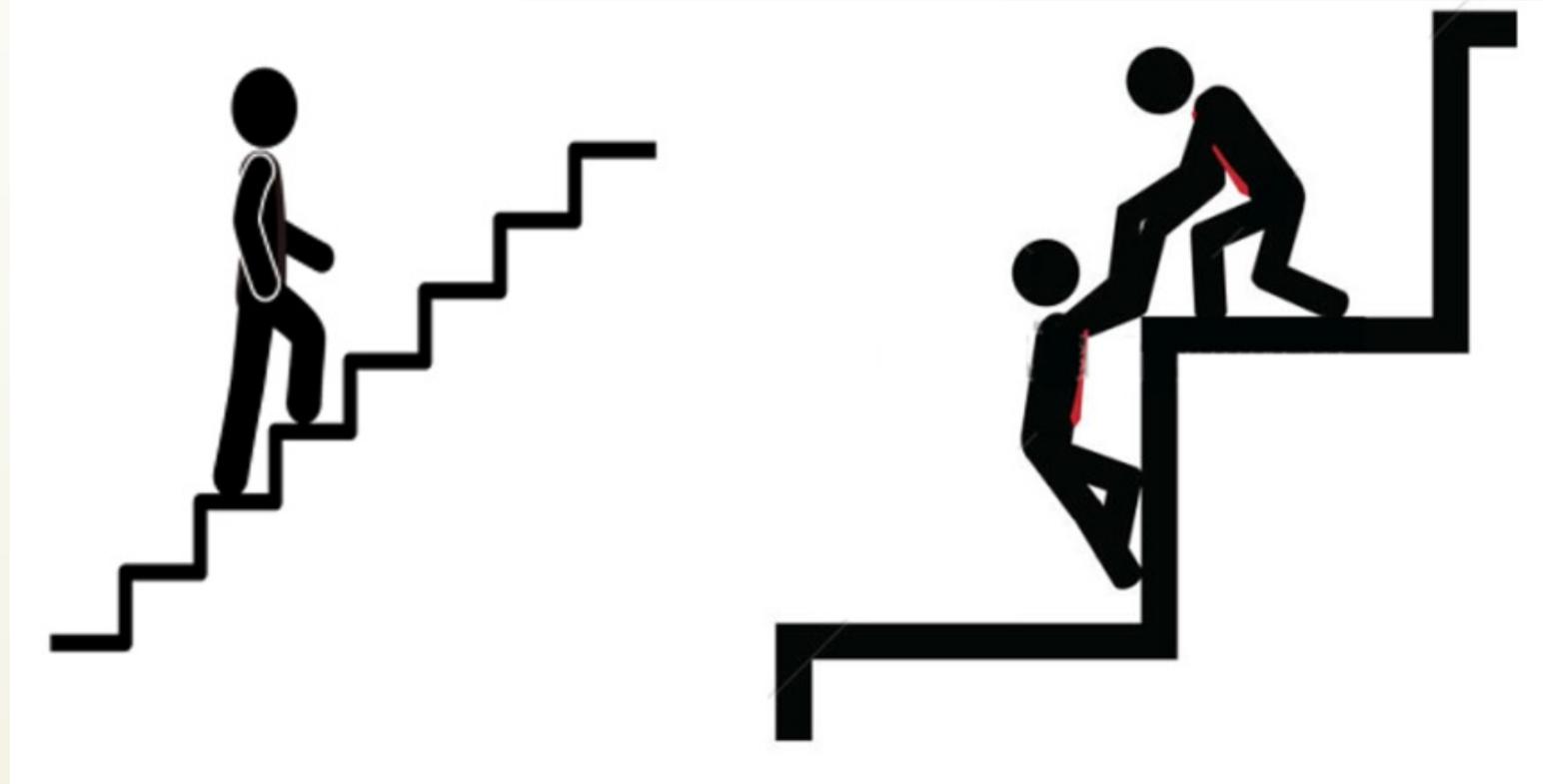
Fluency

What was previously taught

In knowledge – times tables, number bonds etc

Aim to be flexible and accurate

Reduces 'cognitive load'

Variation

Procedural:

One thing changes and the rest stays the same (intelligent practice)

Round to the nearest 10

431

432

433

By taking smaller steps, the children see the patterns and learn by them.

Conceptual:

Different, well-chosen examples used

Standard

567 rounded to the nearest 10 is 570

Non-standard

999 rounded to the nearest 10 is 1000

Non-concept

True or false:

432 rounded to the nearest 10 is 420

White Rose & Power Maths

We started using Power Maths (PM) in September 2019. This was the scheme of work that we were using to facilitate teaching for Mastery.

However, when schools quickly moved into lockdown last Spring they were not prepared. We started using White Rose (WR), Maths education experts and the co-creators of Power Maths, as they quickly produced materials for home learning - videos and online worksheets.

Moving into this academic year, and not knowing what would happen re: the pandemic, we decided to continue using WR materials.

Although it might seem odd that we moved so quickly to another scheme of learning, WR co-created Power Maths and their planning framework matches Power Maths.

Our aim has always been to move back to Power Maths, which we were beginning to see the positive impact of, as soon as possible.

We plan to return to using Power Maths in the Spring Term. This move should not present many issues as the style of teaching & learning will continue to be Mastery focussed.

How each lesson works

Intro - each lesson begins with questions based on prior knowledge but will be used in the current lesson.

Share & Think together – A journey through a concept, with each child building on secure foundations while being challenged to apply their understanding with increasing independent. The class shares their ideas and compares different ways to solve problems, explaining their reasoning with hands-on resources and drawings.

Practice – now children practice individually or in small groups, developing their skills to build fluency, understanding of the concept and confidence.

Bringing the class back together - Lessons often involve the teacher pausing the independent learning to discuss common misconceptions or to add another layer of challenge for children.

Reflect – finally, children reflect on and record their learning from each session and show how they have grasped the concept explored in the lesson.

Mixed ability classes

With the exception of Year 6 and Year 5, all children are having their Maths lessons with their class teacher and their class.

The reason we have selected only these two year groups is because staff have identified greater gaps in the attainment of these year groups and wish to tailor the learning to children accordingly.

The majority of children in each class move through the programme of study at broadly the same pace and are exposed to the same questions.

This doesn't mean we are holding any children back, rather we are not placing a ceiling on the attainment of any child. We weave support and challenge into every lesson to match all children in the class.

Mixed ability classes

Working in a mixed ability class allows for collaborative learning, exposure to different opinions about the same work and regular opportunities for discussion of answers to support pupils' reasoning skills and check and deepen their understanding.

Learners are supported by the structure of the lesson, their peers and additional adults as well as scaffolds provided by the teachers.

Children are extended as a result of higher order questioning where conjectures and generalisations are required and consistent exposure to rich tasks, rather than acceleration to new content.

Growth mindset
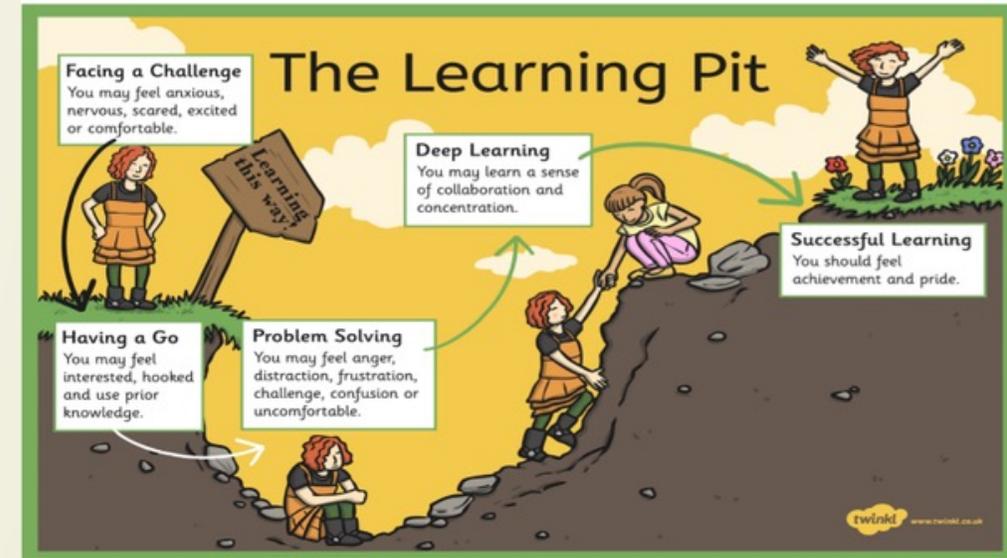
It's ok to get it wrong

Mistakes are valuable opportunities to re-think and understand more deeply

Praise hard work

By focussing on praising effort and learning rather than success, children will be more willing to try harder, take risks and persevere for longer

Mind your language!

The language we use around learners has a profound effect on their mindsets. Using phrases such as 'Everyone can', 'Mistakes can help you learn' and 'I cannot solve this **yet**' will support children in becoming more resilient.

Build in opportunities for success

The small step approach enables children to enjoy the experience of success.

Collaboration and the Maths Hub

Before we purchased this scheme and during this term we have liaised with other local schools and our Maths Hub to support staff in the implementation of Power Maths.

We are continuing to review our teaching of Maths and ways in which we can fine tune the programme.

We are in our second year as part of a Maths hub. These are teacher research groups where fellow teachers local to our area meet. Guided by a maths specialist, we prepare lessons together, observe others' lessons and reflect on practice. The overall aim is to improve and maintain Maths teaching and learning at NES.

Homework

We use a website called MyMaths to set homework. Teachers are carefully reviewing the tasks to ensure that they match the topics and methods taught in school.

Homework that is always valuable is practising fluency, and ensuring a strong understanding of number & place value. This can include: number bonds, mental calculations and times tables practice.

Times tables

The National Curriculum expectations for the teaching and learning of times tables are as follows:

Year 1: Counting in 2s,5s and 10s. Recall and use doubles to 10 and corresponding halves

Year 2: 2,5 and 10 times tables and related division facts

Year 3: As above and 3, 4 and 8 times tables and related division facts

Year 4: All tables up to 12 x 12 and related division facts

Year 5 & 6: Revision of all times tables and division facts

Times tables check

All state schools and academies will be administering the online multiplication tables check to Year 4 pupils this academic year in June 2020.

It is an online check consisting of 25 questions, each worth one mark.

It should take children approximately 5 minutes to complete.

Children will have 6 seconds to type their answer using the computer keyboard, a mouse and the on-screen number pad, or a touch screen device and the on-screen number pad.

Questions are not ordered by difficulty, and will always look like this:

$$n1 \times n2 = \boxed{}$$

Times tables check

The DfE have identified that the 6,7,8,9 and 12 times tables are the most difficult, and will feature slightly more frequently in the check than other tables.

It is intended to identify pupils who have not yet mastered their times tables, so that additional support can be provided.

We will have a 3 week window to administer the check, and we have the flexibility to organise it so that it is done individually, in small groups or whole class.

We will report to parents the results of the check once the window has completed. There is no pass mark, rather the emphasis will be on the number of pupils who achieve full marks.