



Pattishall CE Primary School

An Introduction to Mastery  
Maths  
at  
Pattishall C E Primary



## What does it mean to master something?

- You know how to do it.
- It becomes automatic.
- You get really good at it.
- You can teach someone else how to do it.

Mastering maths means acquiring a deep, long-term, secure and adaptable understanding of the subject.



## Why mastery?

The 2014 National Curriculum was designed to raise standards in maths. It's programme of study states that:

- All pupils should become fluent in the fundamentals of mathematics.
- The majority of pupils will move through the programmes of study at broadly the same pace.
- Pupils who grasp concepts rapidly should be challenged through rich and sophisticated problems before any acceleration through new content.



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**Mathematics is at the core of our curriculum** and it is through our teaching in this subject that pupils learn crucial life skills, including resilience and problem solving. Based on the new **National Curriculum** and a model by the **White Rose Maths Hub**, we are ensuring children gain an in-depth understanding of maths by teaching **fluency, reasoning and problem solving** on the children's journey to mastery of the curriculum. ***Depth not acceleration...*** The old curriculum, measured in terms of levels, encouraged undue pace. Children were accelerated onto more complex concepts before really mastering earlier ones.

The new curriculum encourages the study of fewer skills in greater depth, with a focus on the application of the skill in different scenarios. This is what we call mastery. Teaching methods in maths today are very different to how many adults were taught. **Now we try to help the children understand 'why', rather than just telling them 'how'**. In this way, the children will be much better placed to apply their learning in a variety of situations.



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## Fluency

The first aim of the new National Curriculum in England (DfE 2014) is that all children will '*become fluent in the fundamentals of mathematics, including through 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*'. As this suggests, fluency is the ability to know different mathematical strategies and to understand how to use them at an appropriate time.

***The children must use their times tables knowledge to fill-in the grid.***

Fluency:							
x	2	4	8	3	6	9	
5							
7							
11							
12							

Rapid recall of addition and multiplication facts is an important aspect of this.



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## Reasoning

The second aim of the new National Curriculum is that all children can '*reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language*'. Reasoning is a child's ability to explain their understanding of a mathematical concept. In being able to articulate their knowledge, a child is building a secure understanding of a concept, rather than a superficial one which may later lead to misconceptions.

Reasoning:

x	2			5	6	
	20		40	50		
9		27				
8						
	14					49

***The children must be able to use their knowledge of the times tables facts to 'work backwards' to work out the factors from the answers.***



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## Problem solving

The third aim of the new National Curriculum is that all children '*can 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*'. This is where children are applying their knowledge in different contexts, which enables a greater depth of learning.

**Problem solving:**  
Using the digits 1-9 only once, find the missing factors in this grid.

x						
	16					
		7				
					18	

*The children must work in a logical manner, using a trial-and-error approach to finding the solution to the problem.*





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## The concrete-pictorial-abstract approach

In order to help the children develop a deep conceptual understanding, we try to build solid foundations using the concrete-pictorial-abstract approach.

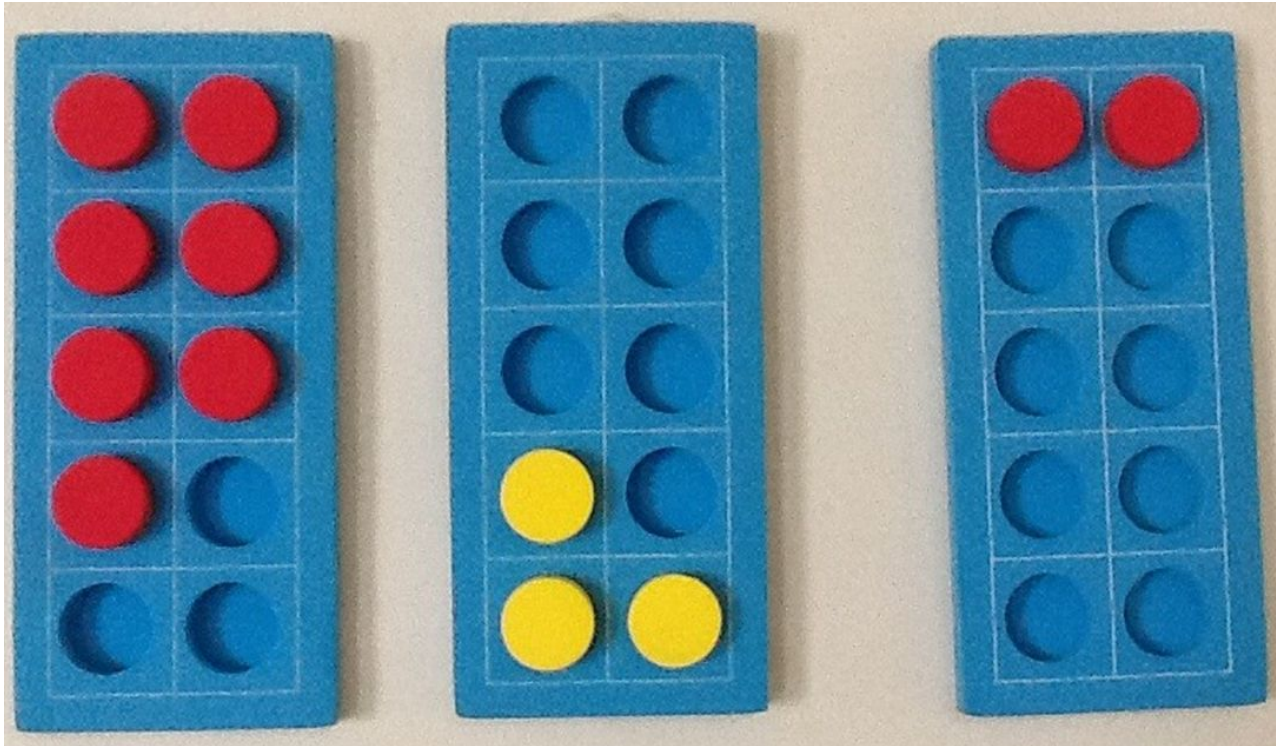
**Concrete:** In this stage, the children are first introduced to an idea or skill by acting it out with real objects.

**Pictorial:** When a child has sufficiently understood the hands-on experiences, they can progress to relating them to different representations, such as a diagram or picture of the objects.

**Abstract:** This is the symbolic stage, where the children are able to represent problems using mathematical notations e.g.  $10 \div 5 = 2$ . The children will only progress to the abstract stage when they have enough context to understand what they mean, as this is the 'final' and most challenging of the three stages.



## Ten-frames



Promotes discussion about 'missing numbers' and pairs of numbers. Children can manipulate numbers in various ways.

# Add three numbers

Add three  
numbers



Can you add to find out how many flowers there are in total?

# Add three numbers

1 Add 7, 3 and 2.

Method 1

Make 10.

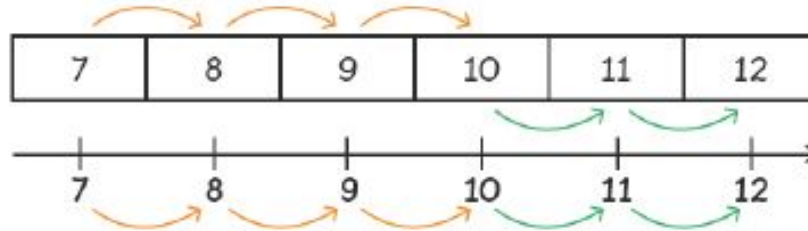
7 and 3 make 10.

$$\begin{aligned}7 + 3 + 2 &= 10 + 2 \\ &= 12\end{aligned}$$



Method 2

Add by counting on.



$$7 + 3 + 2 = 12$$








## The Number Bonds Model

(Part – part – whole)

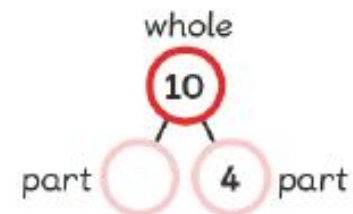
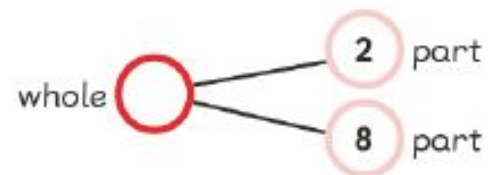
# Making number bonds

Complete the number bonds.

(a)   
  and  make 7.

(b)   
 2 and 8 make .

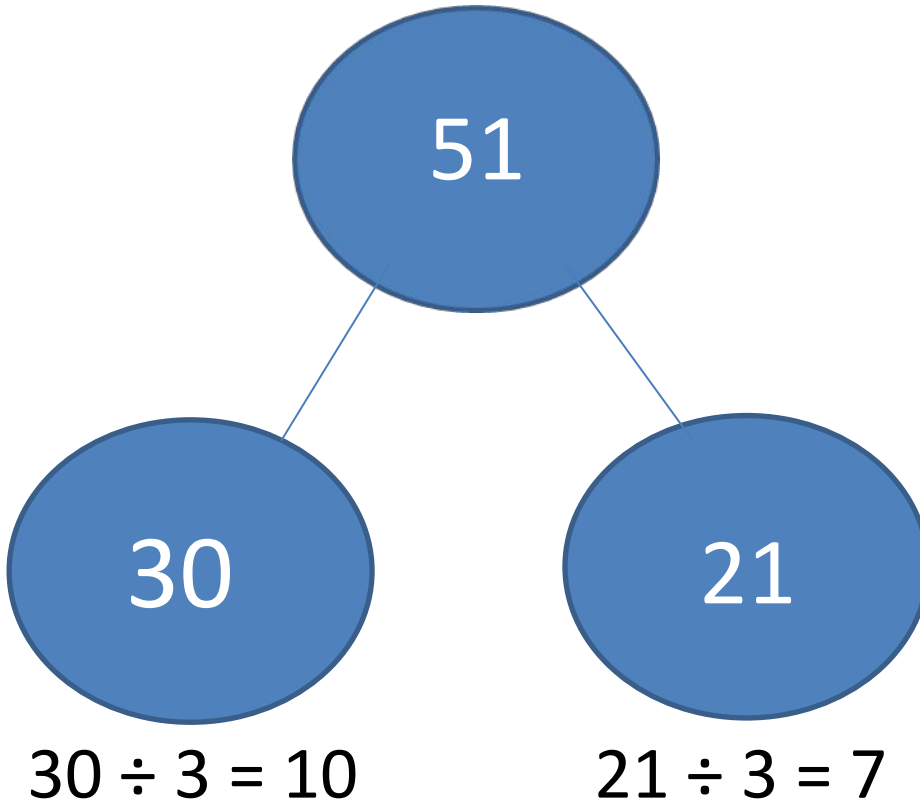
(c)   
 4 and  make 10.





## Part, part, whole method to support mental strategies

$$51 \div 3 = ?$$



If children get used to partitioning numbers in various ways, they have a much better understanding of how numbers can be manipulated to work with them mentally.



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# The Bar Model



# Bar Model

Solve using the bar model

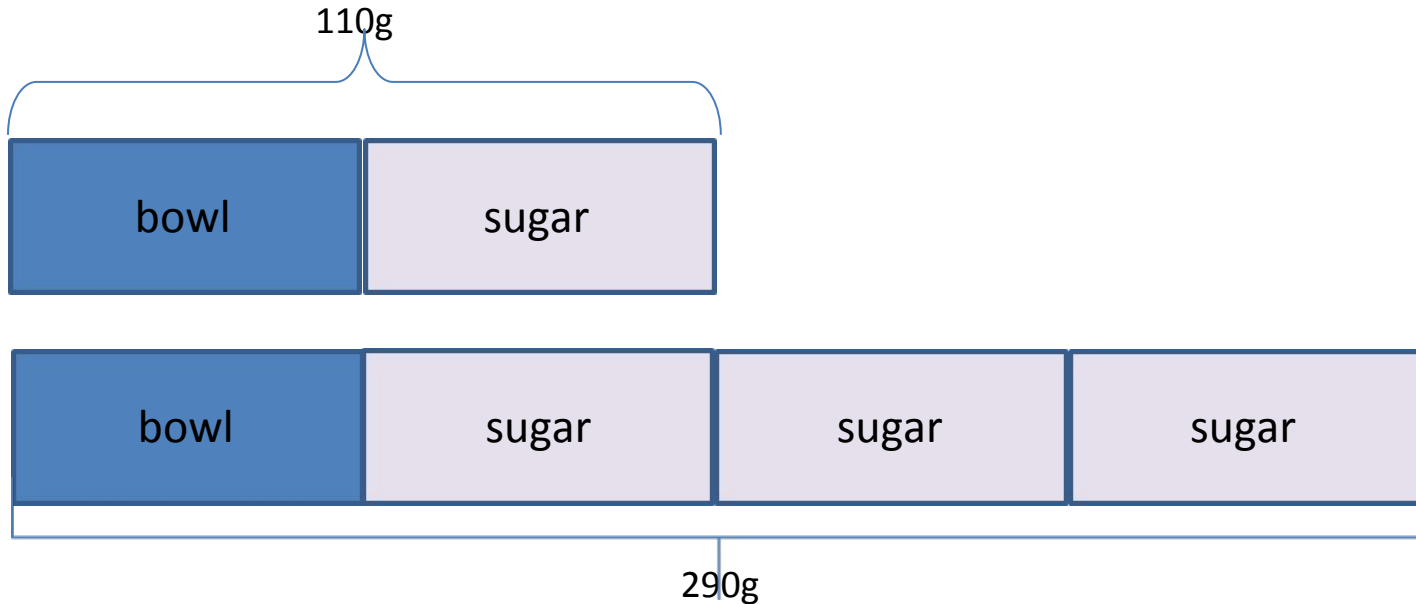
Tim has a bowl and some sugar. Together they weigh 110 grams. Sue empties the bowl and puts in three times the amount of sugar. It now weighs 290 grams.

How much does the bowl weigh?



## Use of Bar Model

Tim has a bowl of sugar, the bowl and the sugar together weigh 110g. Sue pours the sugar out and then add three times more sugar than Tim had. Her bowl now weighs 290g. How much does the bowl weigh?





## What can you do to help at home?

- Be positive.
- **Talk maths** with your child
- Involve children in any maths activity – shopping/ cooking/DIY – let children lead where you can
- Talk about the mathematics in sport
- Encourage quick recall of multiplication and division facts
- Look at number puzzles in papers or magazines
- **Share strategies and methods used at school** (allow your child to be the expert)



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Something to think about.

Thank you for coming.