



Mastery in Maths – What you need to know

8th February 2019

The myth of being 'naturally good at maths'

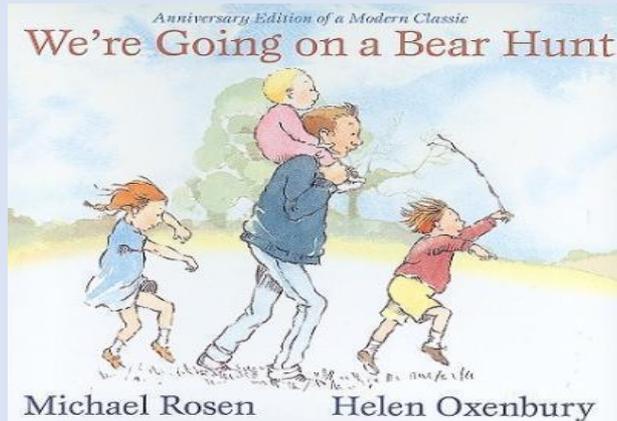
The myth of 'being naturally good at maths' Many people think that some students can work to high levels and some cannot because of the brains they are born with, but this idea has been resoundingly disproved. Study after study has shown the incredible capacity of brains to grow and change within a remarkably short period of time.

Professor Jo Boaler, Stanford University

At Ashton Vale we believe that all children deserve the opportunity to be able to develop a deep, long-term understanding of maths. Maths should be enjoyable and fun for all and nobody should believe they are not 'good at maths'.

Maths Mastery At a Glance

Inclusive approach where all children achieve



'We're all on the same journey. Some people may take slightly different paths like into the swishy, swashy grass but we all come back together.'

We decided to adopt a maths mastery approach. This means that every member of the class has the right to be on the same maths journey.

The whole class moves through content at broadly the same pace. There is no dividing children into 'children who can and children who can't'. Mastery offers the same curriculum to all building self-confidence. It can sometimes be explained by referring to the book 'We're Going on a Bear Hunt' – In the story of the bear hunt...

All children set off on the same maths journey, moving in the same direction. Some children may take a slightly different path. They may need more time to grasp a concept. They may need physical concrete materials such as cubes to support them. But the majority of children should all come back together on the same path for the next part of the journey.

At any one point in a child's journey through school, they have achieved 'mastery' if they have a solid enough understanding of the maths that has been taught so that they can move on to more advanced material. Maths isn't a subject that anyone can 'master' in its entirety – we are all always learning!

Maths Mastery At a Glance

Building a solid tower of understanding



However all moving along the same path in maths doesn't mean that children aren't provided with a challenge. Obviously some children grasp new concepts quicker than others. These children will be pushed further to see problems in different ways and will be extended. We are aiming to build a solid tower of understanding rather than pushing a child on to quickly and the tower to become wobbly.

Maths Mastery At a Glance

Use the number cards below to make two number patterns.
You can use each card only once.



Pattern 1: , , , 13

Pattern 2: 9, , ,

So, here is an example of maths mastery for a Year 1 child who has quickly grasped the concept of number patterns. They can quite easily spot and make a pattern such as 2, 4, 6, 8 but can they move these numbers around to make two different patterns using each number once?

Maths Mastery At a Glance

Use the number cards below to make two number patterns.
You can use each card only once.

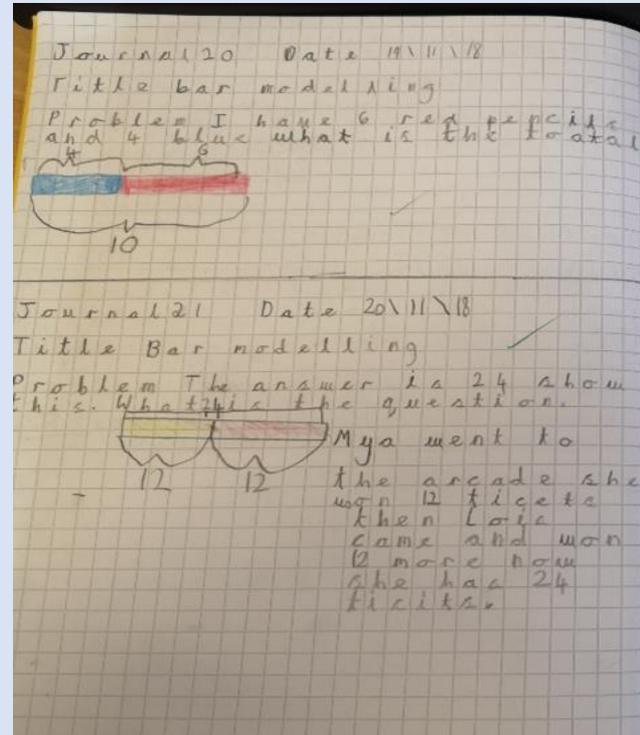
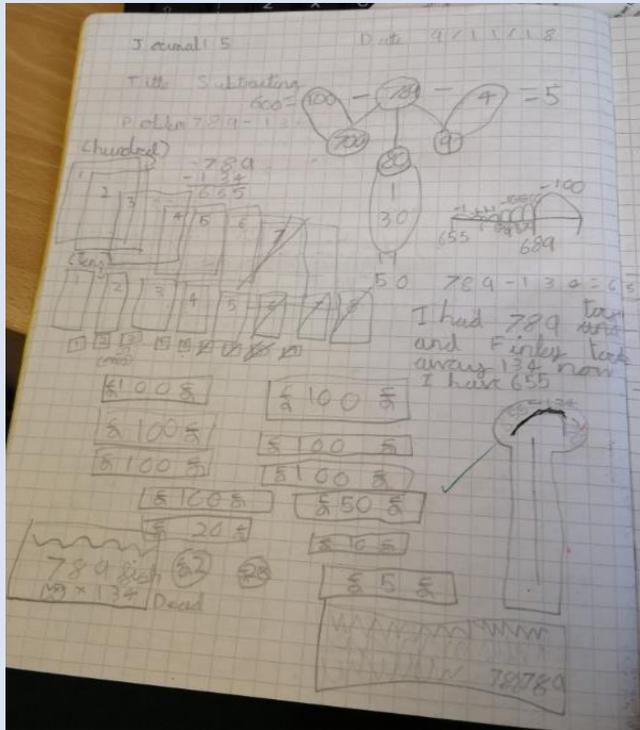


Pattern 1: **16**, **15**, **14**, 13

Pattern 2: 9, **10**, **11**, **12**

They might fill in 10, 11, 12, 13, 14 for the first pattern. But then they can't use 10, 11 and 12 for the next pattern! Being able to persist with problems such as this within a topic rather than pushing a child onwards to the next topic is what provides children with outstanding reasoning and problem-solving skills later on.

Maths Mastery At a Glance



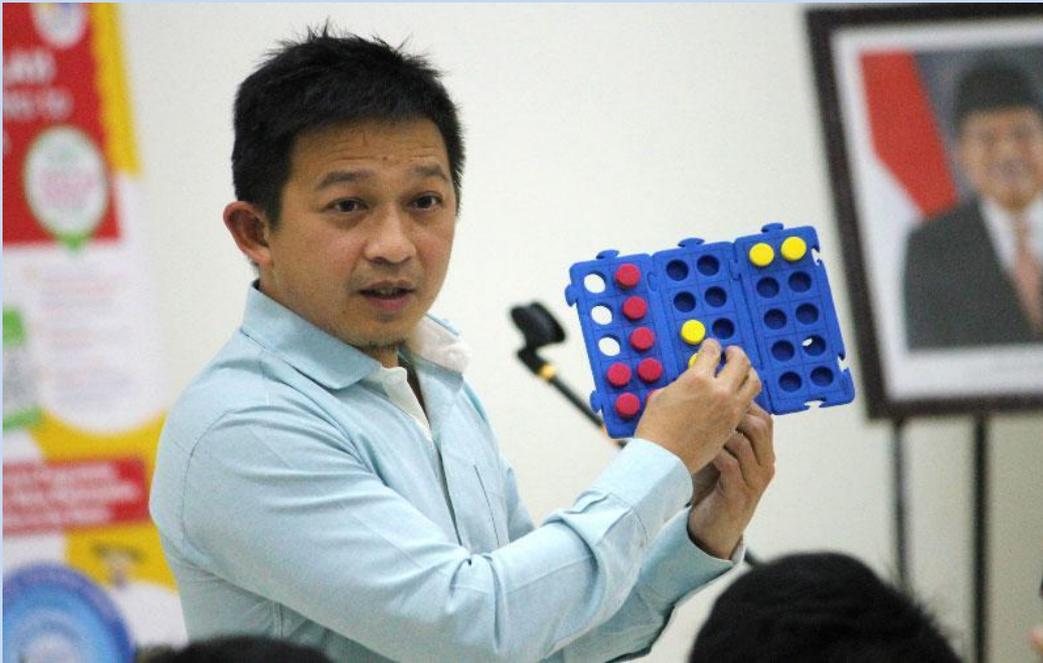
Mastery is not just about finding the answer but has a large focus on finding numerous methods to get there- therefore deepening their understanding of problem solving. Like you can see from one of the year 3s maths journals he's been pushed to find as many methods as possible to solve a problem and has also written his own explanations and reasoning's. Y6 children sit 2 reasoning SATS papers and being able to approach a question confidently will help them greatly.



UK adoption

The Department for Education and OFSTED have all emphasised the pedagogy and heuristics developed in Singapore. Today, maths textbooks based on the Singapore maths approach are being used in thousands of schools across the UK and have been widely adopted by the Department for Education's Maths Hubs.

Maths No Problem is based on Singapore Maths. It has been widely praised by The Department for Education and OFSTED and is being increasingly used in schools across the UK. It has proven to be a highly effective scheme and countries that have adopted this approach outperformed many western countries.



Dr Yeap Ban Har is one of the world's leading experts in professional development for teachers of Singapore Maths. He is the consultant and author of the Maths No Problem scheme.

Miss Hutton, Miss Mitchell and Mr Hollis were lucky enough to attend a 3 day training course with Dr Ban Har. He is one of the world's leading experts in teaching Singapore Maths and is also the author of the Maths No Problem mastery scheme. It was an inspiring 3 days and has since enabled us to fully immerse Ashton Vale into achieving the vision of maths mastery in our school.

Features of an Ashton Vale Maths Lesson

- Vast majority of children work together on the same objective
- Time given to children to explore their ideas
- Children and staff always talk in full sentences with correct vocabulary
- ‘Marvellous mistakes’ are happily shared and unpicked
- We use government recommended textbooks ‘Maths No Problem’
- Each lesson has mastery elements that provides each child with sufficient challenge
- Lastly, it is a fun, interactive and resourceful approach



Each child has their own textbook and workbook. The textbook contains the lessons and the workbook is what the children fill in at the end of their lesson.

In Focus



How many bags of chocolate can Emma get?

The focus task gives children the opportunity to talk about a problem and think about how they would solve it. Every lesson starts with a problem. In the textbook this is called a 'Focus Task'. Children are given time to talk about or investigate how they would solve the problem. This part is very often practical too with resources given to the children. Encourages mathematical language and methods used.

Let's Learn

There are 20 chocolates.

÷ means to divide.
 $20 \div 2$ is equal to 10.



Put 2 chocolates
in each bag.



Emma gets 10 bags of chocolate.

$20 \div 2 = 10$ is a division equation.

$20 \div 2 = 10$ is read as twenty divided by two equals ten.

The children share with the teacher what they think and together they come up with different methods. This is also a teaching opportunity where the teacher will guide them in perhaps a new method.

The next stage usually involves the children sharing with the teacher their different methods. This is also the main teaching part of the lesson where the teacher will guide the children perhaps with a new method or strategy. This is usually very practical and may involve several different examples. This is called the 'Let's Learn'. The teacher may refer the children to their textbooks to show them, do it practically or show them on the Interactive White Board.

Activity Time

Play in groups of 3 or 4.

- ① Put 20  into equal groups.
 - (a) Make groups of 2.
 - (b) Make groups of 5.
 - (c) Make groups of 10.
- ② Write the division equation.

What you need:



Is it possible to split 20  into groups of 4?

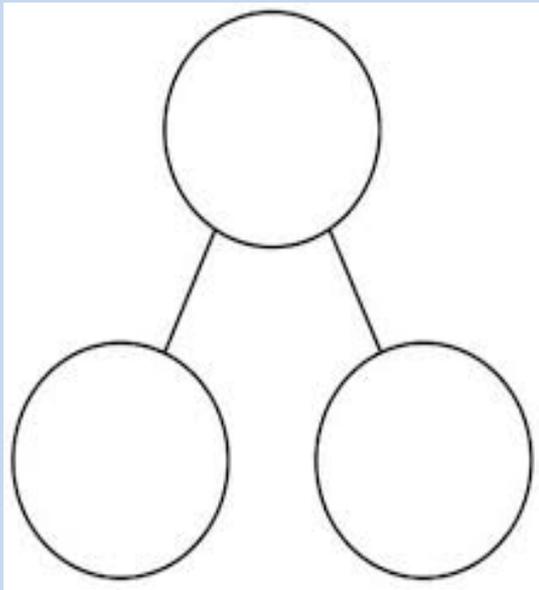


$$20 \div 2 = \square$$

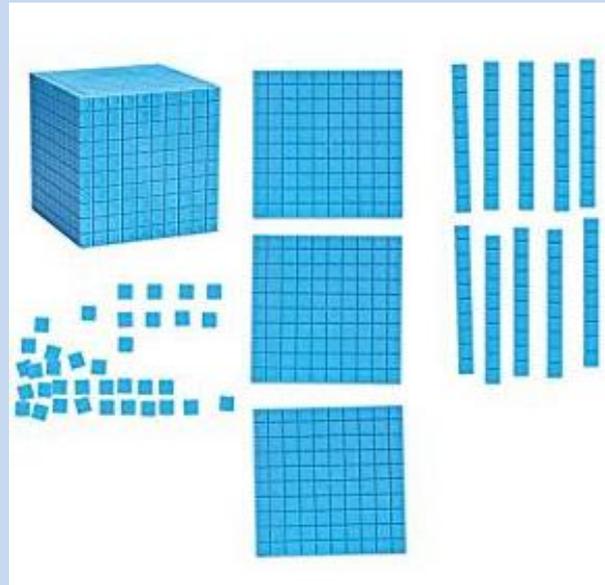
Can you write the division equation?



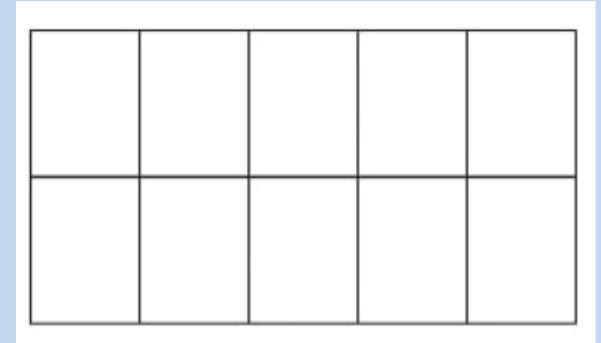
In Key Stage 1 and occasionally in Key Stage 2 an 'Activity time' will follow. The children may either apply what they have learnt through an activity like the example above (some of which you might see later in the classrooms)



Part-part whole model



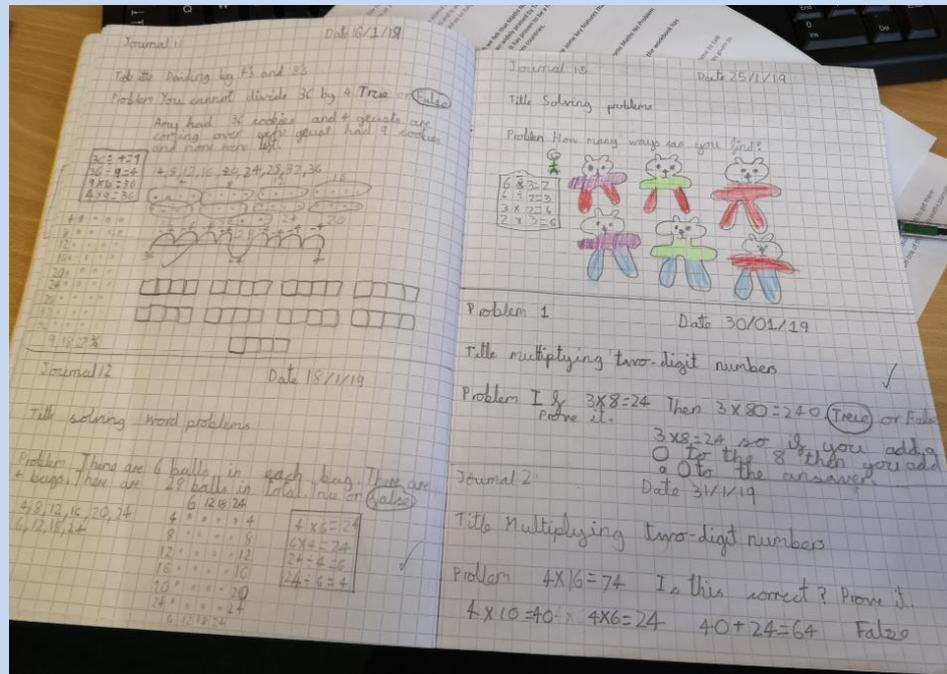
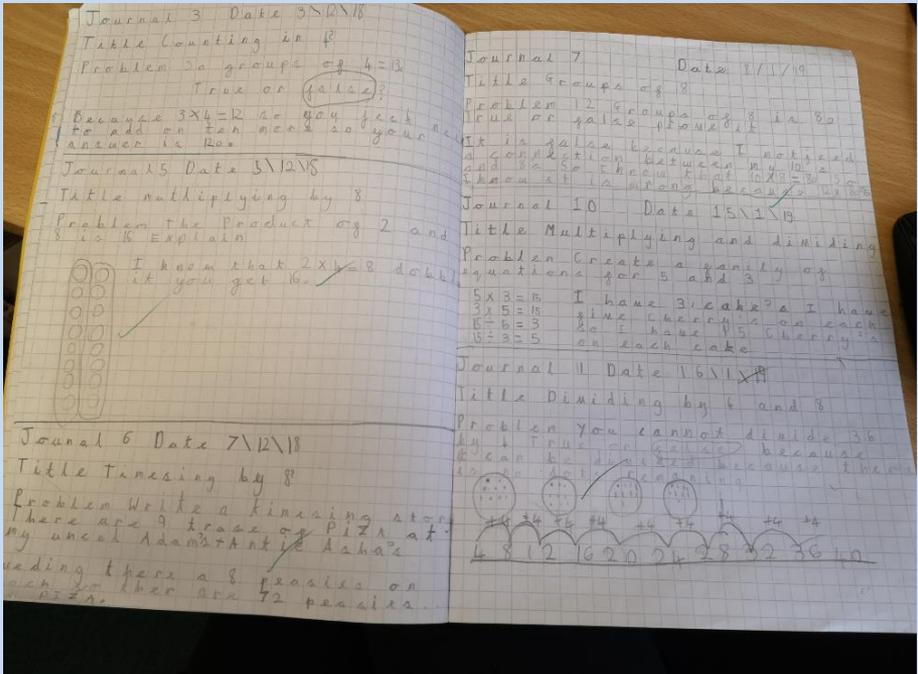
Dienes



Tens
frame

Maths No Problem gives children opportunities to explore different resources— it follows the belief that you should first work with physical objects to secure understanding before moving onto more abstract problems. These resources are carefully chosen to help children understand the **structure** of the maths. They are not just for the struggling children or the younger children.

The resources above are some of the models used.



Having the opportunity to journal is important for children to explore what they have learnt and deepen understanding. In ks2 and occasionally in ks1. All children have a book with squared paper in which is their maths journal. In here, children have the freedom to tackle problems, use models and images, make mistakes to develop and deepen their mathematical understanding about a concept.

(b) 

$8 \div 4 = 2$

There are 2 goldfish in each group.

3 Write the missing number.

(a) $\boxed{2} \times 4 = 8$ 
 $8 \div 4 = \boxed{2}$

(b) $\boxed{5} \times 4 = 20$ 
 $20 \div 4 = \boxed{5}$

(c) $4 \times \boxed{6} = 24$ 
 $24 \div 4 = \boxed{6}$

TO SOLVE THIS WE DO THIS

(d) $\boxed{8} \times 4 = 32$ 
 $32 \div 4 = \boxed{8}$

Multiplication and Division Page 98

Name: _____ Class: _____ Date: _____

Worksheet 10

Adding with Renaming

1 Fill in the blanks.

(a) Add 135 and 186.

$$\begin{array}{r} 135 \\ + 186 \\ \hline 321 \end{array}$$

$\boxed{135} + \boxed{186} = \boxed{321}$

(b) Add 248 and 367.

$$\begin{array}{r} 248 \\ + 367 \\ \hline 615 \end{array}$$

$\boxed{248} + \boxed{367} = \boxed{615}$

(c) Add 432 and 279.

$$\begin{array}{r} 432 \\ + 279 \\ \hline 711 \end{array}$$

$\boxed{432} + \boxed{279} = \boxed{711}$

Addition and Subtraction within 1000 Page 45

Finally children fill out their workbook pages. At the end of the lesson the children will spend between 10-20 minutes completing their workbooks. These sum up the work the children have done that day and indicates their overall understanding. Those who have a strong understanding will be extended by their class teacher to show greater depth not acceleration.

How can you help at home?

- Talk positively about maths
- Reinforce the message that everyone can achieve and that struggle is essential
- Watch Maths No Problem videos (on the Ashton Vale website)
- Ask children to explain their thinking- homework
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- Practice relevant number facts e.g. times tables, number bonds
- Talk to your child's teacher if you have any concerns



Thank you for coming today!

You now have the opportunity to go and see maths in action in the classroom.

If you have any questions please come speak to either one of us after.