

Maths workshop

Year 3 and 4

Math is how
we describe our world
when words are not enough.
Everyone deserves
to speak math
and to play math,
to enjoy its beauty
and its power.

—GEOFF WHITE



Maths Ambassadors



- Zach G (6C) and Jasmine W (4J)
- Pupil Subject Ambassadors – Nominated through school council with SLT and subject leaders.
- Monthly meetings where ideas are discussed. They meet with visitors, lead assemblies etc.

Aims for the year



- Content and sequencing of the curriculum- WRM and CPA approach
- Promotion of a range of quality interactions with pupils. Encourage peer-peer talk and use of vocabulary- reasoning.
- Develop children's fluency and mental arithmetic abilities
- Challenge
- Problem solving tasks are taught explicitly and in context
- Changing attitudes in maths and reducing maths
- Create an environment and ethos where children gain enjoyment through growing self- confidence in their ability.
- Consolidation

White Rose Maths



- LTP- clearly tells you the amount of time that should be spent on each topic, all objectives, resources.
- Planning- subject knowledge and curriculum map to help guide your lessons/planning.
- Progression Map on our website

National Curriculum	KS2			
	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Number: Place Value	<ul style="list-style-type: none"> Identify, represent and estimate numbers using different representations. Find 10 or 100 more or less than a given number Recognise the place value of each digit in a three-digit number (hundreds, tens, ones). Compare and order numbers up to 1000 Read and write numbers up to 1000 in numerals and in words. Solve number problems and 	<ul style="list-style-type: none"> Count in multiples of 6, 7, 9, 25 and 1000. Find 1000 more or less than a given number. Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones) Order and compare numbers beyond 1000 Identify, represent and estimate numbers using different representations. Round any number to the nearest 10, 100 	<ul style="list-style-type: none"> Read, write, order and compare numbers to at least 1000000 and determine the value of each digit. Count forwards or backwards in steps of powers of 10 for any given number up to 1000000. Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero. Round any number up to 1000000 to the 	<ul style="list-style-type: none"> Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit. Round any whole number to a required degree of accuracy. Use negative numbers in context, and calculate intervals across zero. Solve number and practical problems that involve all of the above.

WRM

Progression Map- Year 3

	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	Number: Place Value			Number: Addition and Subtraction					Number: Multiplication and Division			
Spring	Number: Multiplication and Division			Measurement: Money	Statistics		Measurement: Length and Perimeter			Number: Fractions		Consolidation
Summer	Number: Fractions			Measurement: Time			Geometry: Properties of Shape		Measurement: Mass and Capacity			Consolidation

WRM

Progression Map- Year 4



	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	Number: Place Value				Number: Addition and Subtraction			Measurement: Length and Perimeter		Number: Multiplication and Division		
Spring	Number: Multiplication and Division			Measurement: Area	Number: Fractions				Number: Decimals		Consolidation	
Summer	Number: Decimals		Measurement: Money		Measurement: Time		Statistics	Geometry: Properties of Shape		Geometry: Position and Direction		Consolidation

Bruner's CPA approach

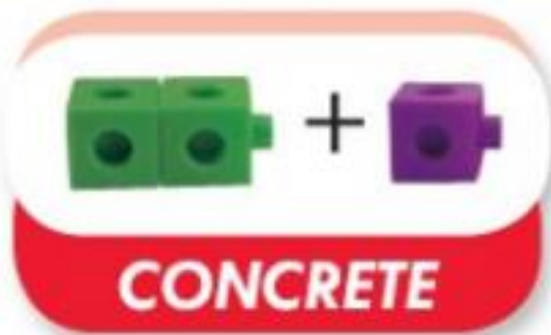


- Concrete: Children have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.
- Pictorial: Alongside this, children use pictorial representations. These representations can then be used to help reason and solve problems.
- Abstract: Both concrete and pictorial representations support children's understanding of abstract methods.

CPA

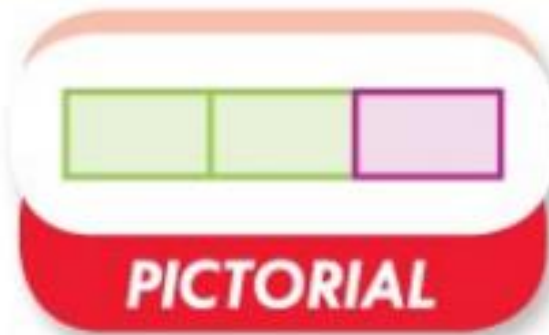


- CPA was developed by American psychologist Jerome Bruner. It is an essential technique within the Singapore method of teaching maths for mastery.



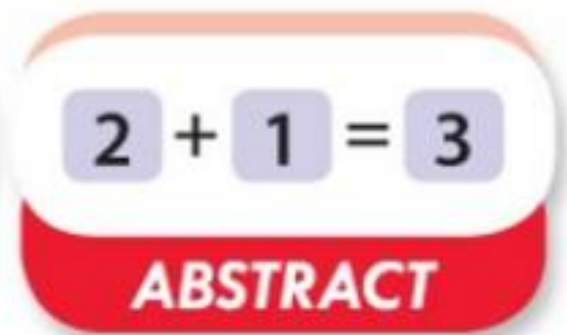
CONCRETE

Concrete is the 'doing' stage, using concrete objects to solve problems. It brings concepts to life by allowing children to handle physical objects themselves.



PICTORIAL

Pictorial is the 'seeing' stage, using representations of the objects involved in maths problems. This stage encourages children to make a mental connection between the physical object and abstract levels of understanding, by drawing or looking at pictures, circles, diagrams or models which represent the objects in the problem.



ABSTRACT

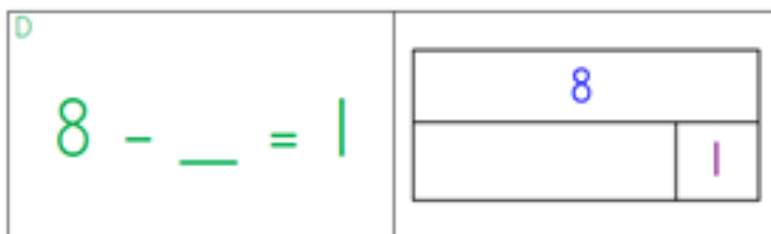
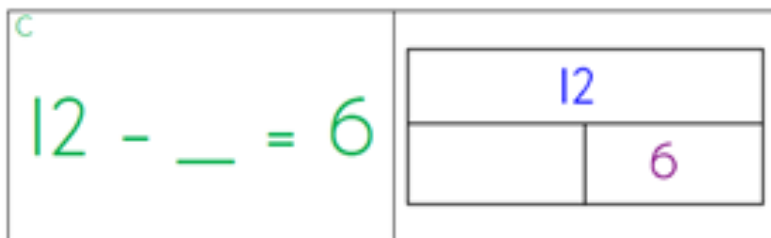
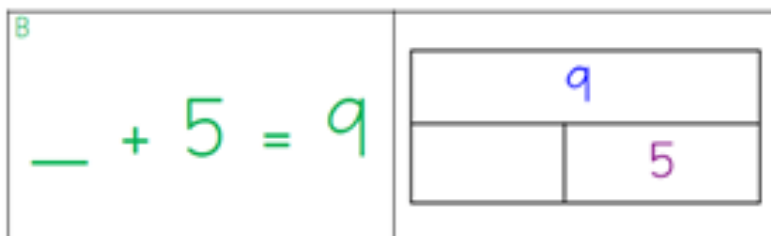
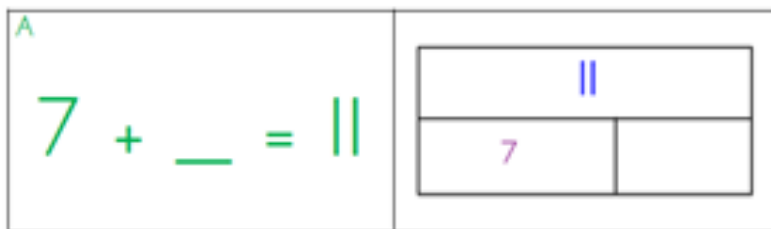
Abstract is the 'symbolic' stage, where children are able to use abstract symbols to model and solve maths problems.

Singapore Maths



- Singapore consistently top the international benchmarking studies for maths teaching.
- A highly effective approach to teaching maths based on research and evidence.
- Builds students' mathematical fluency without the need for rote learning.
- Introduces new concepts using Bruner's Concrete Pictorial Abstract (CPA) approach.
- Pupils learn to think mathematically as opposed to reciting formulas they don't understand.
- Teaches mental strategies to solve problems such as drawing a bar model.

The Bar Model



4

This table shows the heights of three mountains.

Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

How much higher is Mount Everest than the combined height of the other two mountains?

Show
your
method

5,895	1,344	?
8,848		
		1,609 m

7,239	?
8,848	

2 marks

National Curriculum

Lesson structure



The national curriculum for mathematics aims to ensure that all pupils:

- 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.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- 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.

Pythagoras, Newton, Euler, Lovelace

Classroom environment

Fluency, Reasoning and Problem Solving



Pattern and connection identification

Children are taught that learning occurs when actively involved in a process of meaning and knowledge construction as opposed to passively receiving information. Lessons should be based on collaboration, integration, reflection and promote inquiry-based learning. Lessons should provide opportunities to identify patterns or connections in their maths lesson. They can use this to predict and reason and to also develop their own patterns/links in maths and other subjects.

I See Reasoning... What skills do you use to solve this question?

I know... so...

$$\frac{1}{7} \text{ of } 168 = \square$$

$$\frac{2}{7} \text{ of } 168 = 48$$

$$\frac{2}{7} \text{ of } \square = 96$$

Fluency, Reasoning and Problem Solving



Questions that use procedural knowledge	Questions that use conceptual knowledge
Measure the perimeter of the room	Estimate the perimeter of the room. Justify your estimate.
If you sleep for 7.5 hours each day, what percentage of the day is spent sleeping?	Is it reasonable to state that many people sleep for 30% of the day? Why or why not?
Find the sum of one-third, one-quarter and one-fifth	Without adding, is the sum of one-quarter, one-third and one-fifth bigger or smaller than one? How do you know?
Match the object to its associated volume formula	Explain how to determine if you have matched an object to its correct volume formula.
Multiply 24 by 8	In your head, multiply 24 by 8. Explain your method. Try to find another method that works.
Find an equation to solve this problem	Find a problem that can be solved using this equation. How can you tell if you are right?


- Have high expectations of everyone
- Build on the knowledge learners already have
- Encourage reasoning rather than answer getting
- Use a rich mixture of practical apparatus, images and representations using the mastery model of concrete-pictorial-abstract
- Consider how much time pupils are given using concrete resources
- Use a variety of skilful questions and prompts tailored to understanding
- Milk the maths – everyone can be given the same ‘sum’ but this can be deepened in a variety of ways
- Focus on misconceptions
- Initiate maths talk, rich discussions and learning conversations

- Emphasise that there is 'always more than one way to bake a cake' and so it is with Maths
- Listen to what children are saying and teach them to actively listen
- Encourage children to explain their thinking without loss of pace
- Insist on the precise use of mathematical terms and maths vocabulary
- Create connections between topics
- Make teaching as interactive as possible
- Demonstrate or model mathematical ideas
- Use children's methods and working as teaching points
- Ensure that TAs are fully briefed and know how to help
- Share ideas and strategies
- Evaluate and correct children's responses
- Reflect on what has been learnt
- Use concept cartoons

Expectation for books



- High expectations of presentation in books
- We do not stick in worksheets
- Books are marked every day
- Opportunities to answer and be given next steps to consolidate or stretch and challenge.
- Steps for Success – based on skills and knowledge so children have the chance to self- assess.

 LO: To read and interpret two-way tables.			
Steps For Success		C	T
• Read two different two sets of data that are displayed horizontally and vertically.			
• Answer questions by interpreting the information in the tables.			
• Use addition and subtraction skills.			
Key Vocabulary		table, row, data, column	

Maths Mastery



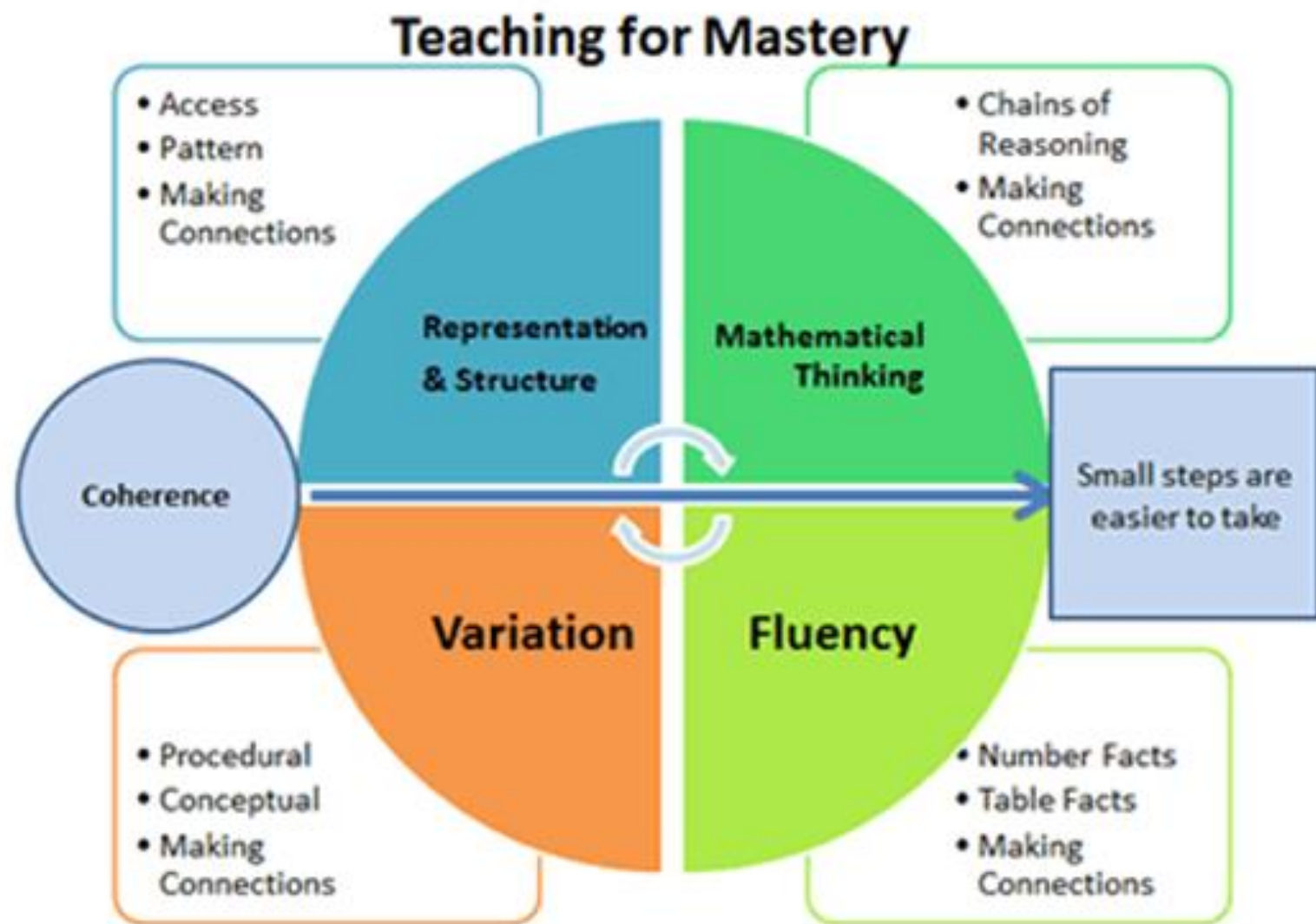
Maths mastery is a teaching and learning approach that aims for pupils to develop deep understanding of maths rather than being able to memorise key procedures or resort to rote learning.

Mastery of a mathematical concept means a child can use their knowledge of the concept to solve unfamiliar word problems, and undertake complex reasoning, using the appropriate mathematical vocabulary.

Mastery	Mastery with Greater Depth
<p>What can we say about 48 000?</p> <p>It is <input type="text"/> less than 50 000.</p> <p>It is made of 40 000 and <input type="text"/> together.</p> <p>It is made of <input type="text"/> thousands.</p> <p>It is made of <input type="text"/> hundreds.</p> <p>It is made of <input type="text"/> tens.</p>	<p>Using all of the digits from 0 to 9, write down a 10-digit number.</p> <p>What is the largest number you can write?</p> <p>What is the smallest number you can write?</p> <p>Write down the number that is one less than the largest number.</p> <p>Write down the number that is one more than the smallest number.</p> <p>Captain Conjecture says, 'Using the digits 0 to 9 we can write any number, no matter how large or small.'</p> <p>Do you agree?</p> <p>Explain your reasoning.</p>



FIVE BIG IDEAS IN TEACHING FOR MASTERY



Consolidation



- Maths Gym
- Next steps
- Interventions- HLTAs- target gaps in their learning
- Workbooks on our website
- Calculation Policy
- Homework- MyMaths and TTRS
- Log ins were given out in September
- Homework expectation
- One piece of MyMaths homework
- 20-30 minutes of TTRS per week- competitions

Assessments



- Assessments- end of term
- Arithmetic, Reasoning 1, Reasoning 2
- 2 lessons after tests- dedicated to filling in gaps.



Enrich lesson

- Problem solving are taught explicitly within each lesson.
- At least one enrich lesson each term.

I want to travel to Rio, Brazil in the summer for a holiday!

Can you help me book this trip?


Remember I only have £5,132.63 to spend!

Accommodation

- Hotel ~~Amazing~~ ***** = £867.78
(Plus Room Service for an extra £67.73)
- Hotel ~~Not Too Bad~~ *** = £673.61
(Plus Breakfast for an extra £25.29)
- Hotel ~~Not So Good~~ * = £329.12
(Plus clean towels for £11.23)

Return Flights

- (AM) British Airways flight (First class) = £2,141.23
- (PM) American Airlines (Business class) = £1,100.76
- (PM) TAM ~~Linhas Aéreas~~ (Economy class) = £989.45



Tickets




- Rio Carnival = £265.34
- Helicopter tour = £427.85
- Cycling Tour = £123.87
- Plataforma Samba Show = £372.11
- Corcovado Mountain Tour = £210.21
- Umbanda = 189.23


Hire a car

- Ferrari = £1,628.73 (Petrol included)
- BMW = £973.88 (Air-conditioned)
- Audi A1 = £921.25 (Top of the range music system)
- Fiat 500 = £597.86 (Not air-conditioned)

Gifts

- Rio Bag = £26.36 (20% off if you also buy the OG hat)
- Rio T-Shirt = £12.78 (Buy one get another half price)
- Rio Flip-Flops = £18.37 (20% off)
- Rio hat = £16.27 (Buy two get 36% off another one)



If you book with British Airways today, you could save £253.73!

Remember you can buy tickets for more than one event!

Don't forget to keep £121.21 for emergency funds!

Enrichment



- Explore Learning workshops – January
- Maths week/Enrichment week- Summer Term including workshops, outdoor learning, enrich activities, Art, History, Maths stories

Maths Club

Thursday at lunch from 12-12:30pm



Newsletter



Can you solve the Sudoku puzzle?

Which one will you choose to solve?

Easy- Chill 1

4	1	3	
		1	
1			4

Medium- Chill 2

6	3	2	4		
4		1	6	3	
	6	3	1		
1		5		6	
5			3		4
					6

Hard- Chill 3

3				6	5	7	2	9
	5				8			3
9		1	3					4
	7			1	3	4		
2	1	6		5	4	9	3	
			8		1	5	7	
6	5	2		9	8		1	
	4	7	8			2	9	5
		9		4	1	3	7	6

The solutions will be revealed in next week's newsletter.

Last week's solutions

Easy- Chill 1

4	1	3	2
2	3	1	4
1	4	2	3
3	2	4	1

Medium- Chill 2

2	5	1	6	4	3
6	3	4	2	1	5
5	4	6	1	3	2
1	2	3	5	6	4
4	6	5	3	2	1
3	1	2	4	5	6

Hard- Chill 3

2	3	5	8	1	9	4	6	7
7	4	6	5	2	3	9	1	8
1	9	8	4	7	6	5	3	2
8	6	7	3	9	5	2	4	1
3	2	4	6	8	1	7	9	5
9	5	1	7	4	2	6	8	3
4	8	9	1	5	7	3	2	6
5	1	3	2	6	4	8	7	9
6	7	2	9	3	8	1	5	4

How well did you do?