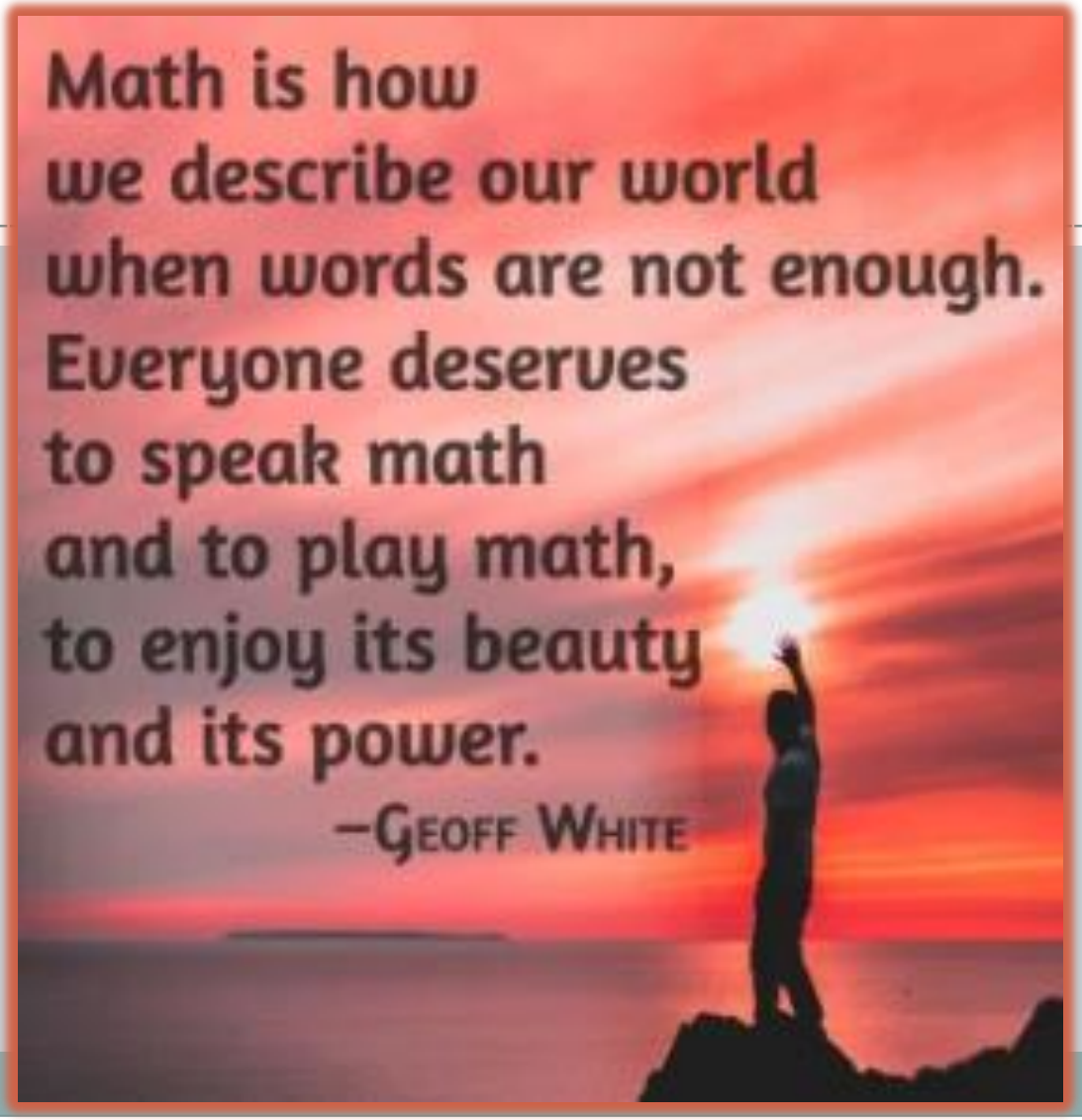
Maths workshop
Year 5 and 6



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
Intent, Implementation, Impact

- 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
- Consolidation
- Create an environment and ethos where children gain enjoyment through growing self- confidence in their ability.

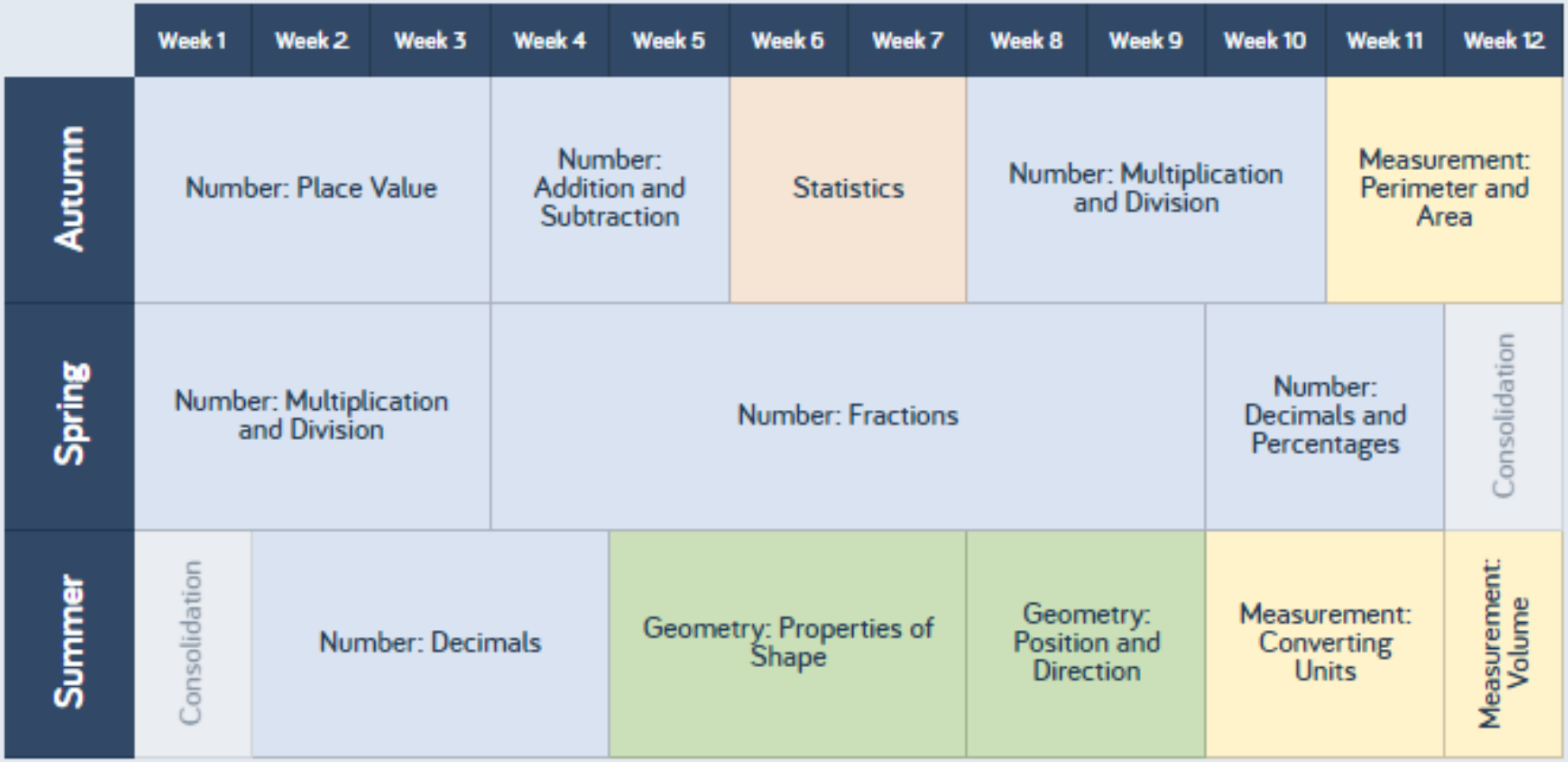
White Rose Maths

- 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

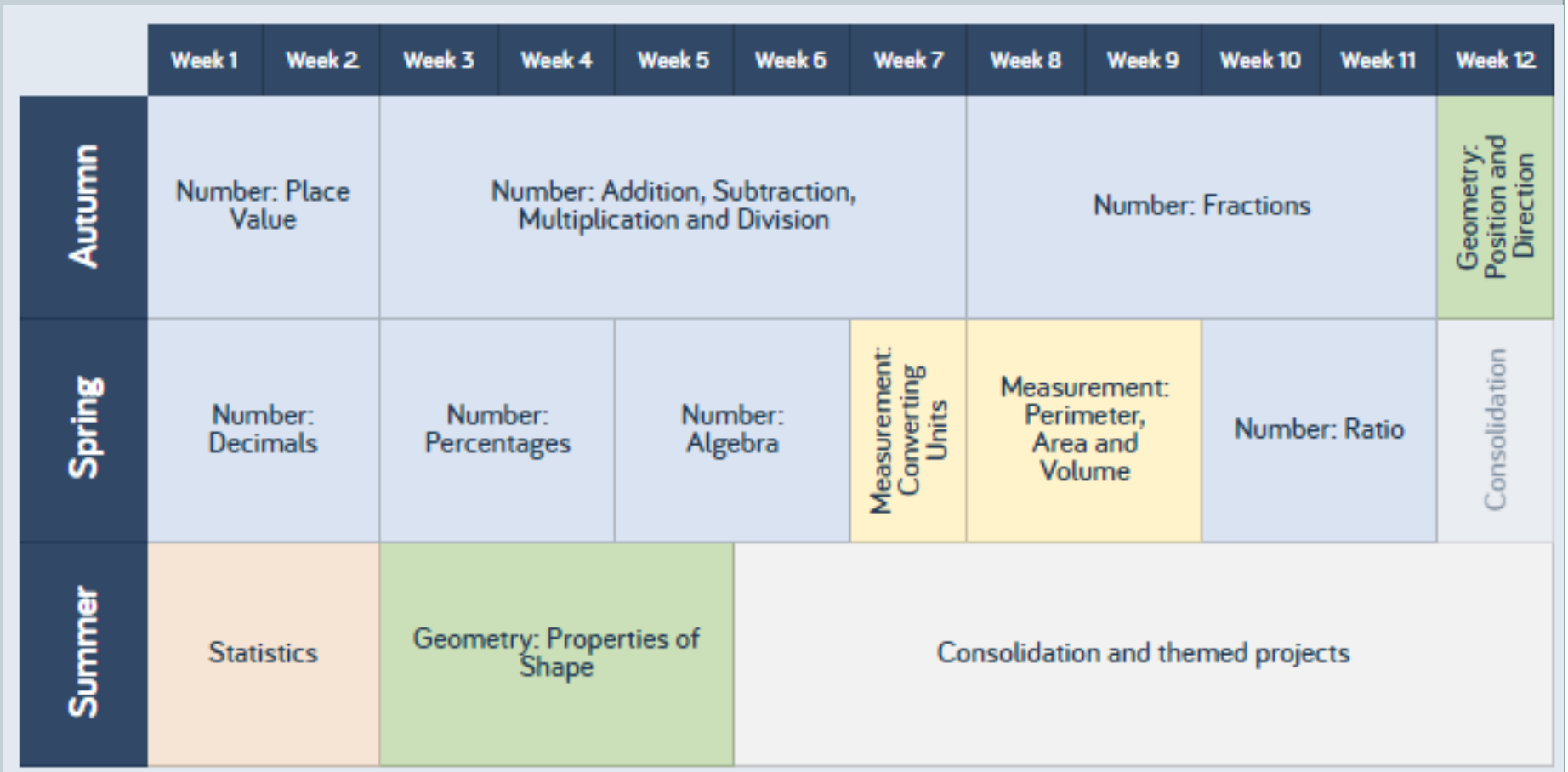
Progression of skills

National Curriculum	KS2			
	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Number: Place Value	• 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	• 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	• 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	• 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 5



WRM
Progression Map- Year 6

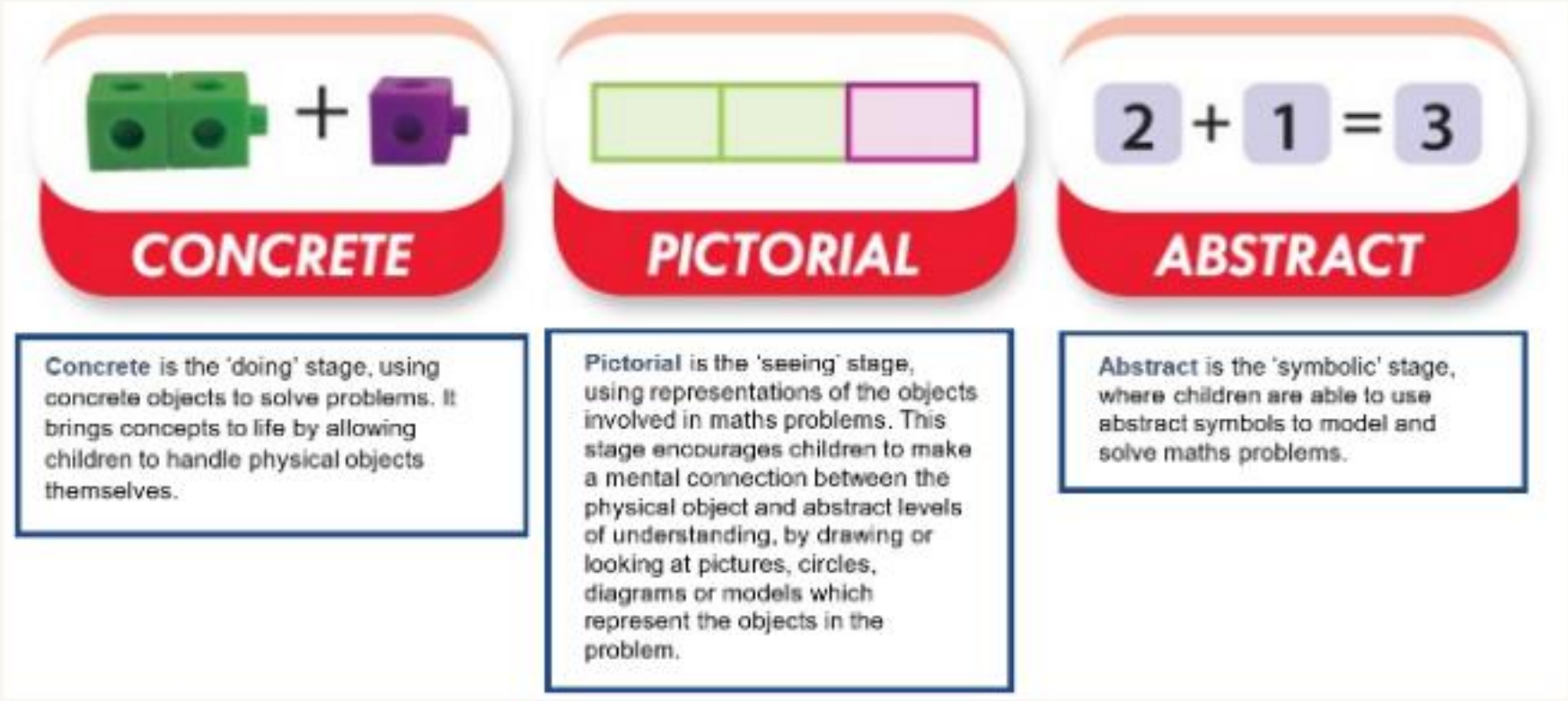


Bruner's CPA approach

- 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.



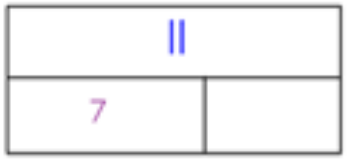
Singapore Maths

- 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

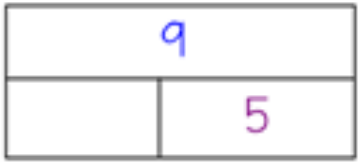
A

$7 + _ = 11$



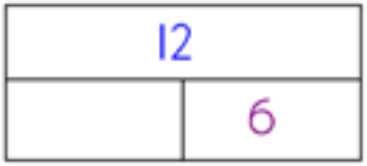
B

$_ + 5 = 9$



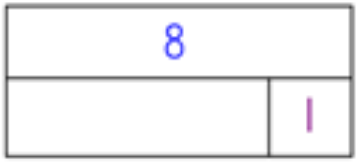
C

$12 - _ = 6$



D

$8 - _ = 1$

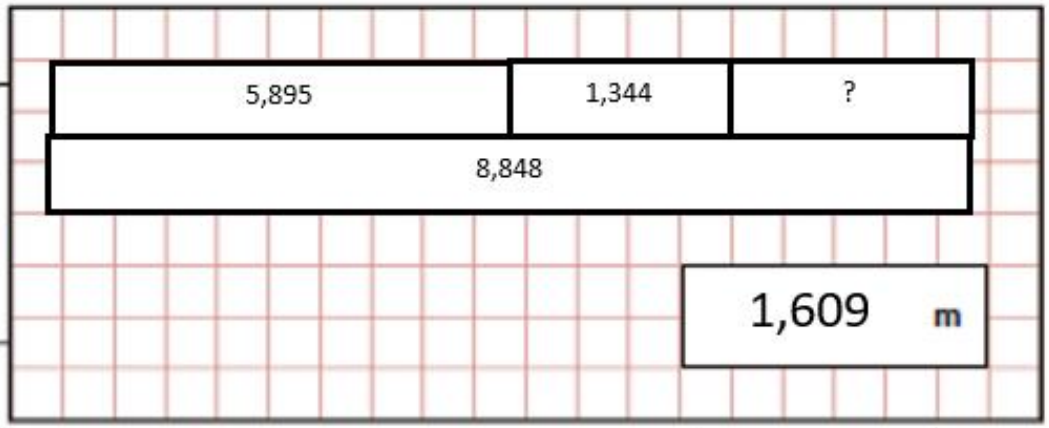


4 This table shows the heights of three mountains.

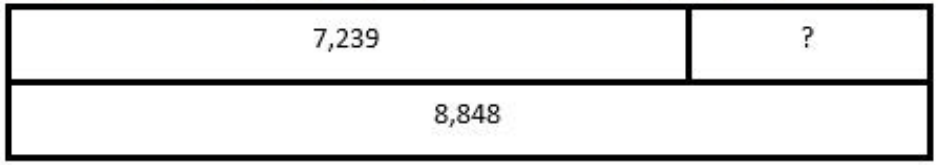
Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

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

Show your method



2 marks



National Curriculum
Lesson structure

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

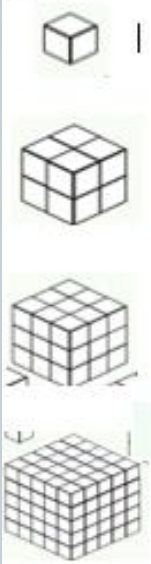
- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following 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 and groups/sets

Pythagoras, Newton, Euler

Pythagoras

1.



Count how many squares are in each cube. What is the relationship between each of the cubes?

2 Filip makes a cube using some smaller cubes.



a) How many cubes make up this cube?

b) How did you work out the number of cubes?

c) This number is an example of a cube number.
Why do you think it is a cube number?

3 a) Complete the table of cube numbers.

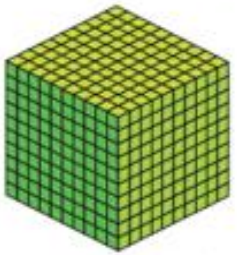
2^3	2 × 2 × 2	8
3^3	3 × 3 × 3	
4^3	4 × 4 × 4	

b) What would the next cube number in the table be?

Newton

4 Complete the statements.
Use the cubes to help you.





a) 5^3 = ☐
5 cubed = ☐
5 × 5 × 5 = ☐

b) 10^3 = ☐
10 cubed = ☐
10 × 10 × 10 = ☐

5 a) Which calculation is the same as 6^3?

6 × 3 6 + 6 + 6 6 × 6 × 6

b) Kim has worked out 6^3 using this method.

$6^3 = (6 \times 6) \times 6$
$= 36 \times 6$
$= 216$

	30	6
6	30 × 6 = 180	6 × 6 = 36

180 + 36 = 216

Is Kim's method correct?
How do you know?

c) Match the cube numbers to the calculations.
One has been done for you.

4^3	4 × 2
5^3	9 × 3
2^3	16 × 4
3^3	25 × 5

6 Calculate 7^3

Euler

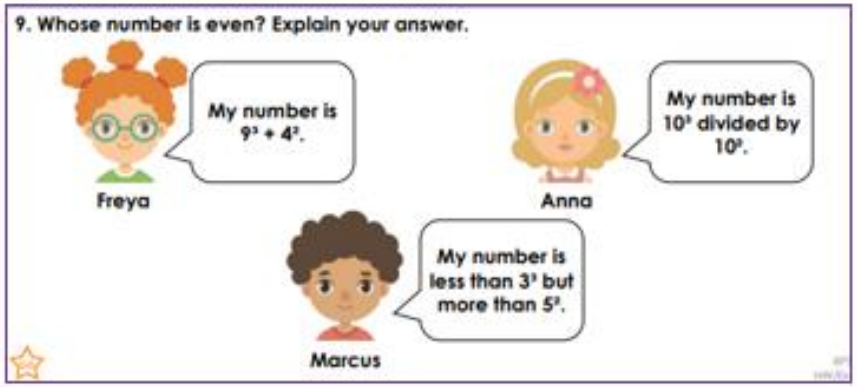
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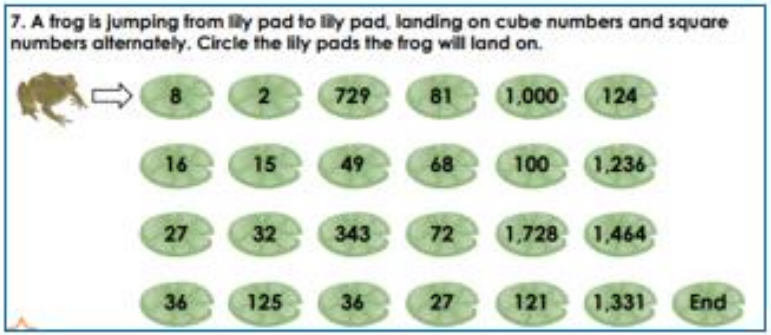


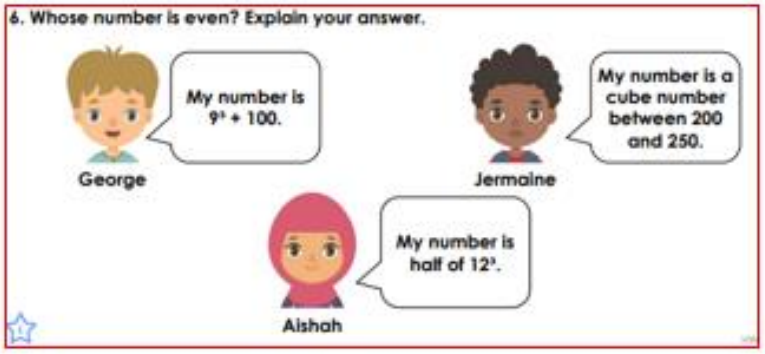
What mistake has Dora made?
Why might she have made this mistake?

8. Scott's age is a cube number.
His sister is 2 years younger than him.
Her age is a square number.
In 3 years, Scott's age will be a multiple of 10
How old is Scott?

Lovelace


9. Whose number is even? Explain your answer.
My number is $9^3 + 4^2$.
Freya
My number is 10^5 divided by 10^3.
Anna
My number is less than 3^3 but more than 5^2.
Marcus


7. A frog is jumping from lily pad to lily pad, landing on cube numbers and square numbers alternately. Circle the lily pads the frog will land on.
8
2
729
81
1,000
124
16
15
49
68
100
1,236
27
32
343
72
1,728
1,464
36
125
36
27
121
1,331
End


6. Whose number is even? Explain your answer.
My number is $9^3 + 100$.
George
My number is a cube number between 200 and 250.
Jermaine
My number is half of 12^3.
Aishah

Activity station



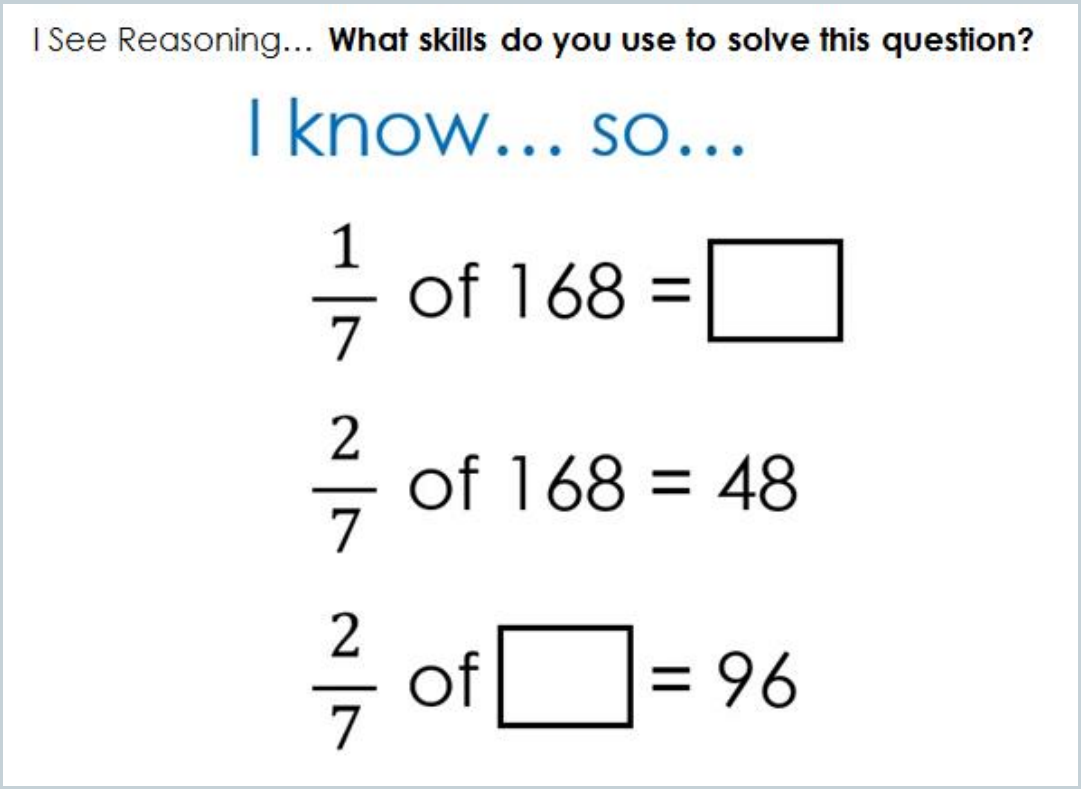
Marking Station



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.



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		

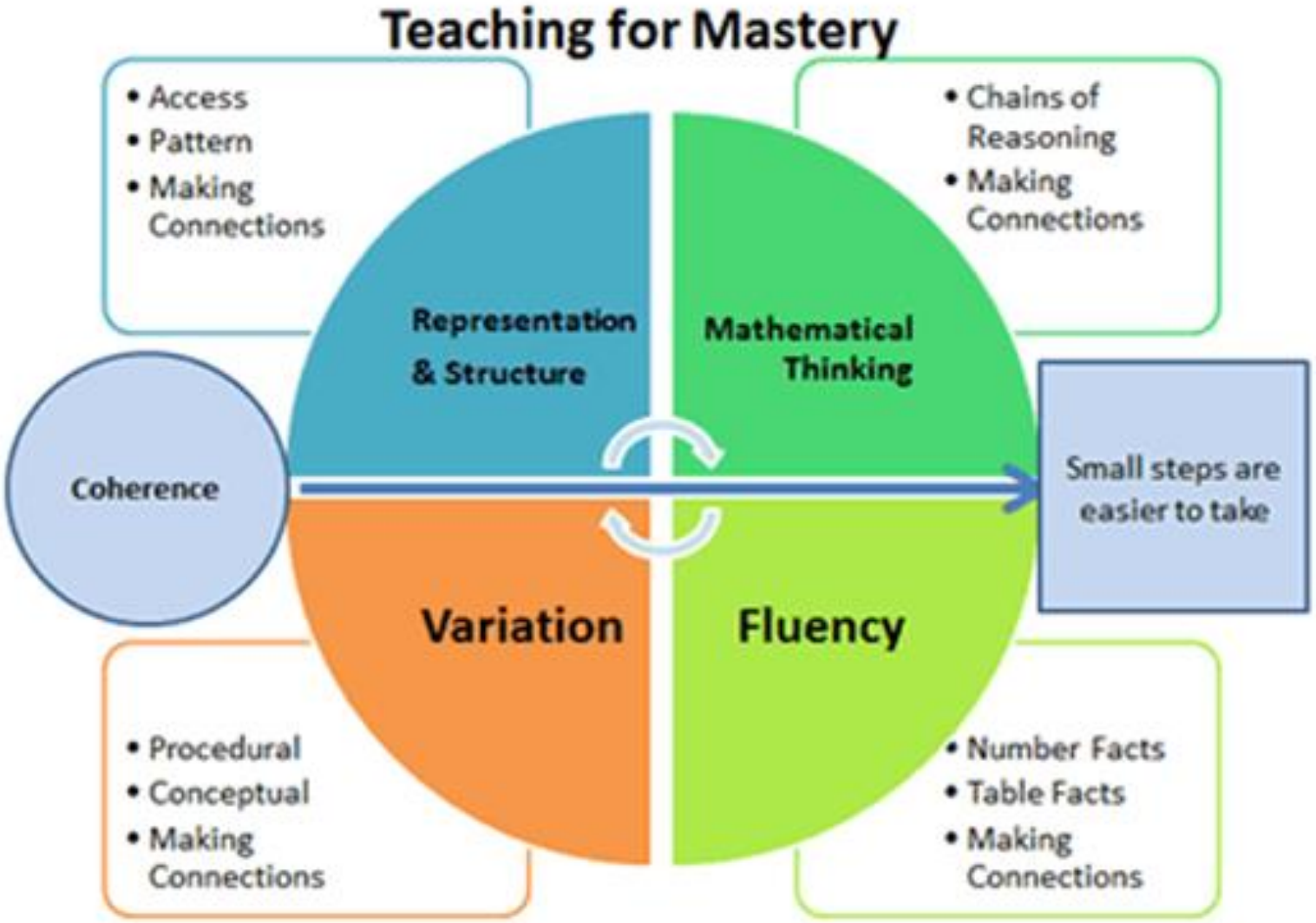
Maths Mastery

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

FIVE BIG IDEAS IN TEACHING FOR MASTERY



Consolidation



Next Step

The square of a number added to the cube of the same number will always be even.

- Maths Gym
- Next steps
- Interventions- HLTs- target gaps in their learning
- Workbooks on our website
- SATs prep throughout the year
- 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

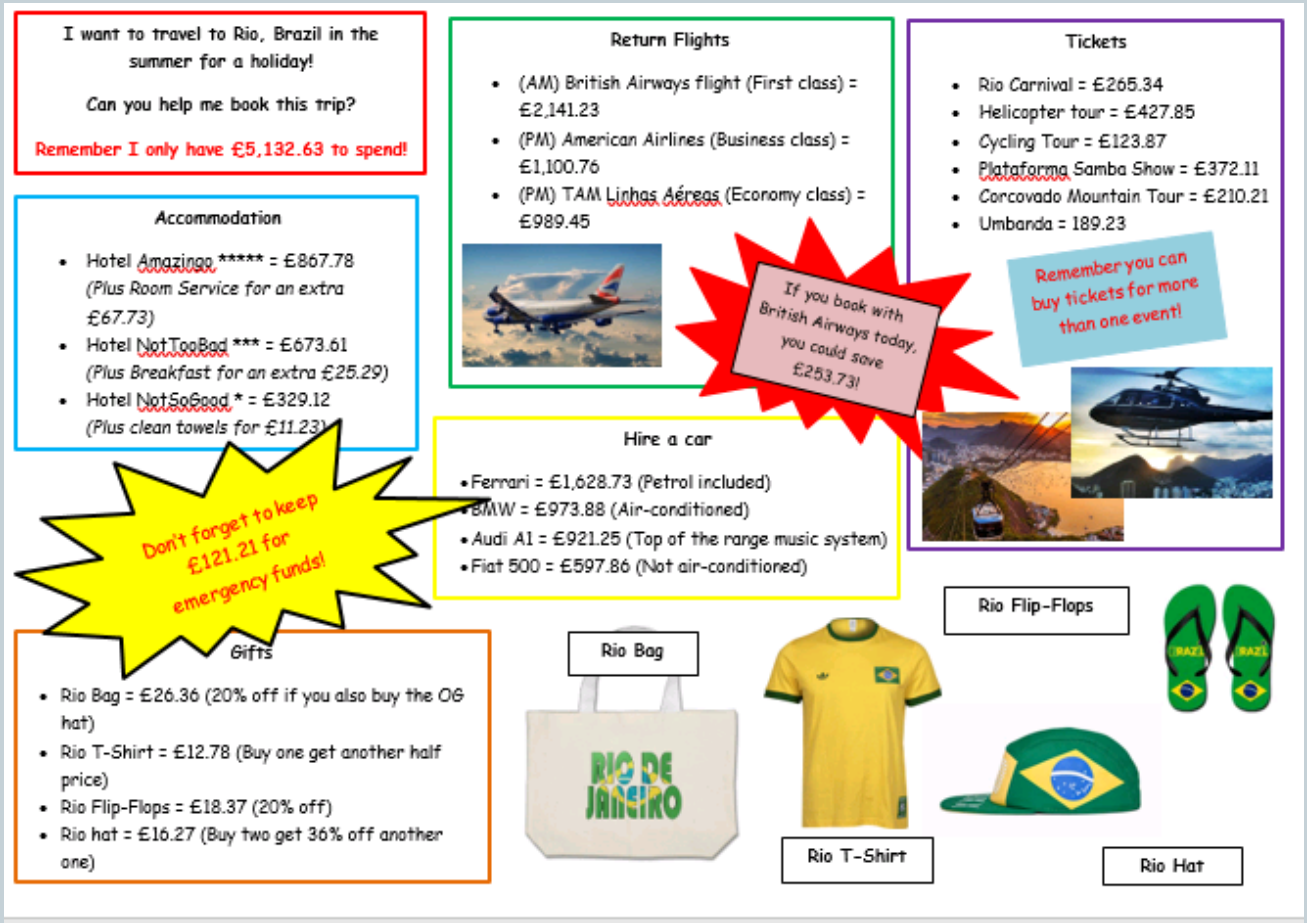
Assessments

- 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.



Enrichment

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

Maths Club
Thursday at lunch from 12-12:30pm





Newsletter

Can you solve the Sudoku puzzle?

Which one will you choose to solve?

Easy- Chilli 1

4	1	3	
		1	
1			4

Medium- Chilli 2

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

Hard- Chilli 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- Chilli 1

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

Medium- Chilli 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- Chilli 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?